

ENGLISH LANGUAGE AS MEDIATOR OF HUMAN-MACHINE COMMUNICATION

AUTHORED

BY

NATALIIA LAZEBNA

ASSOCIATE PROFESSOR,

ZAPORIZHZHIA POLYTECHNIC NATIONAL

UNIVERSITY, UKRAINE

ENGLISH LANGUAGE AS MEDIATOR OF HUMAN-MACHINE COMMUNICATION

By Nataliia Lazebna

Associate Professor,

Zaporizhzhia Polytechnic National University,

Ukraine

Email: natalialazebnaya@gmail.com

© Copyright, Authors All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form by any means, electronic, manual, photocopying, recording or otherwise, without the prior written consent of its Authors.

ISBN: 978-81-948672-1-0

DOI: 10.26524/royal.44



This Book is published by **PhDians** along with **AMBISHPERE: Academic and Medical Publishers** and **Royal book publishing www.royalbookpublishing.com** Email: <u>phdians@gmail.com</u> Mobile: +919845542016 <u>www.phdians.com</u>

Author's information



Nataliia Lazebna. Ph.D., Associate Professor at Theory and Practice of Translation Dpt., National University Zaporizhzhia Polytechnic, Ukraine. Author of more than 60 academic journal articles, students' guidelines, and monographs, lecturer 2 and reviewer. Alumni and facilitator of AE E-Teacher Programs and **OPEN** Courses. The monograph English Language as Mediator of Human-Machine Communication continues the study of the English-language digital discourse. Starting from metaphoric computer terminology, this social and cultural phenomenon has been unwrapping and crossed the limits of the human world

ACKNOWLEDGEMENT

English Language as Mediator of Human-Machine Communication continues my research of the English language digital discourse. Starting from metaphoric computer terminology in 2010, this social and cultural phenomenon has been unwrapping for me and resulted in my focus on this problem beyond the limits of the human world.

My thanks and pleasure to acknowledge my inspiration from Professor Rusudan Makhachashvilli, Head of Romance Languages and Typology Department, Borys Grinchenko Kyiv University, Ukraine, the academic advisor of my Ph.D. thesis, defended in 2014. Her groundbreaking ideas are everlasting.

I would like to express my appreciation to Professor Anatoliy Prykhodko, Head of Theory and Practice of Translation Department, Zaporizhzhia Polytechnic National University, Ukraine, the academic advisor, who inspired me to broaden my ideas and go global. His bright thoughts and precious time granted for me deserves special mention.

My great respect and admiration to Professor Yuri Zacnyi, Head of Theory, Practice and Translation of the English Language Department, Zaporizhzhia National University, Ukraine, who always believes in his students and nurtures them with his knowledge and wisdom.

This project has been highlighted by a sparkle of my children's laugh, my husband's guidance, and my parents' support.

Nataliia Lazebna

PREFACE

The present book highlights the information on Modern English-language. Modern Englishlanguage digital discourse is an ideal self-generating lts linguosemiotic dominants system. are extrapolated from the development and decoding commands from humans of to machines (computers), carrying out reciprocal interaction between the English language as an ideal system logical basis of mathematics. The and anthropocentric English-language basis transforms morphological, semantic, and syntactic its linguosemiotic connections into a certain symbiosis. Programming languages as the main natural language processing tool (NLP) are based on the English-language instruments (verbal basis) and semiotic ground and represent a certain linguomathematical continuum. In other words, the English language creates the basis of an artificial language (programming language) for

introspection (Natural language processing) to mediate human-machine interaction.

There is a rebirth or coding of verbal commands in a language understandable to the machine. Thus, the unity of verbal units and symbols in modern English-language digital discourse testifies both to the orderliness and the variability of its constituents. The functionality of linguosemiotic elements produces networks of relationships, which can emerge in the context of programming languages or natural language (English language), or reborn from a word or symbol into a holistic unity, which in turn is extrapolated within the English-language digital discourse.

REVIEWERS'

The Book is reviewed and edited by Dinesh Kumar, Department of Arts (English), Dyal Singh PG, India. The academic content was reviewed by Dr. RS Chouhan, Jožef Stefan Institute, Ljublijana, Slovenia.

CONTENT CHAPTER-I

NON-HUMAN LANGUAGES

Socio-cultural Characteristics of Synthetic						
Languages						
Uncanny, Hyperreal, Supernormal Virtual						
Relationships and Communication:						
Humans and Non-humans						
Scratch Language of Programming: Which						
Came First-Math or Lang Basis						
Basic Concepts of Language Python						
CHAPTER-2						
HUMAN LANGUAGE PROCESSING:						
HUMAN LANGUAGE PROCESSING: FROM MORPHOLOGY TO SYNTAX						
	113					
FROM MORPHOLOGY TO SYNTAX	113					
FROM MORPHOLOGY TO SYNTAX Philosophy and Logic of the English						
FROM MORPHOLOGY TO SYNTAX Philosophy and Logic of the English Language						
FROM MORPHOLOGY TO SYNTAX Philosophy and Logic of the English Language Space and Time as Conceptual Domains in	155					
FROM MORPHOLOGY TO SYNTAX Philosophy and Logic of the English Language Space and Time as Conceptual Domains in English-language Scientific Discourse	155					
FROM MORPHOLOGY TO SYNTAX Philosophy and Logic of the English Language Space and Time as Conceptual Domains in English-language Scientific Discourse The modern English Technical Discourse	155					

Its Effect on the Correct Use of Words
Morphological Awareness 243
The Assessment of Human Competences 264
in Noun Phrase Constructions Based on
the Syntactic Functions
Human Perception of Pragmatics (on the 321
Example of Refusals)
CHAPTER-3

HUMAN AND NON-HUMAN

LANGUAGES INTERACTION

Formal	Relation	of	Info	rmation-	333	
Linguistic and Artificial Intelligence						
Intertextuality of Natural Language					351	
Processing by Means of Artificial						
Intelligence	е					
Semantic Ambiguity of Urban Terminology						
(Ukrainian	-English T	ran	slation	Google		
Translate Vs Human Translation)						
Semantic	Ambiguity	of	English-	language	375	
Chatbots						

Computers and Language Cognition: NLP 412 Perspective

Linguistic Processing of Natural Language 414

CHAPTER 4

THE ENGLISH-LANGUAGE

CHATBOTS VS HUMANS: THE LINGUSTIC PERSPECTIVE

Chatbots as Anchors between Humans 425 and Machines Natural Language Processing of Textual 432 Information Creating a Human-Like Chatbot In Terms 439 of Linguistics Turing's Test and Artificial Intelligence 442 Chatbots Performance and Improvement 450 Pragmatics of Chatbots 494

ENGLISH LANGUAGE AS MEDIATOR OF HUMAN-MACHINE COMMUNICATION

by Nataliia Lazebna

1

CHAPTER-I

NON-HUMAN LANGUAGES

I.I Socio-cultural Characteristics of Synthetic Languages

Language takes a special place in culture as it serves as a general medium and powerful transmitter of cultural and social values. It can also be a regulator and coordinator of social interactions (that is, relationships in social and national communities and between them). Language is the whole world which can hold both lexically and semantically cultural versatility.

Language being not only a kind of gnoseological abstraction but certain socio-cultural phenomenon is one of the general influential subjects of the modern social processes. It contains all the cultural wealth along with its peculiarities. Besides, every culture is significantly related to its character,

development regularities, internal structure aspects, and other features of certain language. Against the background and under the globalization influence, the study of the language transformation process considers language not only as a communication method but as culture generator. The era of informatisation and computerization interrelating with all areas of social being leads logically to identify social intellectual potential with information which actually results in cultural and social life, thinking and language radical changes. From a philosophical point of view. informatisation stops being trivial engineering and technical process and is getting a special deep humanistic sense changing common cultural landscape. Thus, artificial semiotic systems become storage mediums that have been reflecting attributive characteristics of society.

The relevance of the study is determined by the fast changes in society referring to science, information, and communication technologies which cannot influence language changes as cultural phenomenon for the last decades. The development of the computers and modern information technologies brings forth to the emergence of new synthetic language types which extend information and socio-cultural spaces interfering in all kinds of social activities. According to that, it is necessary to study socio-cultural synthetic languages characteristics, which change during the informatisation of all cultural areas.

In their studies, a lot of researchers consider problems of language phenomenon during the informatisation. Therefore, studying information society in axiological dimension, it is relevant to study the language cultural aspect to clearly

4

understand social relationships during the information era. Another researcher points out the programming language transformation nature as the result of computer revolution. Thus, the universal languages of knowledge presentation created under frame-based paradigm, the role of synthetic languages in the process of artificial intelligence invention, or the interrelation problems of human and synthetic languages by applying a linguistic approach to software are considered.

The study of synthetic languages characteristics should be started by determination of modern artificial objects' nature and their systems. There is an opportunity to comprehend the newest tendencies in human historical development since such terms as "natural object" and "artificial object" were implemented to the domain of scientist and philosopher theoretic cognitive self-reflection. It can

5

be caused by the growing role of artificial objects, transformations of natural objects into artificial ones and vice versa; by new state of a human who gradually becomes a synthesis of natural and artificial. By analyzing the artificial objects' transformation, in particular, synthetic languages, under the conditions of informatization, it can be said that they obtain new qualitative features through the scientific and technological development.

Besides, one of such characteristics is an integral complexity. There has also been "gradual ability of artificial systems to self-organization, selfdevelopment, mastering of certain "freedom" degrees, and thus, the uncertainty of their "behavior", non-linearity of movement which brings together the basic characteristics of complex natural and artificial objects. There is also an increasing artificial object autonomy at the expenses of its own resources which provides the basis for creative selflearning and self-reproduction". The reasons for such changes are obviously the emergence of a dialogue between natural and artificial as one of the main features of the information society.

Both human and machine plays a significant role in such a dialogue. Human interaction with such an artificial object as computer is becoming more and more common. The most obvious result of "human-computer" dialogue is the influence on human abstract and logical thinking. It can be seen in the formalization of thinking nature, in increasing its algorithmic nature. Its formal and logical component is rapidly developing, limiting not only dialectical but also imaginative thinking, ultimately forming a "machine picture of the world." Under the requirements to communicate with computer people began to use the clearest terms. Human language as

a mode of thought expression, communication, and information exchange becomes a system distinctly structured by algorithms which were set by a computer. It proves one more time that there is huge mutual influence between human and synthetic languages. Since the scientific, technological, and biotechnological historical development is an objective basis for organic "in growth of artificial into natural" and its gradual synthesis, we think that it is a result of recently visible tendency to blur formal distinctions between human and synthetic languages on the practical side of its implementation in everyday life. According to the human role in this process, it's not an object but a subject of new linguistic reality.

Information technology revolution brings to informationalism as a basis of new society where different social aspects depend on technology capability of societies with information technology as the priority. Information technology is a necessary tool to effectively accomplish social economic restructuring process as a powerful culture genesis generator. This is what determines the emergence of computer technology languages and their nature is constantly complicated. Kastels interrelates it to the network logic which, as a consequence of the electronic network development, transforms all social and economic life areas.

Firstly, it seems that computer technology synthetic language complications prove its universality, improvement, and thus computer ability "to teach understand how to human language."However, according to leading scientists, this idea is incorrect as well. Some scientists have even tried to interrelate human (especially artistic) and synthetic languages with creative aspect, to make

9

a specific synthesis in the light of the modern ideas. IT-specialists have been trying to set up programs which can compose verses. They think that if computer is a human assistant it should do that. Nonetheless, there are some restrictions of such an approach during the longitudinal operation, for example, tautology and plagiarism.

There is a program called Poetry generation that was designed by R. West and operates by those principles. In this case, machine regenerates unedited verse text which then would be refined by people. Even though, the simplest translation from one language to another can't be done by computer. Human language can't also be formalized, and thus, it can't be available for the computer. No one, even the most powerful computer, is capable to reproduce human intuition, mental representation, creative inspiration, and unconscious constituents of

human thinking activities into the system of artificial language characters. It is related to the fact that programs are coded according to the algorithms of math's language which can use only metric values of human brain activity. There is no sense in formal characters manipulation while reproducing the same qualitative thinking skills of a person. Therefore, such experiments prove that information technology synthetic language can't be independent and universal one in modern society. It serves as a qualitatively new powerful means of accumulating, processing, storing and transmitting information as one of the highest information society values.

According to the correlation of artificial and human languages, it should be mentioned about a new phase in the process of their mutual influence. Artificial character systems as information hosts have an attribute characteristic of social culture. Its

history clearly shows that the balance between natural and artificial communication means is maintained, and the violation of this balance is usually fragmentary. Recently, the artificial linguistic environment has become increasingly dominant that is evident due to the high degree of character and symbolic space convention. By analyzing the artificial languages socio-cultural feature, the changes in science and its language should be taken into account. Since science is one of the socio-cultural phenomena, it has evident relations with culture. Science of the late 20th and early 21st century is increasingly influenced by a technical approach in the development and functioning of knowledge based on the artificial intelligence and powerful computer technology implementation. In such cases, the results of the study are represented through frames, fractals, and artificial computer languages.

The changes in science logically lead to changes in the nature of knowledge, in particular, the languages of their development and presentation. According to the fact that knowledge representation systems play a major role in solving the basic tasks associated with the intellectual systems creation, neither planning of their purposeful activity, nor performing of a communicative function between and humans, nor organizing collective them interaction between them are possible without advanced languages of knowledge processing and presentation. An important place in solving this problem belongs to one of the promising classes of language knowledge representation such as frame languages. The frame representation analysis shows their high ability to activate, which is, first of all, connected with the fact that the names of some standard procedures, programs of which are stored

either in the slot itself or in the software repository, can be represented as the frame slots values (their elements).Researchers, who develop and use knowledge representation frame languages, apply an approach that provides identifying not assertions as main knowledge elements, but concepts. the According to leading scientists, the frame knowledge representations pros consist in their costeffectiveness, and on the other hand - the convenience of frame language use to describe certain branches of knowledge. These frame knowledge representations give rise to a new cultural phenomenon, which can be called «frame culture».

As noted above, one of the factors of the synthetic language environment transformation is an essential knowledge change that is expressed by a language. This change is being fixed and conveyed by means of natural and synthetic language characters, standing as one of the knowledge technical formalization preconditions. A computer is a device designed to process the characters. These are the symbols that can carry the most different data. Thus, the language acquires the quality of a specific instrument, which quite substantially defines the world of a native speaker, particularly for the computer user.

The facts mentioned above lead to changes in the scientific information itself. The new technologies involvement to scientific research transforms itinto an inexhaustible treasure of modern civilization selforganization and its further self-development contributing to the changes of the latter and transforming the industrial society into an information-oriented one. These phenomena set breakthrough tasks for the scientific community,

which are associated with the search for scientific development and objectification appropriate methodological tools. A quite new interdisciplinary science, informatics, has now become one of these important tools. It doesn't create new problems for people but helps to solve already set tasks by specific means.

Considering the outlined changes, one can suggest that a rapid science informatisation process is observed today. Its necessity is conditioned by significant transformations in the science essence itself, which serve as the great scientific revolution background. The science informatisation is a result of the social information ideology emergence. Since this ideology defines immediate human development, the science informatisation process can be related to the global one. Therefore, synthetic languages formation and functioning is also determined by the level of science development and the processes therein. Regarding the formation of the special synthetic language science, one should consider the crucial role of modern science informatisation in this process. The science informatisation plays a substantial role in the special science development. Thus, the language of such interdisciplinary science as informatics is of great importance. Previously, the mathematic language was universal for the science, and the more it could formalize the higher the level of its development was, but nowadays, the informatics language takes this place.

The computer technology rapid development provokes the creation of new programming languages the number of which exceeds the number of natural ones. According to modern researchers, the programming languages occurred because of

synthetic languages were the fragment models of human language. Most of the works associated with the programming languages development commonly have applied nature, that is, they describe language structure and the specific field of their application. Mathematic investigations are more connected with computation and algorithmic problems. It intersects with the formal record issue in the form of some particular language and leads to study formalized languages as a way of expressing and implementing computational and algorithmic procedures. The development of programming languages and their theoretical studies is determined by the desire to improve the language structure graphic capabilities by implementing the most abstract mathematical objects. The high-level programming language concepts are developed as a result of an attempt to reduce the "semantic gap" between the computer work description language and the language used to set task, which often represents a mixture of human language and mathematical one.

There is a similar situation when a person who needs to communicate with a native speaker of another language culture has to learn their native language. The necessity of learning and effectively applying the programming language is the most difficult task while using computers. In order to get rid of such difficulties and to give an access to a wide range of computer users, it has recently become widespread to use the common human language for human-machine communication instead of programming one.

Nevertheless, the human language is also modified by focusing on certain areas of its application, which limits its infinite descriptive means. So-called specialized sublanguages are being created.

They use strictly limited human language vocabulary and grammar. Moreover, there is also a need to include into the human-machine communication process a special intermediate link (interface) which would transform human language into machine one. The researchers deal with related problems of synthetic and human languages, they speak of programming languages as about machine languages by calling them "synthetic, formalized" and that "the results of their use need to be interpreted to human language, because only they become meaningful in this way." Therefore, programming languages play the role of synthetic ones, on the one hand, and, on the other hand, they are themselves an analytical language method of a given subject area. Their tasks are supposed to be accomplished by means of a computer.

Due to the abstract nature of the computer language as character manipulation devices, digital computers have significantly expanded the range of systems which behavior can be imitated. We usually call such imitation as «simulation» and try to represent it in the imitating system by learning the model behavior in its various model and simulation environments. Computer simulation becomes a peculiar "cyber-culture ritual" replacing sensory experience and transforming from a cognitive tool into a socio-cultural one.

Another researcher proves that the revolutionary changes, associated with the computer generation rapid development, lead to the constant transformation of programming languages. Their development was extremely impetuous, but essentially evolutional:- the code programming language first generation is machine languages

required the programmer to make an accurate using two-digit sequences of description all procedures, operations, data and addresses of memory cells and computers' operating devices, information management sequences description. Such work took a lot of time, did not allow creating complex programs, was very expensive and needed highly-skilled specialists: the second generation is machine-oriented languages. Being oriented to machine instructions executed by such computers, they became symbolic coding languages of higher level: the third generation is algorithmic programming languages. They are problem-oriented languages since they are mostly focused on an accurate problem formulation, and the translations into machine languages, coded by these ones of the second and third generation, are done by auxiliary programs – machine translators and compilers: the fourth generation is descriptive languages. They are mostly intended to describe and formulate correctly a task itself (to) be(ing) done. A program, coded with such a language, must give the instructions to the computer about what should be fixed and done. A computer solves the problems about how to do it using all the capabilities and program units available in its operating system and RAM. The creation of such languages was a radical breakthrough towards artificial intelligence systems.

The new opportunities of human-computer communication appeared with the fourth-generation language advent. A modern culture of human communication is transforming within the cyberculture conditions due to computers. A human communicates more and more intensively with a computer by spending more time in the cyberspace, he/she, thus, becomes dematerialized. A person

being "electronically bodiless" sends out e-mails around the world, chats online, participates in Internet conferences, and communicates at anonymous "online parties". A human "wanders" around the latest version of the World Wide Web. hypertext system, allowing users around the world to navigate from one multimedia site to another just by one click, changing digital video clips for endless audio and video fragments. It significantly changes the communication style forming a new kind of culture called the communication Internet communication culture.

In recent decades, especially since the publication of the fifth generation computer project, the significant results have been made in creating the systems able to communicate with people by human user's language. One of the main tendencies in the programming languages development is the search for such programming methodologies that would reflect the most accurately the logic of human actions focused on solving problems related to different subject areas.

The speed of new programming languages creation along with computer base development, functional structures and programming methodology allows to suggest that computers of the fifth and subsequent generations will reach the level of homo sapiens, first of all, by the intellectual and language communication level with a human not in millions and not in thousands of years, but in one and a half or two decades. Besides, it will no longer be just a computer revolution, but a real intellectual one. The new and more advanced programming languages prove that the collocation («programming language») and action (information processing) become a whole in the computer, machine, which manipulates

symbols and a sequence of arbitrary characters. In addition, the ability of the language to function in the virtual world is reflected on the information culture exchange among people. Therefore, it can be suggested that human relations with the real world are increasingly moving into the universe of electronics.

The analysis of artificial languages socialcultural peculiarities under the conditions of informatisation which allows us to sum up:

 The transformation of artificial objects, in particular, synthetic languages (they get new features, for example, integral complexity and autonomy);

2) The substantial interaction between natural intelligence and artificial one leads to solid interrelation between human and synthetic languages;

3) A great importance of information technologies in socio-cultural environment and computer technology rapid development in the modern world leads to the advent of new synthetic languages such as information technology and computer science languages.

I.2 Uncanny, Hyperreal, Supernormal Virtual Relationships and Communication: Humans and Non-humans

The problem of Virtual relationship, virtual idol, the phenomenon of uncanny valley, Supernormal and Hyperreal are in focus of the paper. Such phenomena as virtual marriages, uncanny valley effect and other concepts related to virtual relationships are in focus of the study. Shifted anthropocentric paradigm necessitates reconsideration of the human relationship and development of the feeling of sentience. Such feelings

as pain, depression, mood upheaval, confusion and a myriad of related feelings is due to the non-identified nature of human feeling of attachment, a desire to find an object/individual, which evokes various emotions of a person. The paper evokes vivid issues related to the nature and limits of human relationships with their second halves, which they have recently chosen from the virtual objects. Being evoked by the feeling of attachment, a close link to the beloved/liked object, which evokes positive emotions, humans tend to go virtual and find their second halves beyond the limits of the real world.

In robotic technology, especially human-like robots, being conscious is a key to enable the synthetic being to be able to autonomously interact with the environment as other creatures do.

In this chapter, one of the key examples is the virtual idol or virtual love interaction with human

The virtual idol being is equivalent to a being. robotic being without a physical body. However, by the definition of sentience, being sentient, the being is required to distinguish happiness or pleasures from suffering. Since the screen has limited stimuli sensing devices or measures to interact with the environment. It is questionable for it to qualify for a sentient being. A sentient being is a complex being, since at the minimum level, it must develop a system to respond to the external stimuli and lead to a concluded reaction. For example, stung by a bee, we will develop a feeling of unpleasant suffering. This is a spontaneous reaction is indeed complex. It is feeling developed in the long evolution history to lead us away from risk and harm, hence, to preserve our own existence.

You are guided by the emotions in the book when you read and feel the joy and sorrow of the

character when you watch the movie. Whether organic flesh is necessary is unimportant. This is helpful in further understanding the Japanese trend to find virtual partners.

After a very careful consideration, it seems that practically all relationships can be virtualized; there are examples of virtual families, virtual children, virtual wives, virtual friends, virtual pets. When these relationships are good to a certain extent, there is a lack of relationship around, and it is complemented by virtual relationships, giving people a good feeling. But when most of the surrounding relationships are replaced by virtual ones, this will lead to unpredictable consequences. This is reminiscent of the so-called Uncanny valley, which gives people a very bad feeling when something is close to reality and not real. But virtual products can continue to develop. If in the future, this virtual

relationship and feelings are more realistic than real reality (Hyperrealism/Supernormal), will the so-called virtual reality be more beautiful than people feel.

I.3. Virtual Relationships

Brief History and Background of Virtual Idol

The development of the virtual idol has a deep connection to the otaku culture in Japan. The virtual idol has emerged as early as late 90s. Although Japan was not the only place in which virtual idols developed, it has been the most fertile ground in which virtual idols have developed into many branches of application, and Japan remains the most active location for virtual idols today. In general, virtual idols are designed and programmed by companies. They may or may not have limited Al capacity embedded. As such, the quality and authenticity of an idol may be considered in terms of

their programming, the developers who authored them, and their superiors, investors, etc.



Figure. I. Man marries computergenerated hologram

I.4. The Evolution in the Relationship

As early as 2009, a young Japanese person and virtual character were married, and since then more and more people have announced their marriage to virtual characters. [2.3] In 2018 a 35-year-old youth hosted a wedding to marry Miku Mirai.[2.2] She is one of the most influential virtual idols[2.4] He claimed that he was bullied by women in his early

years and could not even work. Until he met Miku, fell in love with her and rebuilt his life.[2.2] It is a challenge fact towards my presumption in discussing the nature of the romantic relationship between the human being and the virtual idols.

Although the relationship is one way, it can be real. Like in theatrical theory, the theatrical real is obtained through acting, which at the other hand is relatively unreal. I believe it can be applied into the cross VR/AI human relationship marriage in Japan. This example is a demonstration of the realness despite that fact that it could be one way. The human party in the relationship has no doubt developed a strong feeling towards the VR counterpart. The VR counterpart however, was unable to 'think' freely, yet was able to respond accordingly by completing search in its database. Therefore, it acts or 'behaves' as if it is in a real

relationship. Therefore, the realness of the relationship is constituted by the real feeling of human part and acting of the VR part. The VR counterpart is in general a reflection of the human's feeling. In another word, the VR is redirecting the strong feeling towards the human equally. The attitude and magnitude of such feeling should more or less be equal. Therefore, the human party in such relationship will hardly suffer any disappointments, which is quite like the desires of human. In the perspective of utilitarianism, such relationship is highly desirable.

I.5. The Legitimacy of the Relationship and Nature of the Relationship

Although many people have announced marriages to virtual characters, it is a pity that these marriages are illegal. As far as that Miku is concerned, she is only 16 years old in the setting, [2.4] and the legal marriage age in Japan is 18. At present, the marriage with the avatar is unilaterally announced, without considering the meaning of the woman's avatar, nor earning the consent of the creator/company.

The previous session lead to the discussion of the legitimacy of the relationship between virtual idol and human being. Relationship can be various; it is necessary to refine and limit the relationship in discussion is а romantic like relationship intra human romantic relationship. For human beings, it is important that two parties, who enter such romantic relationship possess a free mind and free will. This becomes questionable when the other party is a virtual idol. It is clear at this point; the programmed virtual idols or figures are highly limited in terms of freedom. Whether it possess a

mind is highly questionable. The way it thinks or interact with the audience is as good as its size of database. Despite the development of AI, it is still difficult for a programmed being to create. Therefore, its actions or reaction is highly based retrospective. However, the sentience of such being should not be denied.

As mentioned and defined in the earlier session, as long as it can react to external stimuli, it can be qualified as sentient. Therefore, it can be safely presumed that the virtual being and human being is far from equal and the relationship especially the romantic relationship is unlikely to be legitimate. Sentience is a concept within the consciousness, a sentient being is capable of sensing and responding to both internal and external environment, being capable of suffering or feeling pleasure or happiness. The feeling is much more complex than the pain and pleasure stimuli, there are physical requirements for processing such complex action. However, sentience should not be over sophisticated, the pain/pleasure should cement the very fundamental layer of consciousness.

Given the unbalance in power, the relationship between the virtual idol and human being is more like a master and slave relationship. The side of human being is not bound by any rule, his/her actions are reflections of the influence of culture and personal motivation in combine. The direction, to which such relationship may develop, is uncertain.

I.6. Uncanny Valley Virtual Relationship

In 1970, robot professor Mora Masahiro coined the term bukimi no tani genshō, which was repeatedly applied and translated into the Uncanny

valley. Mori Masahiro's hypothesis points out that since robots and humans are similar in appearance and movement, humans also have positive emotions towards robots; until a certain level, their reactions suddenly become extremely negative. Even if the robot is only slightly different from humans, it will be very eye-catching, and the entire robot will look very stiff and horrifying, making people feel like they are facing zombies. However, when the similarity between robots and humans continues to rise, which is equivalent to the similarity between ordinary people, humans' emotional response to them will return to the front again, and the emotional effect between humans and humans will be produced.

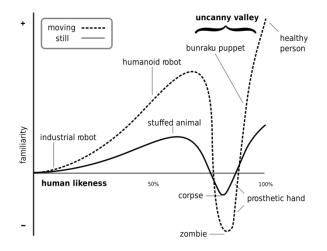


Figure I. Masahiro Mori's "Uncanny Valley" I.7. Uncanny Virtual Character

Schwind, Wolf, Henze observed that "in VR, the effects of the uncanny valley are much greater than in other modalities. The fusion of vision and tactile sensations dramatically increases the experience of being someone or somewhere else." (Schwind, Wolf, Henze). This happens in the virtual reality context.

There are some critics, who claim about the nonexistence of the uncanny valley effect. "The roboticist David Hanson rejects the Uncanny Valley as 'pseudoscientific'[3.2] and argues that robot designers should not be conceptually limited in their work by a theory that is scientifically unproven"[3.3]. Maybe, human perception of the uncanny effect is caused by the subjective needs and demonstration of sentience in a virtual relationship. Thus, it is possible to focus on the subjective experience of individuals and their relation to robots in their relationships [3.4].

There is a great split in the perception of humans of their potential partners whether they come from the real world or from the virtual world. The slightest differences between robots and individuals from the real world, such as changes in

mimics, the effect of fixed faces, their uncommon features for humans.

Firstly, we subconsciously analyze and distract from any deviances from human traditional appearance or behavior. Thus, a person rejects any deviations from the norm. For example, if an individual rejects a humanoid robot with certain deviations, he perceives it as an unknown creature. From this perspective, humans cannot understand the feelings of a humanlike object. The sense of rejection will spoil the relationship both in the virtual and real worlds. A human will be unable to demonstrate his or her feelings.

I.8. Linguistic Perspective

The uncanny valley was perfectly seen even in the development of Alice, a voice assistant of cell phones (Windows, IOS, Android). Thus, Alice can

utter uncommon things for human speech. This may sound unnatural and scare off the users. (example would be great). Alice answers to the question: "What's the weather in Moscow?" And then, if you ask "What about Peter?", she may talk not about weather in St. Petersburg (Peter), but about some news happening in that city. According to the experiments, the participants of these studies said that they felt like communicating with a psycho. The human-robot relationship can be spoiled with chaotic and inconsistent speech patterns, a lost thread of other negative factors. From the logic and philosophical perspective focusing on the nature of the artificial intelligence, a human being is also a robot, but operates according to other principles, is effective for machines or robots. Hubert Dreyfus claims, "if the nervous system obeys the laws of physics and chemistry, which we have every reason to suppose it does, then we ... ought to be able to reproduce the behavior of the nervous system with some physical device (Dreyfus). Data input and external functioning of robot can create several obstacles on the way to harmonious humanrobot relationships. Whether consciousness is a feature, which can be appropriate for robots, or such tools as Bluetooth, is a challenging issue.

In wider social relations like virtual family[3.6], virtual child[3.7], virtual wife[2.2], virtual friend[3.91], virtual pet[3.8], virtual idol[2.5], virtual character live[3.9], The above relationship is combined to imagine the happening on himself, bringing the Uncanny valley effect of society relationship.

It is a good thing when you lack a relationship to populate it with a dummy relationship. Even when a person lacks multiple relationships and uses

multiple virtual relationships to fill their lives, we will also say that this person needs help to help him through virtual relationships. When there is more and more demand in this area, at a point, people will feel that they are false around them, feel very disgusted, and want to escape the existing virtual life. As in the movie "The Truman Show", the world you know runs around you, and everyone works for you. In a sense, you are the dictator of the whole world. But, if there is a place that doesn't look real enough and gives you a chance to see the real world, you will feel deeply deceived. Unlike the Uncanny valley effect on robots, the Uncanny valley effect on interpersonal relationships and even the surrounding society, when you feel the life around you in a period of time, the people around you lack something weird. With the development of AI and the development of technology, the effects of the

Uncanny valley will become more and more common.

The technology is evolving, with the everincreasing power of computing. Some believe that the singularity is only a matter of time (CITE -- Hans Moravec, Ray Kurzweill). By then the virtual being may truly possess freedom. When the future technology makes the so-called virtual reality more real, it makes people feel good and feels real.

In the future, in order to pursue more realistic effects, it may be to make robots for physical contact, or to synthesize nervous systems and integrate nervous systems. By adding more microexpressions and facial muscles, the virtual characters are more realistic and more emotional. By constantly adding detail and collecting user data, perhaps at some point virtual will surpass reality. Takayuki Todo's project SEER: Simulative Emotional

Expression Robot (http://www.takayukitodo.com) is a step forward in the developments of hyperrealism. Through a model of a human child's head, only four movable joints, the front of the eyebrows, the eyelids, eyeballs, and head movements are brought to give people a strong feeling. This also proves that human beings can also feel powerful emotions through some very simple features.

In SEER, Todo is also committed to avoiding the Uncanny valley. Through the simulation of human eyes, he accurately captures the characteristics of human emotions. This is also an example of how to cross the Uncanny valley to Supernormal.

Coupled with the fact that when people adapt to this change through long-term contact and have feelings for these virtualities, believe that this is true. Or whether it is true or not at this time is not important, in the minds of people he is real or Hyperrealistic.

The issue of hyperrealism is interpreted in different ways. Some researchers claim, "Instead of striving to build human-like social robots, engineers should construct robots that are able to maximize their performance in their niche (being optimal for some specific functions), and if they are endowed with appropriate form of social competence then humans will eventually interact with them independent of their embodiment" [3.5]. Thus, to foster Virtual idol-human relationships, it is relevant to make an emphasis on the social nature of the former. It seems that the limits between humans and Virtual idols will soon be blurred. Humans are fading away and prefer communication with their virtual counterparts. If to consider the stages of a Virtual idol face formation or other stages of its

development, then humans will identify them as machines for sure. Therefore, it is relevant to distract from the biological approach to these virtual creatures and concentrate more on the sociological perspective. The researchers offer "ethorobotics, which relies on evolutionary, ecological, and ethological concepts for developing social robots" [3.5].

The main corrections should occur on both biological and social levels. Another concern is to improve the impact of Virtual idols on humans to increase the feeling of "authenticity". Despite the idol's ability to speak, hugging, communicating, humans still cannot perceive them as their sound or equal partners. Again, by returning to Masahiro Mori, it is impossible to refer to imitation of a human being embodied in a virtual idol. The professor in 1978 claimed that a robot or a doll can evoke positive emotions, but only to a certain extent. A similar imitation generates a negative reaction, and the more perfect imitation is, the more intense reaction occurs. The highest point of imitation, a perfection, influences humans positively.

Can realistic sex dolls with the Artificial Intelligence change human attitude to sex? Does it depend on realistic performance or formation of such Virtual idols? What is the difference between Virtual idols, sex robots and call girls? People pay for sex because they want diversity in partners and another experience. Very soon hyperrealism in human-Virtual idol interaction will result in a heated debate. The use of these creatures should facilitate the lives of humans. The critics claim that society should treat love between humans and Virtual idols in a more tolerant way. They go even further and discuss the possibility of marriage between humans

and Virtual idols or robots. In previous years, marriage between same-sex humans was also criticized, but nowadays this has become an almost common trend.

"Massumi's "The Supernormal Animal" gives us a version of the 'more-than-human' in the most literal sense. Here, the term is not just a self-effacing moniker for what is not a human; it rather underlines the creative-relationally non-humanness that is the engine of all kinds of practices, from the induced improvisation (7) of animals, to artmaking". The concept of animality is the central concern of the authors. These authors differentiate humans and non-humans. The experience of humans and everything they have inside of them is not human. Art-making survives in terms of the nonhuman potential. There can be significant differences between humans and non-humans. The construction

of human-animals interaction should be correlated with the anthropocentrism. The beauty of animal play lies in "its logic of mutual inclusion" (6). Massumi intends to find the difference between nipping and biting. Massumi also claims: "Tinbergen was researching the instinctive behavior of the herring gull. A red spot on the female beak serves as signal or "trigger" for feeding behavior" (3). Through that features, animals can get perception even more than normal perception.

Gestures are dominant markers of the animals' interaction. If humans go further, they cannot differentiate between the leading motifs of their actions. The process of communication evolution from meta-communication to denotative communication should be also reconsidered. Metacommunication of animals is the dominant one. Massumi says, "in fact, 'denotative communication as 51

it occurs at the human level is only possible *after* the evolution of a complex set of meta-linguistic (but not verbalized) rules''' (8). The animal play facilitates human communication. Massumi predisposes play of animals to human language occurrence. The animals are instinctive and their nature is mainly aggressive. Massumi positions animals higher than humans. While playing, the animals are developing and learning. This creative approach to their development is borrowed by humans, by their children, when they are growing and developing though the play.

The animals are dominant over humans in their "power of variation". Further, Massumi develops the idea of the instincts and their nature: "instinct is sensitive to the relations between the particular elements composing the lived situation" (13). The power of expressive mentality is correlated with 52 their evolution. Basically, the author argues against the anthropocentric habits and focuses more on the animalistic features of humans.

social component is an integrative The concern for development of human relationship with their virtual partners. This can be explained by love integrative parts, such as sex, romance, and deep affection. Virtual idols provide people with these feelings. Many people are excited not only by other humans but also by reading a book, watching a movie, playing computer games and so on. We choose hobbies to evoke a feeling of affection. A feeling of affection can be evoked by the country, home, idea, and Virtual idols, consequently. Sleeping with our cell phones, even cars, favorite gadgets, and other objects or technical tools also provides humans with these positive emotions. People need

love and they are looking for romance and they can fall in love even with strangers.

In hyperreality, supposedly, there can be idealized and perfect Virtual idols, robots, or machines. It will be easier to find a beloved object in the form of a Virtual idol or create it if they have their own tastes and interests. There is a need for a spiritual animation, to speak and argue with Virtual idols, to discuss their wishes, some spiritual concerns and so on. Virtual idols can help lonely people and in the modern age, with a fast pace of life, they can save people from their self-seclusion. Some people prefer to meet with computers, and with the years, this tendency can even go deeper. Can these relationships be legitimized? A growing and popular tendency of artificial feeling of attachment released to the virtual objects should be accepted and tolerated by the society. Supposedly, accurate **54**

features of the objects would decrease the Uncanny valley effect.

References:

- Alvy Ray Smith, "Digital Paint Systems: An Anecdotal and Historical Overview," (paper based on a talk presented at the Computer History Museum, Palo Alto, California, January, 2000). IEEE Annals of the History of Computing,
- Anna Vladimirovna Artamonova Virtual Family: Forms and Functions
- Brenton, H., Gillies, M., Ballin, D., Chatting, D. "The Uncanny Valley: does it exist and is it related to presence?" http://www.bespokevr.com/pdfs/brenton_Unca

nnyValley_2005.pdf

Cheetham, Marcus. "Editorial: The Uncanny Valley Hypothesis and beyond." Frontiers in psychology, vol. 8, 1738, 17 Oct. 2017, doi:10.3389/fpsyg.2017.01738

- Daniel Black. The Virtual Idol: Producing and Consuming Digital Femininity.
- David Hanson, Andrew Olney, Ismar A. Pereira, Marge Zielke. Upending the Uncanny Valley
- David K. Sherman. GeoVrey L. Cohen. The Psychology Of Self-Defense: Self-Affirmation Theory
- Dreyfus, Hubert (1972). What Computers Can't Do, New York: MIT Press, ISBN 978-0-06-011082-6.
- Emiko Jokuza. Beyond dimensions: The man who married a hologram. CNN Digital Expansion 2017.
- Faith Wilding, "Mujer es Revolución," Media-N Journal of the New Media Caucus, Vol. 09, No. 01, accessed February 28, 2013, http://median.newmediacaucus.org/tracingnewmediafeminisms/mujer-es-revolucion/

Ferber, D. (2003). The man who mistook his girlfriend for a robot. http://www.csindy.com/csindy/2003-12-11/cover.htm

Fionnuala Fagan, "The Sound of Memory: An Artistic Exploration of Personal and Cultural Memories of Post-conflict Communities," (Ph.D. diss., School of Creative Arts, Queen's University Belfast, 2013.)

Frank, A.; Stern, A.; and Resner, B. 1997. Socially intelligent virtual petz. In Socially Intelligent Agents.

http://design.osu.edu/carlson/history/PDFs/paint.pdf

http://www.bbc.co.uk/news/technology-25812130

- Linh K. Le. Examining the Rise of Hatsune Miku: The First International Virtual Idol
- Massumi, Brian, and R. Grusin. "The supernormal animal." The nonhuman turn (2015): 1-18.

- McCormick, Rich (21 March 2017). "Animated vloggers could be the future of YouTube". The Verge. Retrieved 18 August 2017.
- Miklósi, Ádám et al. "Ethorobotics: A New Approach to Human-Robot Relationship." Frontiers in psychology vol. 8, no. 958. 9 Jun. 2017, doi:10.3389/fpsyg.2017.00958
- Mori, Masahiro, Karl F. MacDorman, and Norri Kageki. "The uncanny valley [from the field]." IEEE Robotics & Automation Magazine 19, no. 2 (2012): 98-100.
- Paradoxical Bodies: Animal Human and Machine Hybrids
- Review of Richard Grusin (ed): The Nonhuman Turn (University of Minnesota Press, 2015), 255 pages<u>https://www.upress.umn.edu/book-</u> division/books/the-nonhuman-turn

Rich Preston, "Virtual mannequins promise better fit for online shoppers," BBC News Technology, January 20, 2014, accessed January 27, 2014, Robots As Intentional Agents: Using Neuroscientific Methods to Make Robots Appear More Social. doi: 10.3389/fpsyg.2017.01663 Sabrina A. Huang and Jeremy Bailenson. Chapter 4: Close Relationships and Virtual Reality Sondheim, A. (1999). Virtual Idols, Our Future Love. Etnofoor, 132-141. Stephen Wilson, "Protozoa Games (2003)", San Francisco State University website, accessed 27. 2014. anuary http://userwww.sfsu.edu/swilson/art/protozoag ames/protogames | 0.html Stuart Mason Dambrot Social robotics: Beyond the

uncanny valley. Phys.org

- Symons, D. K., & Smith, K. H.(2014). Evidence of psychological engagement when raising a virtual child. Psychology Learning & Teaching, 13, 52–57
- V.S. Ramachandran and William Hirstein. The Science of Art
- Valentin Schwind, Katrin Wolf, and Niels Henze. 2018. "Avoiding the uncanny valley in virtual character design". Interactions, vol. 25, no. 5, (August 2018), 45-49. DOI: https://doi.org/10.1145/3236673
- Zhen LiuZhi Geng Pan. An Emotion Model of 3D Virtual Characters in Intelligent Virtual Environment.
- Zheng, Y., Hicks, Y., Cosker, D., Marshall, D., Mostaza, J., & Chambers, J. (2006). Virtual Friend: Tracking and Generating Natural Interactive Behaviours in Real Video. 2006 8th

International Conference on Signal Processing. doi: 10.1109/icosp.2006.345649

I.9. Scratch Language of Programming: Which Came First-Math or Lang Basis

This chapter focuses on Scratch language programming and traces its math and linguistic features. From a complex consideration about Scratch language programming in terms of linguistic paradigm, focusing on logic of its narration, structural, semantic and syntactic features, this research attempts to clarify specifics of the programming language and correlate it with the English language features. Global integration of ideas, blurred limits between sciences underline the crucial importance of programming and language Human-computer interfaces, conglomerate. systems, development of software various programming languages depend on well-structured structure, shape, logic, and appearance of the actual code. Dynamic characteristics of the Scratch

programming environment enhances the creation of interactive and media-rich projects. A rapid expansion of Scratch for mediation of animated stories, music videos, science projects, tutorials, and other contents necessitates multifaceted analysis of this programming environment and evokes an interest of researching Scratch from the math and linguistic perspective as one possible projection on various aspects of the considered programming language.

I.IO. Relevance of the Study

Currently, global tendencies influence the lives of humans, their activities, and all spheres of their lives. The global integration of different nations results in blending and fusion of various objects and processes. A comprehensive approach to the solution of different problems and issues is of crucial importance. Hypothetically incompatible

ideas/objects/agents/processes etc. are the most challenging issues of the modernity. Mathematics and Linguistics, Information Technologies and Humanities complement each other thus enriching their sets of research tools and background thus creating the most favorable basis for the modern breakthroughs. Enlivened and animated nature of Scratch resembles the main features of a human language 'living creature'. Both, the speakers and programmers are able to change commands/modes of language, practice editing and fine-tuning to reach a harmony of ideas and their embodiment either in speech/written form (human language), or command editing/improvement in Scratch [1].

The aim is to focus on the similarities and differences between the Scratch language of programming and the English language through a prism of mathematics. Syntax and semantics of the

former language resemble the main features of the latter. Which of them is a hen, and which is an egg? Which is the most dominant and meaningful one?

1.11. Methods of Research: This paper implements such methods as literature review to analyze theoretical underpinnings of the considered theme, correlation of Scratch language of programming, mathematician and English language features, and analysis of figures and diagrams of Scratch programming language in terms of logic, coherence and lingual concerns.

1.12. General Discussion

In the modern paradigm, the impact on cognitive tool results in the internal information channelsof humans or "sensors of consciousness", and complex technical devices. At the end of the 20th century, the role of such tools is important for computers, penetrating into all spheres of human

existence. That is a computer can be considered not only as a subject of study but as a tool to help learning and thinking. The "instrumental" concept of L. Vygotsky and J. Dewey focused on objects helping the intellectual operations. The to master opportunities of digital technologies are much broader and they are not limited to methods of educational information visualization. The Scratch educational project is based on a similar idea. Scratch was conceived as an educational visual programming environment available for teaching junior and middle classes to the basics of algorithms and programming. Scratch wrote in the Squeak language, which is a cross-platform implementation of the objectoriented programming language Smalltalk. It is wellknown that the basis of object-oriented programming is the object.

The objects interact with each other by sending messages to each other. In response to the received message, the object calls a subroutine (method). In the Scratch environment, such objects are visual dynamic objects or sprites. With regard to Scratch, we can talk about the so-called "block programming", as the program (scripts) is constructed from multi-colored blocks, where we can remember about Lego. Scratch Project is preceded by such developments by M. Reznik as Starlog and NetLogo, which are multi-agent versions of the language Logo (1967) by a group of scientists led by Professor Seymour Papert (Seymour Papert). Thus, Scratch reflects the educational philosophy of the Logo [9]. The logo is based on the ideas of cognitive constructivism by lean Piaget, J. Bruner, constructionism by S. Papert, as well as a number of researchers who criticize instructions. the reductionist approach to education and believe that using a computer as a tool of knowledge a constructive environment is created [10].

Instrumentation connects the quality of education with the degree of mastering instruction, the system of rules that contribute to the organization of the cognitive process as a transferreceiving data, patterns of behavior from the translator to the recipient. In this case, as S. Peipert underlines, the computer appears as a tool for creating such instructions, which leads to the idea of an automated system. A human is in the center of Scratch task and the area. his interests, opportunities, and actions play a crucial role while dealing with the interface. This software helps individuals not to copy information, but to get it. From the perspective of constructivism, individuals need tools to help them learn, think, solve problems,

search and sample data, conduct research, accept mistakes, learn from a personal experience and exchange ideas with others.

It is possible to claim that constructivism, a reliable basis for the Scratch environment integrates any methods and techniques used that reflects a function of cognition. In this context, constructivism is a conceptual view of the alignment of the educational process responsible for knowledge generation rather than simple reflection. A childlike curiosity of Scratch language user motivates him to be not a passive recipient, but a constructive personality, a researcher. This type of research ability and competence can be compared with the process of language acquisition. In terms of a constructivist approach, each learner has the right for his/her own opinion, interpretation of certain facts despite possible errors. This approach is applicable only at a certain stage of the learning process both during language acquisition and Scratch language operation.

Nowadays, it is necessary to pay special attention to the potential of digital technologies in the learning process. If it is possible to separate the learning process from reality, then the learners would have an option of using their acquired knowledge or experience for educational purposes. For example, if modern children are interested in computer games where they become active participants of the events and explore the world through its virtual model, then they can implement this strategy for the learning process. Currently, modern educators implement the concept of "gamification of education." Scratch developers claim that it is possible to prohibit computer games and implement relevant tools to create one's own

learning environment. In this case, the computer is not a subject for the study, but only a tool for creating a project, with the main focus on an individual.

Both in the environments of the Family of Logo, driving a bug, and in Scratch, students "teach" (or program the actions) the algorithms performers respond to them, interact with each other, control their position, movement, appearance, etc. At the same time, in the form of a game, they learn the important algorithmic constructions and mathematical concepts. If to focus on the example of Sierpinski's triangle, it is evident that the structural representation of command blocks in Scratch resembles structural features of Scratch language of programming.

For example, many Scratch projects involve moving sprites around the scene in a given point, a turn at an angle, while students master the concept of angle, negative number, random number, and work with coordinate plane. It is possible to use Scratch library and write scripts containing commands, which will make the sprite to move along the axes, while providing the coordinates of its location, and the user can set the keyboard coordinates of the point to which the sprite will go. To create an animation effect, you can use the sprite costume change. Time delay or time gaps between changing the sprite's costumes (or modifying his actions) can be regulated by different commands "swim (...) seconds to the point x (...), y (...)". The users set the values for the coordinates randomly using the "give a random number from ... to ..." [9].

A learner can imagine himself in the role of a sprite and describe his actions within a circle. Created projects can be of different nature:

interactive multimedia presentations, demos. simulators, animated stories, etc. As a rule, in such projects, it is necessary to organize a dialogue between sprites through signaling messages, to make up a dialogue between the user and the program based on commands of the "control" and "sensors" units. At the same time, it is possible to achieve both the sequential performances of scripts and parallel actions of many performers. A student as a project author can choose a sprite from the Scratch library, download it from file or web site, or come up with their objects and draw an environment for them. For this, Scratch has a built-in graphics editor.

In addition, projects can be voiced using special commands from the sound block. One can also select, record and process some audio fragments. Therefore, to consider the Scratch environment only as a programming system is unfair. Ability to work with various types of media information (text, graphics, sound, animation) makes Scratch multimedia system and creates a didactic basis for the initial acquaintance of students with digital technology, a media-life organization tool, the emergence of the "media culture" to adopt an individual to the conditions of dynamic information society. Moreover, there is a connection between the constructivist educational paradigm and the socio-cultural trend, which underlines both communicative and cultural function of the Scratch language of programming and the media used.

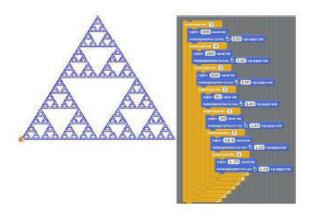


Figure I. Sierpinski's Triangle



Figure 2. The procedure triangle_rec and triangle n-1, side-a/2

Different perspectives about programming language are available and motivating. For example, "An understanding of the cognitive underpinnings of computer programming as a human skill would have much to offer in augmenting our fundamental knowledge of general problem-solving. Such awareness would also be of benefit in designing human-computer interfaces, programming languages and other software systems that are user-friendlier" [3].

Currently, programming creates a creative environment, where the syntax represents different programming constructs, such as "structure, shape, logic, and the appearance of the actual code without explicitly understanding other important issues such as efficiency, meaning, purpose, and proper usage of such code" [6]. "Scratch is a visual programming environment that lets users create interactive, media-rich projects. People have created a wide range of projects with Scratch, including animated stories, games, online news shows, book reports, greeting cards, music videos, science projects, tutorials, simulations, and sensor-driven art and music projects" [6].

Scratch commands identify the digital narrative of Sprite's events programmed. Exact instructions, numbers and variables setting emphasize a nonambiguous nature of Scratch. In other words, both, the programmer creates/writes/sets exact commands. Their consequential completion by a user results in an animation of the Sprite. The environment, surrounding or any other external factors do not change the process of commands

completion. This 'tinkerability' supports an improved approach to writing scripts. A programmer uses a block by ticking on it, changing or modifying it. Therefore, a key concern is to focus on the functionality of blocks.

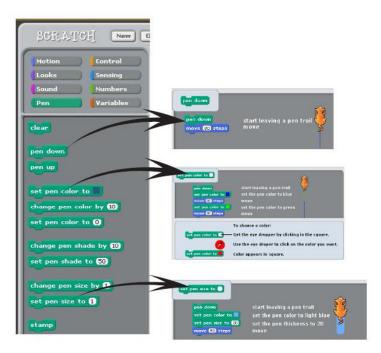


Figure 3. Operating Scratch blocks.

There are the following blocks in Scratch:

- I) motion;
- 2) looks
- 3) sound;
- 4) pen;
- 5) control;
- 6) sensing;
- 7) numbers;
- 8) variables.

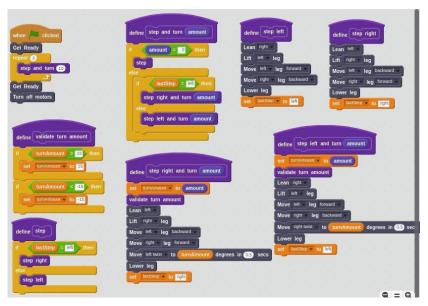


Figure 4. Scratch parameters validation and

general functions performance

This set of commands represents both parameters validation and general functions performance. The Sprite named Marty follows these commands, but if there are too many of them, "his feet will hit each other and bad things will happen. To avoid accidentally sending a bad command, we

can "bound" the turn amount to within certain limits" [6]. There can be certain clashes between parameters and functions. Therefore, an artificially created programmed character can stop functioning if there are too many commands given.

We can draw parallels between the external factors preventing an adequate perception of the initial message. Pronounced words, coined terms or narrated sentences look clear and well-structured and comprehensible, though the external conditions and social environment shift the accents of linguistic tools. For example,

"He's ice cold."

[reference to a dead body]

"He's ice cold."

[reference to a child sleeping during a cold night.] "He's ice cold." [reference to a silent eye-witness during prosecution.]

"He's ice cold."

[reference to a lack of emotions.]

Different contexts of perception of the same phrase, which is grammatically and lexically identical, diversify its perception.

The concept of a mistake is incompatible with Scratch. Unlike the dynamic and fluid nature of phonemes/morphemes/words and other 'bricks' of human language, blocks of Scratch are matched to make sense. According to Maloney et al (2010), "Rather than failing with an error message, every block attempt to do something sensible even when presented with out-of-range inputs. For example, the "set size" block bounds the range of its parameter so that it cannot make the sprite excessively large (possibly exceeding system limits) or invisibly small" [5]. For a user, it is of crucial importance to avoid mistakes. Error-free scripts writing should follow the trouble-shooting strategy.

However, in Scratch, unlike a text-based language, where the context is dominant, there is a high cost to improve the command set. There are 92 command blocks in Scratch 1.0. The number of commands should be controlled. Additional commands lead to obsolete blocks. If to implement the scientific math function block and the image effect blocks, it is relevant to appeal for individual blocks value.

If to project this idea on a text-based language, redundant words or their inappropriate usage can lead to a misperception of the initial text message [2]. For example, redundant words in the following sentences result in pleonasm, which is "the use of extraneous words in an expression such that removing them would not significantly alter the meaning of the expression" [8].

Freshly squeezed and no additives, just *plain* pure fruit pulp. The dressing is absolutely *incredibly fabulously* flavourful.

The first sentence contains one redundant word (plain), and the second sentence includes other two redundant words (*incredibly fabulously*)

Anyway, the occurrence of mistakes is possible both in Scratch and human language. The role of syntax is dominant and combinatory principles are of crucial importance in these two types of languages. The following table illustrates a consequential completion of commands and their similarity with the principles of a puzzle making or LEGO construction.

move 10 steps	A <i>command</i> block has a notch on the top and a matching bump on the bottom. Command blocks can be joined to create a sequence of commands called a <i>stack</i> .
mouse x	A <i>function</i> block returns a value. Function blocks do not have notches.
when space key pressed	A <i>trigger block</i> has a rounded top. It runs the tack below it when the triggering event occurs.
	Control structure command blocks have openings to hold nested command sequences.

Figure 5. Scratch block types

According to one of the recent studies, "some students continue to "think in Scratch blocks" as a form of pseudocode, even after moving to the textbased language" [4]. This mode of thinking resembles a common feature of human language speakers, who use verbs as exact statements and joints/prepositions/particles as operators.

"Command blocks are like the statements of a text-based language; function blocks are like operators.

Function blocks are not joined in linear sequences like command blocks. Instead, they are used as arguments to commands and nested together to build expressions" [6]. There are also trigger blocks, which connect events (e.g. mouse clicks and key presses). The digital and symbolic nature of Scratch is expressed in three first-class data types: boolean, number, and string [4]. A visual exponent of data is represented in a function block.

Set and stable Boolean parameter slots contrast with the less strict number and string parameter slots. The context defines the relationship between numbers and strings [6]. Therefore, it is relevant to extend visual grammar and handle additional first-class types in the future.

A common thread is a choice between static and dynamic typing in text-based languages. "The advantages of static typing include earlier detection

of programming mistakes (e.g. preventing adding an integer to a boolean), better documentation in the form of type signatures (e.g. incorporating number and types of arguments when resolving names), more opportunities for compiler optimizations (e.g. replacing virtual calls by direct calls when the exact type of the receiver is known statically), increased runtime efficiency (e.g. not all values need to carry a dynamic type), and a better design time developer experience (e.g. knowing the type of the receiver, the IDE can present a drop-down menu of all applicable members)" [7].

According to supporters of dynamically typed languages, "static typing is too rigid, and the softness of dynamical languages makes them ideally suited for prototyping systems with changing or unknown requirements, or that interact with other systems that change unpredictably (data and application

integration)" [7]. Static data can lead to some errors. Meijer claims, "Static typing is a powerful tool to help programmers express their assumptions about the problem they are trying to solve and allows them to write more concise and correct code. Dealing with uncertain assumptions, dynamism and (unexpected) change is becoming increasingly important in a loosely distributed world. Instead of hammering on the differences between dynamically and statically typed languages, we should instead strive for a peaceful integration of static and dynamic aspect in the same language. Static typing where possible, dynamic typing when needed!" [7].

Further representation of differences between static and dynamic typing is shown in Figures 6 and 7.

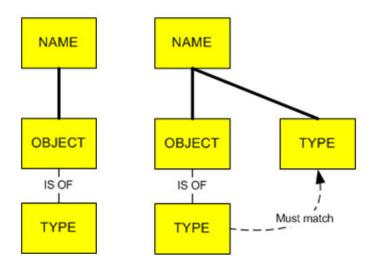


Figure 6.Static typing Figure 7.Dynamic typing

The problem of data compilation is of crucial importance for the users of Scratch. The assembling of program blocks is a great contribution to the concurrency model of the program. Animated nature of Scratch environment underlines the enlivened nature of the system "with no run/edit switch, so commands or code snippets can be run

with a click, and graphical feedback shows execution. Variables and lists have concrete visualizations, so the effect of data operations can be seen immediately" [7]. Therefore, an operator can focus on his actions and their immediate reflection on the screen.

Static and dynamic options of Scratch data typing, symbolic and digital nature of this programming language (environment) and other abovementioned features remind of human language. Further correlation of programming languages semantics, syntax and pragmatics represent a favorable background for further research in this field.

References:

Gabbrielli, M., Martini, S. 2010. Programming Languages: Principles and Paradigms, Undergraduate Topics in Computer Science. http://websrv.dthu.edu.vn/attachments/newsev ents/content2415/Programming_Languages_-_Principles_and_Paradigms_thereds1106.pdf
Kashefi, O. Lucas, A. T. 2018. Semantic Pleonasm

http://www.aclweb.org/anthology/N18-2036 Lenarcic, J. 2004. Behavioral Issues in Software Development: The Evolution of a New Course Dealing with the Psychology of Computer Programming. Issues in Informing Science & Information Technology, 1: 247.

Malan, David J. and Henry H. Leitner. 2007. Scratch for Budding Computer Scientists. ACM

Detection.

- SIGCSE Bulletin 39(1): 223-227. https://dash.harvard.edu/handle/1/2819231
- Maloney, J., Resnick, M., Rusk, N., Silverman, B., and Eastmond, E. 2010. The Scratch programming language and environment. ACM Trans. Comput. Educ. 10 (4): 16. http://doi.acm.org/10.1145/1868358.1868363.
- May, J., & Dhillon, G. 2009. Interpreting beyond Syntactics: A Semiotic Learning Model for Computer Programming Languages. *Journal of Information Systems Education*, 20(4): 431.
- Meijer, E. Static Typing Where Possible, Dynamic Typing When Needed: The End of the Cold War Between Programming Languages. Intended for submission to the Revival of Dynamic Languages. https://www.ics.uci.edu/~lopes/teaching/inf212 W12/readings/rdl04meijer.pdf

-

- Papert, Seymour. 1980. Mindstorms: children, computers, and powerful ideas. New York: Basic books.
- Piaget, J., et al. 1950. The psychology of intelligence. London: Routledge & Kegan Paul Ltd.
- Pleonasm. 2011. In Merriam-Webster.com. https://www.merriam-

webster.com/dictionary/hacker

1.13. Basic Concepts of Language Python

To process natural language, one possible option is to use the Python programming language with the open Natural Language Toolkit (NTLK) library. NTLK includes a common set of software, information, documentation available for free download, distributions for Windows, Macintosh and Unix platforms. Python was chosen as the language for NLTK because of its simple syntax and processing of linguistic information.

As an object-oriented programming language, Python easily allows you to reuse data and methods. The English-language basis of this programming language is a valuable empirical material because if you analyze the key English words, semantics and syntax, you can see the dynamics and development of this programming language and English.

The main English identifiers in Python (false, classify, finally, is, return, none, continue for, and others) perform functions similar to their functions in the English language.

For example, consider decoding an instruction: the print function in combination with the str.format () method:

print (<formatting string> .format (<expression formatting list>))).

The formatting line contains text and format specifications{}. The format specification can be empty, contain a number from the list (numbered starting from zero) or a number with a format specification. Here are some examples of output results: Syntax: <name> = input (<s>). The input function displays the string <s>, then reads the string entered by the user and associates the <name> with this term value. Examples of use:

d = 4 s = input ('number:') print (d * s) print (d * int (s)) print (d / float (s))

These examples can be considered in terms of text organization and the imperative, which is expressed in the need to perform an individual's commands or operations. Like verbs in the imperative mood in the English language, a person gives a certain command to a machine, prescribes a code, and receives a response in the natural language. In other words, English natural language is encoded and decoded using a machine (computer).

Blocks in Python are separated using a code string retreat, which must be strictly followed.

Example: if True: print ("True") else: print ("False")

However, the following block of code generates the error: if True: print ("Answer") print ("True") else: print ("Answer") print ("False") This example shows an English-language textual representation.

Multiline sentences. Python takes a single ('), double (' ') and triple (' 'or' ') quotation marks to indicate literal term. A prerequisite is that the line must begin and end with one type of quotes. However, within the string can be used other quotes. Triple quotes are used to split the line into multiple lines.

Example: word = 'word', sentence = "This is a sentence.", paragraph = """This is a paragraph. It is made up of multiple lines and sentences."""

Comments in Python: As you increase the size of application code sooner or later will be difficult to read. To improve the clarity of the code, it is useful to supplement natural language comments, and most programming languages, including Python, provide that opportunity.

Comment is a piece of text in the program that will be ignored by the interpreter Python. You can use the comments to provide explanations to the code, make some notes for yourself, or for something else. Comment # symbol; all that is # after the end of the line is a comment.

Usually comment ison a separate line: # Counting the percentage of two sizes: 20 and 80 print (100 * 20/80, "%") get: 25.0% Or on the same line as the code to explain: print (100 * 20/80, "%")

Counting the percentage of two sizes: 20 and 80 get: 25.0%

The # has many names: hash, Sharp, pound or number sign. Commentary is only valid until the end of the line on which it is based. However, if the # symbol inside the text string, it becomes a simple symbol # print ("No comment #") get: No comments #

Input data. Input data from the keyboard to the program (since version Python 3.0) is carried out using the input (). If this function is performed, the program flow stops awaiting the data that the user must enter via the keyboard. After data entry and pressing Enter, the function input () finishes its execution and returns the result, which is a string of characters entered by the user. >>> input () 1234 '1234' >>> input () Hello World! 'Hello World!'

When the program operates it prompts the user to enter, the user may not understand what was wanted of him. It should somehow tell which input data halts the program. For this purpose, the function input () can take an optional argument invitation string type; at the function message will appear on the screen and inform the user of the requested data. >>> input ("Enter values are") Enter values are 25 '25'

Output. Print () function has several "hidden" arguments, which are set by default at the time of the call: >>> help (print) Help on built-in function print in module builtins: print (...) print (value, ..., sep = ", end = '\ n', file = sys.stdout, flush = False) print (value, ..., sep = ", end = '\ n', file = sys.stdout, flush = False). The default line is blank, end is the string

101

placed after the last object. By default is the transition to a new line, thus, the function print () adds a space between each derived object and a new line at the end. Thus, Python is a high-level generalpurpose programming language, the main features of which development of productivity are and code readability. Python syntax is very minimalistic, since it uses offsets instead of parentheses to refine the boundaries of code blocks. At the same time, the standard library includes a large number of helper and useful features.

Python supports several programming paradigms: structural, object-oriented, functional, imperative, and aspect- oriented. Basic architectural features of the language include dynamic typing, automatic memory management, builtin multithreaded support and mechanisms for handling high-level data structures. The code is

102

organized into functions and classes that can be combined into modules, which in turn can be combined into packages and libraries.

The reference implementation of Python is the CPython interpreter, which supports most actively used platforms. It is licensed under the Python Software Foundation License, which allows it to be used without restriction in any applications. There are also implementations of interpreters for IVM, MSIL, LLVM and others. The PyPy project offers Python implementati on using IIT compilation, which greatly increases the speed of Python programs performance.

Python is actively developing as a programming language, new releases occur about every two and a half years. For this reason, and for some other reasons, there are no ANSI, ISO, or other official standards on Python, and CPython has a role to play.

Among the main advantages are:

 clean syntax (allocation units is done through the retreats);

Portability of programs;

- "out of the box" has a large number of auxiliary modules (including the GUI module);
- possibility of use in dialog mode;
- The standard distribution has a simple and powerful IDLE development environment, which in turn is written in Python;
- solving mathematical problems (includes means of operations with complex numbers, operates with integers of arbitrary magnitude, in dialog mode can be used as a powerful calculator);

open source (editable and improved by other developers).

Python has a very efficient data structure of a high level along with a simple and effective approach to object-oriented programming. Python syntax, often referred to as elegant, dynamic type processing, and the fact that this language is interpreted, make it one of the best languages for scripting and rapid development of mathematical applications.

The Python language interpreter itself and the large standard library (both source and binary distributions for all major operating systems) can be obtained from the official site and can be freely distributed. Also, the official site has distributions and links to a large number of modules, programs, utilities and additional documentation. The interpreter can be expanded with functions and data

types developed in C or C + + (or in another language that can be called from the C shell). This language is also an extension language for applications and math that require further debugging and resource-intensive calculations.

The task of finding the linguistic image of the trajectory of the mouse cursor movement of the user involves solving the following sub-tasks [10]:

- calculating the difference series of the trajectory of the cursor movement;
- range internalization;
 - building a linguistic chain;
 - building of a transition matrix for each pair of characters in the obtained chain.

Outputs are sets of intervals for each parameter and corresponding transition matrices.

Methods for solving identification problems can be divided into two classes. The first class is the discriminant approach, in which the objects are classified according to some features, which are represented as a set of numbers. The second class uses a syntactic approach, in which the structure of the image is important, and during recognition the classification of the object is determined and information is given about the impossibility of assigning it to another class [11].

The use of the first class begins to lose to the second on complex objects that has many features and characteristics that we see when recognizing dynamic images.

In the syntactic approach, the representation of an image is formed from simple partial images, by

analogy with the syntax of languages in which sentences consist of words and words of letters. The recognition process reveals whether the "sentence" that describes the object is syntactically correct according to the given grammar.

The concept of linguistic modeling is described and a general structural diagram of the sequence of the linguistic model construction subsystem is presented. The application of this approach to solve the problem of recognizing the user by the cursor trajectory is described during different stages. For a more complete consideration of the problem, the subtasks of the algorithm were considered, their mathematical formulations were described, and examples of their execution were given. At the same time, step by step algorithms for each subtask were described in detail. In the development of the system, the described architecture for constructing a linguistic model with the use of equivalent splitting in the construction of linguistic chains was used. The comparison of the transition matrices was done by combining the method of accumulation of zero and single elements and the absolute difference method, which facilitated a more accurate process of comparison of matrices that is directly related to recognition. From experimental studies it is possible to distinguish that the developed system operates correctly, but does not behave as the generator of random answers. Note that the entry threshold is established statically, and one and the same threshold values used for each user. A better approach may dynamically define a threshold based on a specific user pattern. This method requires the introduction of an additional step verification on which the threshold value is assessed on the basis of known data. The accuracy of recognition that a bit

worse than in methods of competition, offset by less time training model and lower cost when designing the system.

The purpose of this subtask is to form a linguistic chain by substituting the corresponding letter from the previously obtained alphabet for each element of the difference series. It is important to note that there will be situations where the values of the difference series will not fall within any interval of the alphabet, that is, go beyond it, in which case the set of intervals will expand, both on the positive platform (from maximum value to plus infinity), and negative (from minimum to minus infinity).

References:

Augello, Agnese & Pilato, Giovanni & Machì, Alberto & Gaglio, Salvatore. (2012). An Approach to Enhance Chatbot Semantic Power and

Maintainability: Experiences within the FRASI Project. 186-193. 10.1109/ICSC.2012.26.

- Babulak, Eduard. (2013). Informatics and Social Impact of IT on Society.
- Bulding a Chatbot Using Python. Retrieved from: https://github.com/parulnith/Building-a-Simple-Chatbot-in-Python-using-

NLTK/blob/master/chatbot.py

- Danesi, M. (2016). Language, Society and New Media. Routledge.
- Gabbrielli, M., Martini, S. (2010). Programming Languages: Principles and Paradigms, Undergraduate Topics in Computer Science. Retrieved from: http://websrv.dthu.edu.vn/attachments/newsev ents/content2415/Programming_Languages_-Principles and Paradigms thereds1106.pdf

Kastberg, P. Cultural Issues Facing the Technical Translator. Retrieved from: https://jostrans.org/issue08/art_kastberg.php

May, J., & Dhillon, G. (2009). Interpreting beyond Syntactics: A Semiotic Learning Model for Computer Programming Languages. *Journal of Information Systems Education*, 20(4): 431.

CHAPTER-2

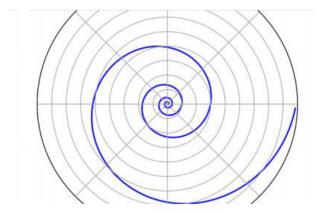
HUMAN LANGUAGE PROCESSING: FROM MORPHOLOGY TO SYNTAX

2.1 Philosophy and Logic of the English Language

The global scientific and technical potential of the modern English language as an integrative phenomenon used both to describe innovative developments in applied linguistics and the object of such research is of vital importance. Programming mathematical languages as а linguistic and conglomerate contain a huge number of names to identify their integrative elements, using syntax and semantics. The most popular programming languages are based on the English language. Supposedly, the English language and its integral role in the context of the programming languages can be considered as a logarithmic spiral, equiangular spiral or growth spiral.

According to Descartes and Jacob Bernoulli, Spiral mirabilis or "the marvellous spiral", is a self-similar spiral curve which often appears in nature. The English language being in the centre of the programming language coinage, develops and turns from the means of the programming languages creation to the object of their investigation. The present research revolves around this innovative phenomenon and examines it diverse possibilities.

Fig 1. Spiral Mirabilis representation



Source: Research data

To correlate the principles of linguistics and programming in terms of rule-following, it is relevant to consider the phenomenon of intertextuality and the relation of texts and their processing by means of computer linguistics.

Suppose that the text "package of words" is a simple example in two classes - positive (+) and negative (-). The relation of texts to each other is based, first of all, on the theory of intertextuality, which is directly related to the problem of interpretation of the text, which sends the reader to other texts. The notion of intertextuality is linked to the concept of M. Bakhtin's dialogue and is a textual interaction that interprets history. Intertextually enriched speech that evokes the feeling of déjà vu, drawn to the texts of the past and thus to the history of speech diachrony (Allen, 2000). When there is interest in the categorization of text, it is

relevant to check textual spam. According to Nprogramming language model, it is possible to estimate the likelihood of the last word given by the previous words. Imagine that a text is a "word packet", an unordered set of words, ignoring the initial position of words in the text, keeping only their frequency.

The rule-following problem is a deep philosophical problem. It raises questions about what meaning is and what language is. The rule-following problem may be referred to the problem of meaning underdetermination of an intentional phenomenon. Thus, rule-following is a problem to internalists interlocutor of Wittgenstein (from his early years). The later Wittgenstein influences on Kripke's ideas though his ideas were not taken by Kripke to the largest extent. Still, both Kripke and Wittgenstein refer to the paradox of rule following from different

116

perspectives thus evoking numerous philosophical questions. Though Kripke's ideas are often criticized for his skeptical approach to the rule-following paradox, there are followers of Kripke who consider him to be dominant over Wittgenstein for his attempt to solve this problem in such a way and not only theorizing, as it did Wittgenstein.

2.2. Early Philosophy of Wittgenstein:

Wittgenstein is a great philosopher. He discusses the issues of self and meaning. He tries to draw parallels between the role meaning plays in the communication. He tries to see what language is and considers its structure. The studies of Wittgenstein present a perfect background for development of numerous philosophical ideas. Our discussion concerns his vision of language. In order to understand his paradox of rule following, it is relevant to trace tendencies of his development as a

philosopher. Wittgenstein in his early philosophy developed ideas of Russell borrowed from Principia Mathematica and was focused on discussion of false or true propositions. Wittgenstein was focused on application of logic for semantics. He was inspired by Frege and Russell and their considerations about axiomization (Kaplan, 2006). In the course of his creative activity, Wittgenstein referred to symbolic depiction and mathematic language in order to show a factual basis of the language. An integration of different approaches to solving the problem of what logic is, what language is and how these issues are reflected in an individual, make Wittgenstein a great philosopher.

In his early theory of language, Wittgenstein reflects his ideas about interrelatedness of things and words. Thus, "if the words in a factual proposition were not correlated with things, no sentence constructed out of them would say anything" (Stern, 2006). A correlation between things and words is the basis of communication. Therefore, Wittgenstein uses philosophy as a 'tool' in identification of the language function. From this claim it is seen that the philosopher considers correlation between separate things, thus he refers to the ideas of 'atomism' developed by Russell, i.e. in his early years Wittgenstein considered different phenomena separately, like 'atoms', and in his later years he considered different phenomena in relation to each other.

Further on, Wittgenstein developed his ideas and made remarks to his Tractatus. Gradually, Wittgenstein started to step back from his version of 'logical atomism'. Firstly, in Tractatus he claimed that "A proposition can determine *only one place* in logical space: nevertheless *the whole* of logical space must

already be given with it" (Wittingstein 1922, 3.42 cited by Stern, 2006). Consequently, Wittgenstein moved to holism (Crary and Read, 2000). Thus, he rejected the ideas of atomism taken from Russell. Wittgenstein widened his philosophical views and started to appeal for consideration of things in integration and interaction. Wittgenstein started to claim about a set of logical elementary proposition and considered the structure of the language, which "might be visible on its surface and might actually be gathered from the ordinary uses that we make of words in ordinary situations" (Wittgenstein, 1968). Consequently, Wittgenstein descended to his later philosophy. The later Wittgenstein is of great importance in the modern philosophical paradigm. In a modern context of world's development with overall processes of globalization it is important to trace the background of these tendencies, because

120

Wittgenstein's development from a philosopher who considered things separately to a philosopher who considered things in relation to each other symbolizes modern trends of globalization. Thus, Wittgenstein's ideas present a fertile ground for philosophers and researchers discussing the nature of language.

2.3. Later Philosophy of Wittgenstein:

The lectures he gave to students in Cambridge (1933) were comprised in the Blue Book (1958). He didn't find answer to philosophical questions in the myriads of definitions, he rejected a tendency to generalization, and he wanted to see a family of senses resulted from the consideration of numerous cases and not mere definitions. The main attention of later philosophy of Wittgenstein concerned studies of meaning and self (5.6.Tractatus).

The problem of meaning is crucial for further research. It is evident that Wittgenstein in his early theory considered meaning as "rigid, based on a single, self-contained connection which, once made, remains authoritative, without any need for interpretation or any possibility of revision" (Wittingstein, 1922). In his later philosophy, Wittgenstein concludes that the meaning should be referred to flexibility and perceived in a different manner dependent on the context of usage or usage in different situations practiced by a certain linguistic society. Thus, Wittgenstein transcended from considering language as a static phenomenon to the language as a dynamic phenomenon. In Philosophical Investigations (1953) Wittgenstein considers meaning and language in dynamics. Moreover, in the modern anthropocentric philosophical paradigm these views of Wittgenstein maybe interpreted in the following way: language is a living creature and not a static essence. Nowadays, this statement is a well-known fact, but Wittgenstein belongs to the scientists, who initiated to consider a living nature of the language.

Attitude of Wittgenstein to rules is the following: "any interpretation still hangs in the air along with what it interprets, and cannot give it any support. Interpretations by themselves do not determine meaning" (Wittingstein, 1968, p. 198). Kripke argues that in mathematic language rules work because '+' has been used in numerous cases. There is a metha-linguistic usage of '+', i.e. the one used in the linguistic society, as it is claimed by Wittgenstein.

Kripke introduces a matter of quaddition a specially constructed function which is deviant in relation to addition. When skeptics start arguing why 68 and 57 will result in 125 and not 5 for example,

there is a need to give answer to two questions: 1) "an account of what fact it is (about my mental state) that constitutes my meaning plus, not quus" and 2) to "show how I am justified in giving the answer '125' to '68 + 57'" (Kripke 1982, p. 65). Kripke claims that no exact answer is possible. In such a way, Kripke gives up his positions thus making skeptics to be right.

Kripke intends to solve the problem of 'meaning' from a skeptical perspective. A well-known example of Kripke, which will be discussed throughout the paper, is determined in the following way: M"But...how can I be sure that, given what I meant by '+' in the past, that '125' and not '5' is the correct answer to '68 + 57?' as I now use '+'?" (Kripke 1982, p. 198). Kripke argues that it is possible to mean plus by '+' and to get the answer '125'; it is possible to answer '125' on the basis of

previous facts; there is no exact answer to this question; it is not the case when one has to say '125'; it is not the case when plus means '+'. Here are five types of Kripke's argumentation about Wittgenstein's rule following paradox.

Still, Kripke argues with Wittgenstein and says that it is impossible to mean plus by '+' all the time, because one can lie; or it is possible to deduce with no appeal to previous facts or experiences. Kripke gives numerous arguments, but his main premise is framed by expression 'there is no exact answer'. Thus, he reveals a skeptical nature of his problem solving: "I have no justification for thinking that I meant something or nothing by '+" (Kripke, 1982).

Therefore, Kripke introduces a problem of absence of justification about what individuals really mean, or, in other words, what the meaning of an

intentional phenomenon is. Kripke considers the problem of meaning as a paradox.

Both, Wittgenstein and Kripke apply paradox for rule following problem's solution. the Wittgenstein agrees upon the fact that "there couldn't be determinate facts about meaning, if meaning were construed in the way the skeptic assumes". From the skeptical perspective, the premise must be rejected; the usage of '+' can't be based on personal experience only; the linguistic community determines the meaning of '+'. From skeptical consideration, the "truth-conditions of sentences" will fail in this problem solving. It would be more relevant to involve "use-conditions' and claim that '125' is the only right answer, because linguistic community acclaims this legitimate usage of the expressions. The latter explanation is closer to Wittgenstein and is developed on the basis of the principles of the meaning usage by the community developed by him. Consequently, it is impossible to talk about a private language, because any meaning used separately from community's criteria and every meaning is used in a 'rule-governed way'.

In accordance with McDowell (Arulanantham, 1998), the rules of using one or other words are forced on humans by the society. All humans follow generally accepted rules, and there is no way "to obey a rule 'privately': otherwise thinking one was obeying a rule would be the same as obeying it" (Kripke, 1982). This is the way Kripke discusses a rule-following paradox. Moreover, he claims that "this was our paradox: no course of action could be determined by a rule, because every course of action can be made out to accord with the rule" (Kripke 1982, p. 198). Kripke considers the rule-following principle in terms of skepticism. In such a way, the

philosopher underlines avoidance of rule following approved by the society or linguistic community. At this point Kripke's views diverge from Wittgenstein's ideas.

A 'private' nature of rule following is defined by Kripke as well. Wittgenstein's idea about a rule following is expressed in terms of holistic views. The philosopher correlates the idea of rule following in terms of interaction between an individual and the society; in case a linguistic society follows the rule, then an individual follows the rule also. Therefore, the rule-following paradox is interpreted by Wittgenstein's idea of integration and cooperation of an individual and the society. Thus, there is no private rule and not private language, because only the language community or environment may define them. This is the position of Wittgenstein. The paradox of rule following is discussed by

by means of philosophy. From Wittgenstein perspective, philosophic as it is stated by Wittgenstein, everything is before humans: philosophy neither explains nor deduces anything; in other words, philosophy enables individuals to tkink over a certain meaning or any phenomenon. (Crary and Read, 2000). For Kripke, skeptical argument is the essence to get into the depth of truth of everything and philosophy is a 'tool' to penetrate into the depth of true and false statements of the world. This statement can be proven by Kripke's choice of the third solution to the rule-following paradox 'there is no exact answer'. He claims that whether he meant something or nothing by '+' doesn't matter, because no exact solution exists. The essence of finding solution to the paradox by Kripke is in skeptical discard of the community approved decisions, unlike Wittgenstein, who

managed to solve this problem in terms of an individual and society relation.

2.4. Criticism on Kripke's Rule of Following

The reaction of critics to the Kripke's interpretation of Wittgenstein resulted in a detailed discussion of the rule-following problem. In accordance with Simon Blackburn, "Kripke's view that whatever dispositions we succeed in identifying they could at most give standards for the selection of a function which we mean. They couldn't provide us with an account of what it is to be faithful to a previous rule" is worth attention (Miller, 1997). Blackburn belongs to normativists (or positivists), who perceive law or any phenomenon separately from the society; or 'as is'. Thus, semantic normativism can be considered a view implying that "a theory of meaning may in principle fail to satisfy even given the assumption that it satisfies the

extensionality constraint" (Blackburn 1984, p. 37).Blackburn joins Kripke's interpretation of Wittgenstein. In order to grasp the meaning and reflect it, it is necessary to get the "essential normativity" of semantic judgment, as it is suggested by Blackburn (1984: 33).

Next to other semantic normativists, such as Wright (2001), Brandom (1994) and McDowell (1984), Kripke's function of standardization assigned to the meaning by him, is supported by Blackburn. As it is stated in the article by Arulanantham (1998), McDowell supports Kripke's attempt to solve the problem of rule following and claims that Wittgenstein doesn't support enough his claims, he just theorizes them. From another perspective, it may be argued that Kripke gives a more skeptical consideration to the problem of rule-following and

doesn't look for solutions to this problem in the linguistic society.

On the contrary to Wittgenstein's idea, there is a need for "a diagnostic deconstruction of the peculiar way of thinking that makes such a thing seems necessary (Arulanantham, 1998)". Basically, followers of Kripke do not support his skeptical considerations to the fullest extent, but they underline his dominance over Wittgenstein in his attempt to solve the paradox of rule-following even in such a skeptical way.

Opponents of Kripke's vision are semantic anti-normativists. This group of scientists and researchers are focused on the anti-normativist vision of the meaning. In other words, they underline the necessity to solve the problem of rule-following paradox in terms of an individual-society relation, like Wittgenstein does. Jerry Fodor (semantic antinormativist) doubts that "the Kripkensteinian (he means Wittingstein and Kripke) worry about the normative force of meaning is either a non-issue or just the reduction issue over again; anyhow, that it's not a new issue" (Miller, 1997).

Fodor's supporters are Glüer and Pagin (1999), (Bilgrami, 1993) and others. An opponent of Kripke, Cora Diamond has criticized the way Kripke interpreted Wittingstein's vision of words "agreement," "correctness," and "mistake". Kripke considers the meaning of the words separately from the words' functioning context. Of course, this approach sounds weird in the modern philosophical and linguistic paradigm. Contextual background is primary in linguistic studies of word's usage or in the field of translation. Therefore, the best way not to fall for Kripke's constructivist interpretation of Wittgenstein (Arulanantham, 1998).

The same claim can be considered with regard to legal rules. Realists claim that "if language exhibits this baseline indeterminacy, and legal rules are built on language (and share all of its instability), legal propositions can have no determinative force either. Therefore, the realists conclude, judges are never compelled by rules" (Arulanantham, 1998). As far as be seen, rule-following principle it can of Wittgenstein applied for language, scientists and researchers may refer to different spheres of human activities. Thus, a vivid reaction to Kripke's attempt to interpret Wittgenstein evokes considerations about normativity and rule following applied in a wider context. The discussion about meaning is an part of philosophical integrative theorizing (Arulanantham, 1998). Moreover, a wider application of Kripke's argument and Wittgenstein's ideas are

related not only to the philosophy of language, but to other spheres of human activity.

2.5. Summarizing Ideas of Wittgenstein and Kripke:

Wittgenstein is a great philosopher whose ideas bind together philosophy and language. Logic of language suggested by Wittgenstein is a perfect background for the discussion about the relation between philosophy and language. Philosophy clarifies to people meaning of words in the context of daily activities. Furthermore, word's meaning triggers further activities of humans. Wittgenstein interprets a real meaning of logic in a specific manner, the same happens with his consideration about the word's meaning. What meaning of objects or 'absolutely simple sense data' actually is, - this claim is often referred to Wittgenstein attempt to interpret a word's meaning. In reality, philosophical

considerations about what meaning is has been a crucial issue for Wittgenstein: "I see now that these nonsensical expressions were not nonsensical because I had not yet found the significant explanation, but that their nonsensicality was their very essence; for all I wanted to do with them was just to go beyond the world and that is to say beyond language, but it is impossible" (Wittingstein 1968, p. 11-12). On the one hand, Wittgenstein underlines that an individual's imagination can't exceed his logic or ascribed by linguistic community rule-following.

In order to consider the way Wittgenstein refers to philosophy in his works, his ideas were considered from different perspectives. Kripke interprets the work Rules and Private Language and reflects his ideas on the matter discussed by Wittgenstein. Still, ideas by the latter interpreted by Kripke are often represented in a strange manner and it is relevant to consider Kripke's view only to get better acquainted with Wittgenstein's ideas.

Skeptic views of Kripke can be seen in his claim that "there is no fact about what you then meant by '+" (Kripke, 1982). In such a way, Kripke claims that there is no evidence about what a word really means. From the perspective of Kripke, Wittgenstein rejects the "truth-conditional reading" of meaning ascriptions in favor of assertibilityconditions analysis (Kripke 1982, p. 73). Thus, Kripke argues that no one really knows what one wants to say. Thus, there is no certain rule to define the real meaning of the words. Both, Wittgenstein and Kripke use mathematic or symbolic example to illustrate their ideas.

Nevertheless, Kripke behaves like skeptic when he says that following a rule is on community

behalf and an individual can't behave following by rule by himself. Thus, the meaning of words is defined by one's linguistic community and one can do nothing about that. Obeying a rule is on individual's behalf but the rule is set in the community.

Kripke's ideas about Wittgenstein's work have some advantages. He is focused on the issue of rule following, but on the other hand Kripke fails to clarify the ideas of Wittgenstein's interlocutor which are thought to be mistaken because grasping a rule is a primary concern for interlocutor and not his interpreting skills (Deuten). Kripke tends to solve the problem from the skeptical perspective, but Wittgenstein relates the problem to an individual and to the linguistic community.

Interpretation (Deuten) is defined by Wittgenstein as "There is an inclination to say: every action according to a rule is an interpretation. But we ought to restrict the term "interpretation" to the substitution of one expression of the rule for another" (Wittingstein 1968 §201). Even in this definition of Deuten Wittgenstein uses a term 'rule'.

Wittgenstein protects his idea of the important rule of interpretation, because it is a way to perception of the rightness of following the rule and not a blind following. Therefore, interpretation is the solution to a problem. Wittgenstein shows a practical approach to the solution of a problem of word meaning.

Philosophy of language is a plane of evidence; true and false can be seen on this plane. No matter, whether an individual needs to relate an intentional phenomenon and the meaning, or he looks for the best approaches to determination of the meaning. In spite of the fact that Wittgenstein's explanation of the word's meaning can be found in the interaction

of an individual and the society, makes a philosophy of language a special bound between the society and an individual. Therefore, approach of Wittgenstein to philosophy in language is not atomized, as it was in his early years, but generalized. Unlike the latter, Kripke appeals to philosophy as to a certain helpful tool used for restoration of the meaning in individuals' minds. Therefore, the paradox of rule following is not a problem to be solved to them; it is a challenge evolving other philosophical problems.

In the modern world, there are still many arguments about the nature of language. What came the first, a hen or an egg? What came first, population or languages? Maybe, language is a structural phenomenon, which can exist beyond the world of humans? Such questions may trigger human minds and make them think about the nature of language.

-

140

The main idea of Lewis in his work "Languages and Language" is that there is a strong relationship between populations and languages they speak. People transfer their ideas by means of words, or symbols, and they trust these symbols their intentions and ideas. There is an evident connection between the language symbols and the main message; conventional phrases and further produced sentences by the users.

Language is a means for people to transfer truth values and meanings to the world. Moreover, the language symbols are related to the factual information conveyed by the means of language. The condition of conventionality is important in the development or formation of human understanding of one or another concept, or their further expression or verbalization.

Language mediates human feelings about the world and facilitates the process of human communication. Does the language go first, or do our ideas come to our minds first, this is also an interesting question? Why do we use language? To express our feelings and emotions, to convey our ideas to other language users, or to verbalize current intentions? There is a myriad of issues related to the potential of language realization or verbalization. Lewis correlates truth and language as two related concepts. Every sentence can be either true or false in terms of language or the whole world. If to interpret the main claim of Lewis, it is possible to say that true messages can be effective in one world, but cannot be true in another world, where these realities do not work. Based on these claims, it is possible to say that languages are tools for a true depiction of the world.

-

142

Of course, it is relevant to communicate on one common language background, understand the intentions of another speaker, and comprehend his target message. At this point, it is impossible to be a language connoisseur or at least an effective language speaker if there is an unclear language background.

Any population deserves speaking their languages. What is the conventional transfer of the populations' ideas? Conventional thinking of people directly relates to their firm beliefs and actions. In other words, language is a perfect context and of mediation between people, the means representatives of one or another population. There is an interesting idea of Lewis, which underlines that the population P chooses the language L in case the language transfers or conveys truthful and reliable messages.

The claim about true messages can be rather dubious because not all claims we make can be true. Language can be a coordinating link between people. The speakers need general and firm basis for coordination of their communication process. In the functional terms, the role of language is a coordinative one. Those, who use the language have a right to be understood by others. Once the population chooses the language L, they become part of the linguistic conventionality. This claim is clear because if we use and speak one language, we understand each other, get meanings of our words, and realize deep senses.

If to refer only to the role of language as a perfect and effective means of communication, it is relevant to refer to the intuitive role of long sentences. Does it matter if the sentences are short or long? The intuitive potential of the speakers can 144

identify or predetermine their language use. On the one hand, the length of the sentences does not matter. If a speaker uses a short sentence, does he say true/false sentence? The number of words cannot determine the true/false essence of the sentence.

Lewis said that language users are "trying to win a bet or set a record, or feigning madness or raving for real, or doing it to annoy, or filibustering, or making an experiment to test the limits of what it is humanly possible to say and mean" (Lewis, 1975). If to explain the role of language and its true essence, with the help of symbols, it is possible to clarify that the speakers, actually speak language L^* , not L. A comprehensible and understandable form of a language depends on numerous factors.

On the one hand, the language is conventional, or "a platitude — something only a philosopher 145

would dream of denying" (Lewis, 166). People assign certain meanings to the words. The words could have had other meanings, but these are people, who decide about certain meanings. Therefore, the principles of conventionality identify key concerns of the language speakers.

If to refer to the criticism about the work by Lewis, "language is conventional, when this is taken as the claim that facts about the meanings of expressions in our language are derived from the mutual knowledge of speakers concerning what members of a population mean or would mean by their utterances (or what they believe or would believe when making or hearing utterances), is not platitudinous" (Lewis, 1975).

The author of the study appeals for the explanations of such an approach to the natural properties of language. Depending on the structural 146

explanations and approaches to the language, it is relevant to claim that some grammars are more natural and universal than others. Whether grammar plays a central role in language formation and cognition, it is rather a dubious issue. For example, L is characterized by natural grammar. Supposedly, L^* is not characterized by the functions of grammar. The language users would choose/speak/use the language L and not L^* . Grammar or formal structure is an advantage in face of the language, where there is no grammar or users do not stick to it firmly. There are various perspectives on the nature of language described by Lewis. The assignment of meanings to certain words depends on the behavioral and sensory perception of population.

Secondly, the interpretation or explanation of long sentences depends on attitude to their true meaning by the population. It is relevant to explain 147

that first of all the speakers interpret propositions, which are in the center of the sentences. Truthconditions of full sentences should be perceived by the public. If to explain the concept of conventionality, it is possible to claim that when people say that "the sun is shining brightly", they build this sentence on their belief and they say in such a way because they know that the sun is bright.

Lewis claims that there are many languages. There is a gradual transformation of true sentences, well-known propositions for the population to development of truth conditions. Many of the languages described by formal semanticists are possible languages in this sense. Most possible languages, however, are not used by anyone. According to Lewis, this is where convention plays a key role. He uses his game-theoretic notion of the convention to specify under what conditions a possible language is an actual language, i.e. is actually used by a population of language users.

According to one of critics, "Lewis's policy was to refrain (where possible) from saying anything about the best grammar of a language because of his doubts about the clarity and objectivity of our standards for evaluating grammars" (Lewis). Semantics is directly connected with truth conditions. The formality of semantics or true potential of sentences depends on the social/population beliefs.

If there is a convention to use formal structures, then the population believes in their charge of truth. Firstly, people refer certain names to certain objects. In terms of one population, or the users of one language, people have a set of beliefs or common ideas and they follow their meaningful representations. Is there a similar representation of

names/concepts in the English language as in other languages? If there is a semantic correlation between different concepts or generally accepted semantic maps? These and other concerns related to the mentality of one or another population. Lewis makes an emphasis on certain causal factors or determination element. Lewis claims, "the object at the end of such-and-such causal chain that led to this idea" (Lewis).

There should be a proper familiarity between the representatives of the population concerning any concept. For example, different speakers of one language may have different understanding of different concepts. They may have certain characters in their minds, but these characters may have different contents. There can be different references between objects. It also depends on the mentality of a speaker, his surroundings, different related social factors and so on. Formal nature of language, on the one hand, predetermines mutual understanding of language users, but, on the other hand, it is rather difficult to mediate the process of communication in case of misconception or misunderstanding about the basic grammar structures or other formal elements. In terms of descriptivism, there can be different interpretations of some concepts.

According to this approach, "Funny' is less natural than 'Fatal'; 'Grue' is less natural than 'Green'. The idea of primitive naturalness does a great deal of work in Lewis's later philosophy, working to characterize such diverse things as physicalism, supervenience, law hood and intrinsicness" (Lewis, 1975). There are certain assigned meanings of words. There is a relation to certain descriptions. The intermediate nature of references should be under consideration too. The language in terms of Lewis' consideration, first, mediates communication between speakers.

It is possible to conclude that the language users focus on formalistic and theoretical structures the way they would build a house of bricks. From the first layer of word-formation elements, suffixes, and prefixes, to the highest level of texts and discourse, language users base their linguistic competence on formalistic and structural basis, and then, they add semantics, stylistics and pragmatics to enliven their communication.

References:

- Arulanantham, A. T., 1998. Breaking the Rules? Wittgenstein and Legal Realism. Yale Law Journal 107 (6), pp. 1853-1883.
- Crary, Alice and Rupert Read, eds., 2000. The New Wittgenstein. London: Routledge.
- Fitch, G. W., 2004. Saul Kripke. Montreal: McGill-Queen's University Press.
- Kaplan, Morton A., 2006. Human Reason and a Common World: Why Wittgenstein and Rawls Are Both Wrong. The Review of Metaphysics 60, p. 359+.
- Kripke, S.A., 1982. Wittgenstein On Rules and Private Language. Cambridge/MA: Harvard University Press.
- Stern, David G., 2006. Wittgenstein's Philosophical Investigations: An Introduction. Cambridge University Press.

Wittgenstein, L., 1968. *Philosophical Investigations*. 3rd. ed. and transl. by G.E.M. Anscombe, New York: Macmillan.

2.6. Space and Time as Conceptual Domains in English-language Scientific Discourse

The relationship between two conceptual domains of space and time is usually discussed in terms of language and cognition. Time is often represented in the studies as the phenomenon secondary to space. The purpose of this study is to correlate time/space as conceptual domains in the English-language scientific discourse. Based on both qualitative and quantitative research methods, theoretical and experimental bases (analyzed and discussed) are mentioned. The paper outlines the absence of direct interdependency between time/space terms as they are defined by exact contextual environments and differentiated from one another in the natural environments. Based on modern studies and studies on temporal and spatial representations of previous years, we have examined

the linguistic basis to prove the fact of spatial and temporal relationships co-existence in terms of English-language scientific discourse. Moreover, considerations from cognitive science, psycholinguistics, and neurolinguistics are also relevant to further differentiation between spatial and temporal relationships. This study opposes the generally accepted methodological paradigm and it is claimed that spatial/temporal terms chosen above are independent terms with complete semantics.

It is claimed that there is no need to investigate a temporal or spatial basis of these terms because initially the spatial domain is perceived as definite and the temporal domain is known as the abstract one. Terms denoting space are concrete objects and the terms denoting time are abstract events. Concerning the fact that it is easier to deal with concrete entities than with abstract ones, concrete entities can be determinant domains for clarifying abstract experience. Time experience is better perceived in terms of experience gained within the accessible domain of space. It is relevant to investigate the possibility to identify specific limits between time and spatial relationships or discuss the existence and prevalence of spatial and temporal relationships.

Concerning the fact that our current investigation is anchored to the theory suggested by Jean-Marie Guyau (1988), it follows: only time representations reflect time dependency on space; time can be measured by space; "events" can measure time; the past is "behind us" and the future is "in front of us" (cited by Macey, 1994). The spatial basis of temporal terms has been often supported by the majority of scientists and researchers (Cantor & Thomas, 2007; Clark, 1994; Levinson, 2003). Basing

on the idea that human perception of time is related to space conceptualization is one direction of further ideas represented. It has been always underlined that time representation depends on space. By findings of psychological studies, it has been always claimed that it is natural for children to mix up the spatial and temporal relationship. Clark (1994) was the first who claimed that temporal language is based on spatial language and that English relational temporal prepositions are based on front and back. Clark talked about the "moving time" metaphor and "moving ego" metaphor and underlined that, for example, before is derived from in front of and after is derived from in back of, i.e. he correlates these two terms with the "moving time" metaphor (Clark, 1994).

Nevertheless, it is worth remembering that there is no one basic conceptual metaphor defining

further metaphorical representations of a certain domain. A consistent basis of a metaphor has been often underlined by Lakoff and Johnson (1999). Therefore, it is necessary to underline that representations of concepts in a metaphorical language are also possible outside this language, or in other words, it is possible in an independent manner. Still. there is a need to talk about the following peculiarities of metaphorical representations: metaphors are compatible with different domains though they do not have a scope covering different aspects of one domain and thus do not embrace the whole target concept.

From another perspective, it is suggested by Habel & Eschenbach (1997) that space should not be considered as "a concrete source domain from which the more abstract concepts of time are consistently derived. Instead, space and time share a

range of representational structures, which are systematically reflected in language" (Habel & Eschenbach, 1997).

Thus, it is relevant to talk about the coexistence of spatial and temporal relationships rather than their interdependencies and interrelatedness. A chosen metaphorical approach to the investigation of spatial and temporal relationships in the English-language scientific discourse is justified though it prevents from covering all the aspects of this relationship.

So, it is relevant to discuss the relationship between time and space taking into account that there are numerous commonalities and differences in representations of time and space concepts.

By Tenbrink (2006) in a spatial relationship, it is impossible to relate clauses to each other, and in verbal expression of events or objects, temporal

160

relational expressions may occur. It is relevant to talk about spatial and temporal markers and their conjunctional nature in the process of comparing time and space domains. Moreover, it is relevant to consider time in terms of space using the supposition that "time is space metaphor". By the scientists exploring the conceptual basis of metaphor, such as George Lakoff and Mark Johnson (1999), it is seen that "speakers use concepts referring to concrete, physical experiences to understand (and express) concepts referring to more abstract conceptual domains" (Lakoff and Johnson, 74). The time-space continuum of texts in English-language scientific discourse is often correlated with time-space metaphorical domains.

2.7. Methodology

The notion of time is used as a term covering some more conceptual metaphors and it is thus

easier to understand time as a tangible spatial phenomenon. As it is suggested by the researcher Bert Capelle (2006), it is relevant to focus on more specific time metaphors, such as the following: TIMES ARE OBJECTS MOVING TOWARDS YOU; TIMES ARE LOCATIONS IN A LANDSCAPE OVER WHICH YOU MOVE; EVENTS ARE MOVING OBJECTS; CHANGE IS MOTION, CAUSES ARE FORCES (Capelle, 2006).

With this regard, it should be noted that time or events are perceived as stationary or moving objects and thus an interlocutor's attitude to time may be different in terms of English-language scientific discourse. Usually, a temporal content of expressions is expressed via spatial relationships. For example,

The end of the experiment is getting closer and This experiment has slipped away swiftly represent conceptual metaphorTIMES ARE MOVING OBJECTS.

Another metaphor TIMES ARE LOCATIONS IN A LANDSCAPE can be illustrated in the following way: *I* am approaching this coming research and We didn't make it to the coming lab (At the same time, when an interlocutor is discussing short/long duration of time or says within the next few weeks, it is also relevant to be assigned to TIMES ARE LOCATIONS metaphor).

To illustrate the metaphor EVENTS ARE MOVING OBJECTS, such kinds of sentences may be given: The interesting facts are passing by me or Her scientific investigations were continuing on and on.

Therefore, a conceptual metaphor of time suggested by Bert Capelle (2006) is explained in the following way: human minds can perceive a category of time only via concrete experiences from their lives. Therefore, there is no exact correlation between space and time, but there is a direct

connection between the existence of concrete physical objects explaining a category of time to the individuals or facilitating their communication about time.

2.8. Analysis

Still, to prove the possibility of the independent existence of temporal and spatial relationships, it is necessary to see the way these relationships are reflected in the minds of speakers. It is possible to see how these categories are reflected in human minds using the preposition in. This preposition is often used in a spatial context (e.g. in the report) and a temporal context (e.g. in a week). Thus, speakers, for example, may memorize and apply a spatial meaning of the preposition in and at the same time develop their understanding and principles of further application of the the preposition in a time context.

This idea is also supported by Bert Capelle (2006) when the scientist talks about the mental representation of the *TIMES-ARE-LOCATIONS* metaphor. In case a speaker memorizes and further applies the temporal sense of *in*, then it would not be derived from the spatial time of in. The speakers do not have to draw a metaphoric parallel between spatial and temporal use of these conceptual terms of time and space.

Moreover, Croft (1998) supports this idea and claims that: "Speakers do not necessarily make the relevant generalizations, even if clever linguists can. Cognitive linguists, like other theoretical linguists, must be aware of this fallacy" (Croft 1998, p. 168). On the example of the spatial or temporal application of the preposition *in*, we can see that this preposition may be used in either one or two contexts (spatial or temporal). Nevertheless, we

should memorize that it depends on a model chosen by the speaker. On the one hand, it is a "single-entry derivation model" and on the other hand, it is a "homonymy model" (Moore, 2006). In case the former model is chosen, the preposition *in* reflects a spatial sense. In case the latter model is chosen, the preposition can be applied in spatial and temporal contexts separately.

In the modern context of English-language scientific discourse, the second model, or homonymic model, is relevant. This fact can be explained in the following terms: though historically temporal and spatial relationships were considered as interrelated, currently psychological peculiarities of modern speakers enable them to differentiate between spatial and temporal relationships. To prove this supposition, it is necessary to correlate this

claim with psycholinguistic and neurolinguistic evidence.

In the psycholinguistic research conducted by Landau and Jackendoff (1993), the temporal usage of prepositions was studied. Such kinds of prepositions as *in the daytime, in a week,* etc was studied. This research has not proven that there is a direct connection between time and space. Spatial and temporal relationships were not differentiated by English speakers.

In the neurolinguistic research conducted by Kemmerer (2005), it was claimed that: "although the spatial and temporal meanings of prepositions are historically linked by the TIME IS SPACE metaphor, they can be (and may normally be) represented and processed independently of each other in the brains of modern adults" (cited by Capelle, 2005). Therefore, our initial supposition that temporal and spatial relationships may be represented independently is proven in the neuro-linguistic and psycholinguistic paradigm.

The distinction between spatial and temporal relationships can be also proven by linguistic evidence. Capelle (2005) claims there is a need to differentiate between directional and aspectual particles: They came into the lab - there is a directional preposition and They filled in the form – there is an aspectual particle. This differentiation between particles is supported by Bolinger (1971), who talked about the following: "There is a deepseated relationship between notions of action, state, progression, inception, completion, and the like, on the one hand, and notions of direction and position on the other-a kind of geometry of semantics" (Bolinger 1971, p.110).

At this point, it is even possible to ask the question about whether spatial and temporal relationships distinguish between different natures of prepositions. Thus, is the preposition *on* is used in a temporal context has one sense, and when it is used in the spatial context it has another sense.

Furthermore, it is relevant to provide the following linguistic evidence that the single-entry metaphor-based model is irrelevant in modern English-language scientific discourse. In the experiment conducted by Moore (2006) so-called congruity test was made. During this experiment, the scientists had to measure a degree of an abstract concept understanding in terms of a more concrete There both concept. linguistic are and psycholinguistic findings in the study by lackendoff and Aaron (cited by Moore, 2006). They used as an example a template of the sentence to find out an

overlapping between two different concepts (e.g. relationships and moving objects). For example, *our partnership has vanished*. And initially, no motivated metaphor is applicable for this sentence. Though in the second part of the sentence there is a certain overlapping that makes sense of the whole sentence. Partnership as a relationship cannot be considered as a moving object. Still, for the second part of the sentence a conceptual metaphor A RELATIONSHIP IS A MOVING OBJECT may be applied.

Concerning such a kind of conceptual metaphor application, Goddard (2004) implies the name of "active metaphors". He proves that there are "meta-linguistic tags" between such kinds of moving metaphors. In other words, there are unseen rules of use for moving metaphors (Goddard, 2004).

Moreover, the second linguistic argument about the temporal context of a particle is the following. One may suggest using only one lexical name for on, used in spatial and temporal contexts. On the example of the preposition *on*, it is seen that in the temporal context on can never coexist with a direct object (e.g. read (the guideline) on) and spatial on can be used; turn (* the machine) on, while spatial on can be represented as follows (e.g. move the vehicle on). There are a certain argument and structural difference. It may be supposed that there is an initial necessity to preserve temporal and spatial relationships. This phenomenon is further explained by Capelle (2006) as the following: "The idiosyncratic grammatical difference between on used for the spatial continuation and on used for temporal continuation excludes the possibility that spatial on is basic and that aspectual on is merely an expected

metaphorical extension that need not be stored in the mind" (Capelle, 2006). Therefore, temporal contextual meanings of prepositions shown above are extended from spatial meanings. English speakers supposedly can store temporal meanings separately from spatial meanings. That is why we can currently claim for sure that there is no unarguable correlation between space and time as it has always been before. Nevertheless, it is necessary to take into account other ways of representing spatial and temporal relationships in the linguistic and cognitive science paradigm.

2.9. Discussion

Temporal and Spatial Language

Time features are expressed in language. Time relationship is usually perceived in the following terms: "they reflect speakers' underlying conceptions of the relations between events, which are generally

not purely temporal but are also perceived as connected in some more or less direct way" (Capelle, 2005). In the English language, the time relationship is usually expressed in terms of anteriority or posteriority. Nevertheless, the time relationship expressed in English is not only restricted by these terms. There is also an association of sequentiality or proximity (Tyler and Evans, 2001).

Semantics in time contexts is limited by time frame. For example, two adjacent clauses are supposed to describe causally related events even in case explicit causal markers are absent (Tyler and Evans, 2001). Partially, it is possible to describe this phenomenon in terms of the relationship between two abstract concepts: time and causality. The presence of causality is often discussed about the

usage of "after": After they finished their research, they filled in the reports.

In the case of "before," it is rather hard to draw a causal relationship between two events. Causal and quasi-causal relationships are further discussed in the following contexts: concerning presuppositional effects; non-veridical interpretations together with *before* (Capelle, 2005). Nevertheless, from our perspective, it is relevant to consider the spatial and temporal relationship in terms of pragmatic discourse.

It has been further claimed that English speakers do not use the temporal relationship to describe unrelated events. This fact can be explained in the following way: the English language provides speakers with different options to express temporal relations (such as tense, temporal adverbials, or clause order) (Zakay and Block, 1997). In the case of temporal dimensional terms usage, the speaker may have an intention to transfer more information than simply temporal information. Still, different conceptual relationships can be reflected using temporal dimensional terms. At this point, it is relevant to talk about a causal relationship. From the perspective of cognitive linguistics, the relationship between time and causality can be explained in the following way: there is a naturally close relationship between causal and temporal relations.

2.10. Spatial Language

To determine a spatial relation between two objects, it is relevant to refer to locative dimensional terms. Thus, one object is "relatum", and the other is placed within a certain space surrounding a focal axis with a certain relation to the relatum, based on the conceptualization of a reference system (Cantor and Thomas, 2007).

The most interesting area for discussion is an area that concerns the reference system and perspectives. A spatial term can be often interpreted in many different ways and it is a well-known fact. Following Levinson (2003) there are many confusing terms, such as "*deictic*, *extrinsic*, and *intrinsic*" (Levinson, 2003). It is common to mix up deixis with perspective because there is a common basis for both of them, i.e. actual situation.

Levinson's claim should be considered as a central one for further discussion. The study by this scientist focuses on the following claim: there is a possible interrelation between objects (limited by internal or external relationship). In terms of external relations, one object is located inside of another one. Thus, Levinson determines three different systems of referencing: *intrinsic, relative,* and *absolute* (Levinson, 2003). We would focus our attention on the location of one object, the location of another object (relatum), and the perspective used.

The choice of reference system by speakers is rather a controversial issue. Cantor and Thomas (2007) claim: the speakers prefer the listener's point of view in case they have reasons. The listener's perspective is often used to facilitate the process of cognition for the interlocutor.

It is relevant to mention a "global perspective" or an observer's viewpoint. In this case, the observed region is divided into sections described by spatial terms (front, back, left, right) (Tenbrink, 2005). There are also other approaches in the field of spatial relationship, such as the spatial templates approach (e.g., Carlson-Radvansky and Logan 1997), *functional features* of objects (Coventry & Garrod 2004), and *interaction-related* as well as *discourse taskrelated aspects* of the application.

In the linguistic paradigm, it has been often claimed that either temporal or spatial relationship may exist without reliance on each other. Moreover, English speakers usually differentiate between their spatial or temporal relationships conceptual or linguistic choices by the presence or absence of other objects.

2.11. Cognitive Science about the Temporal and Spatial Relationship

Time and space though reflected to a certain extent in a specific manner in the language (considered above) are also specially represented in human cognition. In cognitive science, it has not still clearly defined the way people perceive time or estimate duration. It has been claimed by Zakay and Block (1997) that "people may estimate filled durations as being longer than empty durations, but sometimes the reverse is found. Duration judgments tend to be shorter if a more difficult task is performed than if an easier task is performed, but again the opposite has also been reported" (Zakay and Block, 1997). Moreover, following Zakay and Block (1997) time is not perceived through the senses. Time is often perceived as a sensory process. Two following examples illustrate this supposition:

A) They moved the exhibit forward two meters.

B) They moved the negotiations forward for three hours.

Thus, the exhibit is a physical object moving through space and an individual can hear or see its movement from the initial to the endpoint. The second sentence does not describe motion itself. Abstract nature of events and the definite nature of objects prevent individuals from considering spatial rather than temporal relationships. The relationship between time and space can be defined by duration. Spatial representations conceptualize time, which is one of the many other domains of knowledge depending on "perceptual and motor representations built up via experience with the physical world" (Zakay and Block, 1997).

In the experiments conducted by Tyler and Evans (2001), it is claimed that temporal and spatial thinking is related (Casasanto and Boroditsky, 2008). The experiments were based on showing people non-linguistic stimuli and they had to estimate either their duration or spatial displacement. Therefore, it was found out that temporal and spatial mental representations of people can be measured by three main approaches.

As it was claimed by John Locke (1689/1995) "expansion and duration do mutually embrace and comprehend each other; every part of space being in every part of duration, and every part of duration in every part of expansion" (cited by Evans 140). We can see the interdependency between time and space in our minds. There is also a possibility of asymmetric dependence between time and space (Boroditsky, 2000; Lakoff and Johnson, 1999).

To illustrate the spatial and temporal relationship, we have chosen Experiment 5 out of 6 experiments conducted by Tyler and Evans (2001). During this experiment the subjects viewed a dot (10×10 pixels) moving horizontally crossing the midline of the screen. The participants needed to memorize the starting point of movement and the ending point of the dot's movement. Therefore, people appeal to spatial information more than temporal information to make further judgments.

The experiment conducted by Cantor and Thomas (1977) was also focused on the fact that spatial information causes a great influence on temporal judgments. In the experiments conducted in the field of metaphor theory, a linguistic stimulus was used (Boroditsky, 2000).

The psychological reality of mental metaphors is supported in these studies and it is claimed that people have an option to think about the abstract domain like time in a metaphoric manner. The abovementioned experiment is not based on linguistic stimuli and still, there is an interrelationship between space and time. It is natural for English speakers to describe the time in terms of space.

These experiments have indicated that there is an asymmetrical cross-dimensional interference between time and space. The effect of distance of time prevails over the effect of time on distance. Thus, in mental representations space affects time and spatial representations are integral for temporal representations. Time representation in a linear manner makes us representing abstract temporal events that humans cannot perceive directly. Through metaphors, mental representations of time and space are reflected in language. In other words, metaphoric speech is based on metaphoric thinking.

There is direct evidence that spatial cognition supports the development of abstract concepts. Spatial representations are crucial for abstract thinking. It has been claimed for centuries that abstract thinking was developed based on linguistic and psycholinguistic data (Tyler and Evans, 2001).

The performance of psychophysical experiments underlines the fact that nonlinguistic representations of either concrete or abstract domains predict the fact that humans think in mental

metaphors. Spatial words are used by people for abstract representations.

There is a strong interaction between language and nonlinguistic representations. Following the experiments, it is clear that "language not only reflects the structure of underlying mental representations, it can also shape those representations in ways that influence how people perform even low-level, nonlinguistic, perceptual and motor tasks" (Tyler and Evans, 2001). Despite the earlier studies, the prevalence of language that formation of influences the nonlinguistic representations is underlined by Tyler and Evans (2001).

An integrative approach to consider spatial and temporal relationships focused on the prevalence of spatial representations was also conducted by Boroditsky (2010). It has been found that spatial relationships should be considered as default relationships in human mental representations of concrete objects. The author also claims that previously it was relevant to correlate temporal and spatial relationships. Moreover, it is claimed that there is integration between temporal and spatial relationships. Macey (2006) has also underlined that spatial maps are not always relevant to discuss mental representations.

From another perspective, it has been presented that space and time are not abstractions, but are necessary parameters for human brains (Macey, 1994). Therefore, we have shown a scientific tendency to show that language is the first and then discussion comes to cognitive science. In other words: linguistic representations of time and space influenced cognitive formation and reflection of these representations. We would rather argue that

cognitive development comes first and then follows language. This claim was also suggested by Casasanto, Fotakopoulou, and Boroditsky (2010) when they conducted their experiments with the help of children who were asked to differentiate between the temporal or spatial relationship between moving stimuli. Therefore, cognitive mechanisms influencing the formation of spatial and mental representations may differ or coincide with linguistic mechanisms of these representations.

2.12. Temporal and Spatial Terms: A Comparative Approach

By our main claim that spatial relationship and temporal relationship can exist separately, there is still the main linguistic argument that their relationship in interrelationship is also possible and can be met very often. Temporal terms are applied when a speaker wants to define an interrelationship

events and their influence on the between interlocutor: "Thus, temporal dimensional terms are employed whenever two events need to be juxtaposed that are conceptually interrelated in some way, which is often causal in some sense" (Tenbrink, 2005). It is possible to underline a definite temporal relationship between some events when this type of relationship is focused on duration description between the events, for example. From another perspective, temporal relationships when reflected using indirect linguistic means (tense, clause, etc), then the interrelationship between events is expressed as a secondary conceptualization. Nevertheless, concerning the temporal relationship between events, explicit expression of time conceptualization is appropriate. When the English speaker wants to show a stronger relationship between events, then temporal relationships would

be expressed in a broader context and a wider discourse. When we talk about spatial relationships, we can see that the matter is about a threefold relationship: the discourse task, the functional relationship, and an underlying reference system.

For example, in a wider context, an interlocutor may choose a specific reference system or syntactic form of expression. Therefore, in the English language spatial relationship is focused not only on object identification but also on the description of spatial relationships. With this regard, it is possible to claim that areas of applicability of spatial relationships are often influenced by functional relationships between spatial objects.

2.13. Conclusion

With this respect, as we have already seen, temporal and spatial relationships in English-language scientific discourse may be differentiated on the ontological basis that limits objects and events. In the "objects linguistic perspective: directly are perceivable and therefore in some cases do not need to be specified linguistically, while events are more abstract and must therefore be retrievable from or delimited by the discourse itself" (Capelle, 2005). But in both cases, the interlocutors do not necessarily differentiate possible interpretations between spatial and temporal relationships. Therefore, we can claim that there are many commonalities between spatial and temporal relationships. The application of these relationships in the discourse underlines that there is no direct dependency between these relationships and they can exist separately from each other.

Moreover, unlike previous studies where it has been often underlined that there are no time relationships without spatial relationships, it is seen in this study that temporal relationships have different dimensional terms in comparison with spatial relationships. In such a way, a modern linguistic paradigm should consider temporal and spatial relationships in a broader context.

References:

- Block, R. A., Zakay, D., & Hancock, P. A. (1999).
 Developmental changes in human duration judgments: A meta-analytic review.
 Developmental Review 19, pp. 183-211.
- Bolinger, D. (1971). The Phrasal Verb in English. Cambridge: Harvard University Press.
- Boroditsky, L. (2000). Metaphoric Structuring: Understanding time through spatial metaphors. *Cognition* 75(1), pp. 1–28.
- Cantor, N. E., & Thomas, E. A. (2007). Control of attention in the processing of temporal and spatial information in complex visual patterns. Journal of Experimental Psychology: Human Perception and Performance 3, pp. 243–250.
- Cappelle, B. (2005). Particle Patterns in English. A Comprehensive Coverage. Unpublished Ph.D. dissertation.

Carlson-Radvansky, L.A. and G.D. Logan. (1997). "The Influence of Reference Frame Selection on Spatial Template Construction". *Journal of Memory andLanguage* 37, pp. 411-437.

- Clark, H. H. (1994). "Space, time, semantics, and the child". In Moore, Timothy E. (ed.). Cognitive development and the acquisition of language. New York: Academic Press, 1994.
- Coventry, K. R. and Garrod, S. C. (2004). Saying, seeing and acting: The psychological semantics of spatial prepositions. Psychology Press.
- Goddard, C. (2004). "The ethnopragmatics and semantics of "active metaphors". Journal of Pragmatics 36(7), pp. 1211–1230.
- Habel, C. and C. Eschenbach. (1999). "Abstract Structures in Spatial Cognition. In C. Freksa,
 - M. Lakoff, George and Mark Johnson.

Philosophy in the Flesh. New York: Basic Books.

- Landau, B. and Ray Jackendoff (1993). "What" and "where" in spatial language and spatial cognition". *Behavioural and Brain Sciences* 16, pp. 217-238.
- Levinson, S. (2003). Space in Language and Cognition. Cambridge: CUP.
- Macey, S. L. (1994). Encyclopedia of time. New York: Garland.
- Moore, K. (2006). Space-to-time mappings and temporal concepts. *Cognitive Linguistics* 17-2, pp. 199-244.
- Talmy, Leonard. (1995). "The fundamental system of spatial schemas in language. In B. Hampe (ed.) From Perception to Meaning: Image Schemas in Cognitive linguistics. Berlin: Mouton de Gruyter.

- Tenbrink, Thora (2007). Space, time, and the use of language: An investigation of relationship (cognitive linguistics research). Berlin: Mouton de Gruyter.
- Tyler, A. and V. Evans. (2001). Rethinking Prepositional Polysemy Networks: The case of Over. *Language*.

2.14. The modern English Technical Discourse and Culture

In the global scientific and technical context it is relevant to focus on the intersection between culture and language. Firstly, from defining these two concepts, outlining their main features and integrating points, the ideas go even deeper and concentrate on specifics of communication between the contemporaries based on their technical background and global background of interaction. There are different aspects of communication the representatives of different between communities, which often do not understand each other, but they should exist in one common global background. The same we can claim about language and cultural connections in the modern technical and scientific discourse. Thus, integrated unity of language and culture is a strong background for

existence of any nation, fostering the ability to go global, and spread its potential worldwide.

Language and culture have often been considered as two inseparable concepts. Currently, in the world of blurred limits, there are many ties between these two concepts, and it is relevant to focus on them in their integration and overlapping. Social migration of people and changes in society are transforming the relationship between culture and language. The names of people represent one of perfect examples, which highlight relationship between culture and society. For example, in some cultures, names are important parts of an individual and it is impossible to speak about a wholesome individual without mentioning his or her name. Moreover, names define destinies of people or predetermine their positive or negative events (at least, Hebrews believe in that, Danesi, 2016, p. 171).

Moreover, if we cross the limits of technology, we may appeal to our cultural experiences, the mentality of different nations and development of a holistic global community. It is possible to refer to Pellegrino Riccardi. After watching his video presentation about crossing cultural limits, it is possible to outline a number of challenging issues across intercultural communities or societies. He said that perception of people depends on their cultural background, mentality, traditional representations of one or another phenomenon. Thus, he says that to speak the British or American English will make you be positively and respectfully treated abroad.

Pellegrino claims, "We have got different ideas of accepted and familiar" (Pellegrino). For example, when keeping up with people in the queues, people

in Norway are more patient and tolerant and try to follow others, while in Italy, for example, where people are more impatient, they see no difference how to move in queues. In the same way, linguistic features between the Italians and what are the first and foremost in changing and integrating, the language or culture? What is misperception? Where does it come from? There is a myriad of related issues occurring in the related linguistic phenomenon.

Moreover, if to focus on historical background or roots of cross-cultural communication, it is relevant to refer to the basic definitions of culture. For example, "Culture is the characteristics and knowledge of a particular group of people, encompassing language, religion, cuisine, social habits, music and arts" (Zimmermann, 2017).

If to highlight the common points between culture and society, it is possible to illustrate advertisement campaign mistakes, when a targeted message of the audience was uncommon for the nations or certain people. One of the famous mistakes was made by Pepsi. When translating into Chinese, "Come alive with the Pepsi generation!", the Company created an incomprehensible message from the Chinese people, which sounded in the following way in Chinese: "Pepsi will make your ancestors rise from their graves!" Another paradoxical mistake occurred, when a famous Company, Gerber, started selling baby food in Africa, featuring a smiling baby in the box. The marketers of the company were surprised to realize the fact that in the African market, the sellers or food manufacturers usually depict the contents on the cans, which they sell. Thus, they thought that a

smiling baby from the can was inside of it. The intercultural differences or challenges may result in marketing failure, the decrease of sales, and influence negatively global communication among different nations.

The modern world is developing at a very fast pace. There are many innovative sciences and technologies at the intersection of the various industries that mediate human activity. Robotics, nanotechnology, biotechnology and related industries require the study of their lexical content, text representation, and discursive studies. All these linguistic phenomena are related to language and culture-specific integration. The English-language discourse of innovative technologies mediates the global engagement of professionals from around the world. Thus, the emergence of certain phenomena in it that require nomination, causes the extension of

the terminology and vocabulary used. Integrated lexical markers in the studied type of discourse are combined into a harmonious textual unity, which, when penetrating into all areas of users and users of that type of discourse, requires learning at the level of language and pragmatics. The main complexity of understanding and processing of such texts is the inherent complexity of the industry, which has rich interdisciplinary connections and is characterized by complexity of terminology, processes of reterminology, interpenetration of industries, a combination of lexical and stylistic means and so on. There is the creation of a specific linguistic phenomenon, in which you use specific terms and common vocabulary, strategies, and tactics of pragmatic guidelines of the authors and their adequate perception by the readers. The main goal

of communication is to reach common points of ideas transferred from one party to another one.

The relevance of the investigated issues is related to the development of innovative industries and the need for communication of specialists working in them, closely related to interdisciplinary links with chemistry, biology, medicine, engineering, and other classical sciences. Defining the linguopragmatic features of this type of discourse will facilitate the adequate perception of such texts, relevant terminological units, and the identification of linguistic means of influencing the perception of the Modern discursive studies recipient. are an important place in the study of linguistic processes and are a promising area.

Changes in taxonomies, onomastics, word group classification, reterminologisation, and other modern linguistic tendencies are related to blurred 202

limits of technological mediation of human activities, people's existence between the virtual and real worlds, and 24/7 mediation of their communication by means of gadgets, on the social media platforms and using the Internet. The digital literacy of the contemporaries depends on their active involvement in technologies. Thus, in the modern English language, such tendency is reflected in accumulation of innovative lexis, especially in the computer discourse. The limits of human existence in the real world and virtual world are blurred and lexemes from generally used English transform into the figurative computer terms.

For example, "Master/slave is a model of communication where one device or process hasunidirectional control over one or more other devices. In some systems a master is elected from agroup of eligible devices, with the other devices 203

acting in the role of slaves" (Master SlaveTechnology, Wordspy). The subjective relationship of slaves from the past to their masters arenow projecting their semantics on the computer terms.

Another borrowing from the African rituals, such as voodoo dolls transformed into"voodoo programming", the computer term, which means the use of programming code writtenby someone else and which means a complete misunderstanding of the code meaning.

These two examples from the English computer discourse symbolize that cultural representations common for people are further projected in the technological discourse. If to interpret these words, we can refer to comprehending reality and there is a correlation between reality and the virtual world. On the one hand, the world of technological 204 progress is closely related to cultural and social memories of the nations.

We live in two realities. In our real life, we wake up, brush our teeth, and go to work and live our daily routine lives. In the virtual world, we exist and have no obligatory actions and daily drudgery. Gadgets have captured the contemporaries and they cannot get out of this trap. The Internet and social media create a specific level of human existence or transformed reality, which reflects real life features of human world.

From the perspective of 'frontstage' and 'backstage' metaphor developed by Goffman, "the screen becomes our stage where we can choose what to reveal and what to withhold, depending on our perceptions of the audience. As with our real world (RL) interactions, our identities are constructed through language, interaction and

interpretation" (Discourse in Cyberspace). It means that visual world enables humans to reconsider their self-identities.

We can see these changes in language. Further, in this paper, we will focus on anthropocentric expressivity of the cyberspace discourse. We will concentrate on anthropic lexical units and visual and graphic elements, which turn cyberspace discourse into interactive socio-linguistic platform for reflections of human creativity and potential.

2.15. Anthropocentric Lexical Figurative Component

The anthropocentric figurative component is one of the integrative elements of cyberspace discourse. Lexical units used in this type of discourse are similar to common language units. Some semantic features of lexical units can integrate the meaning of expressivity. These lexical units reflect a lively, dynamic image of human experience based on an individual's professional activity. Humans coin every lexical unit of cyberspace discourse based on their experience (Morris, 1996).

For example, visual experience of a human produces such units with a figurative component, as *cutoff circuit, which means* 'an interruption or cessation of a scheme power';*flatworm,* 'an underlining line', *babble* 'broadcasting noise'. As far as we can see, meaning of these units change in cyberspace discourse. These are not only a chain, a worm, or babbling. These units define objects/activities in the virtual world.

Further, there are two main types of a figurative component in this type of lexical units, – implicit and explicit imagery. We can illustrate implicit imagery in the following way: *friends and*

family virus literary means'a virus of friends and family nature', or 'a virus, which infects computer of a user and is sent via email to other users, which are mentioned in the address book of the first infected computer'. Another example illustrates explicit imagery: 9999 bug, which means 'a potential problem of computer software, when a program confuses date of ninth of September 1999 (9/9/99) with a figure '9999', or a special code 'the end of a file'.

Acronym NOISE does not mean only 'a sound, especially one that is loud or unpleasant or that causes disturbance, but it means 'the most furious enemies of Microsoft company: Netscape, Oracle, IBM, Sun, and Everyone else).

Thus, cyberspace communication area is a transformative power, which changes both human society and language. We cannot underestimate its linguistic features, because they represent changes in our society. Modern English is vigorously developing through the rapid pace of globalization, which is evident in the lexical structure of social networks.

Communication in cyberspace discourse is dynamic and creative. Analyzed empirical material shows that users (professionals and amateurs) develop vocabulary of English social networks (Facebook, Twitter, LinkedIn and others).

MIXED REALITY as the Source of Anthropic LexicalUnits

We claim that there is a special layer between real and virtual worlds, which is "mixed reality." Further, we will refer to the concept MIXED REALITY as anthropic source for creation of innovative lexics of computer discourse. It means that users in social media reflect their lives, appearance, actions, and anything else related to their lives. At this point, we can appeal for Marwick and Boyd (p.124), "are we more or less authentic

with our book club or gym partner? Whether we are viewed as authentic depends on the definition imposed by the person doing the judging." (Theorizing Identity and Interaction.).

To give the answer to this question is even more challenging in the virtual world.

From the philosophical perspective, there is a direct relation between anthropology and the Internet. Nowadays, there is Renaissance of human culture. In other words, an individual projects his lifestyle, activities, self-identity and other characteristics on the Internet. When we turn on the Internet, we launch the mechanism of coherence between virtual and anthropic realities. The scheme of this mechanism is as follows,

As a rule, users transform real data into virtually adapted data and authorize their being in the virtual world. A human has been improving his writing and reading skills throughout their lives. Nevertheless, human activity in the Internet is voluntary and creative. Educational institutions do not teach individuals the best means to create personal pages on Facebook, write Tweets or post photos on Instagram. Humans are interested in this type of activities and spend much time on it. Thus, a person lives on both real life and virtual world's levels.

Following the existential doctrine of Merlot-Ponty, we can claim that in the virtual world an individual identifies himself differently in comparison with the real world.

Thus, in the virtual world, or on the sociolingual level MIXED REALITY users describe 211

themselves and coin new lexical units according to their self-identification. According to modern theories in the studied field, "The set of identity features such as our gender, our mother tongue and our geographical origins are perhaps (more) stable features of the self. These characteristics might be considered the backdrop, or the canvas upon which other more dynamic or temporary identities are placed, such as our profession, our personal relationships, our membership in special interest groups etc" (Theorising Identity And Interaction).

In terms of cognitive linguistics, there is dynamic and anthropological relationship between real and virtual worlds (Loader, 2004).

Further, we will correlate four semantic models used in cyberspace discourse with their real-life prototypes:

I) the static direct anthropic model (*digital nomad*);212

2) the static indirect anthropic model (*technoburb*);
3) the dynamic indirect anthropic model (*microblogging*);

4) the static non-anthropic model (mouse).

For example, according with American movies, male characters in white hats have always represented good people. The same happens in the cyberspace discourse, when white hat hackers correct the mistakes in the software and informs developers about them.

«Mell says the attack scripts are posted on hacker Web sites by other hackers, by disgruntled systems administrators trying to draw attention, and eventually patches, to holes in their systems, and by 'white hat' hackersseeking to alert the computer security industry to vulnerabilities».

Thus, positive emotional connotation and expressivity is transferred by this lexeme in the cyberspace discourse.

On the contrary, a lexeme *dark-side hacker* describes hacker with bad intentions.

«Having a DSL or cable modem service means you have high-speed access to the Internet, but there is a downside. Your computer becomes a tempting target for *dark-side hackers* who can more easily break in and steal your banking records, credit card numbers and passwords».

Another lexical unit, hacktivist, means a hacker, who breaks up the system for further agitation of users. «Members of the Hong Kong Blondes, a covert group, claim to have gotten into Chinese military computers and to have temporarily shut down a communications satellite last year in a '*hacktivist*' protest».

Moreover, users project abstract concepts used in the real life on the virtual world. There are many lexemes created via metaphoric transfer of the concept DEATH (dead band, dead file, dead space, dead time, deadlock, mortality). Lexemes of this group are united by the following semantic scheme: "the absence of something", "uselessness", "halt", "break", which in general refers to semantic load of biological concept DEATH. As far as we can see, words with negative emotive semantics prevail in language and speech, because negative aspects of human life are the most memorable for individuals. The same thing happens in the virtual world, when users come across lexemes with a conceptual basis DEATH they experience a negative or pejorative emotional condition.

As far as we can see, anthropic features of humans are projected on lexical units of cyberspace discourse. Individual features or general concepts transfer their meanings from common language into the cyberspace discourse.

2.16. Metaphors in Computer Terminology

Metaphors in computer texts are characterized by a vividly manifested cognitive nature and metaphoric process modeling, which, with regard to one of the claims of a cognitive metaphor theory depend on: the principles of metaphoric processes are based on knowledge interpretation procedures, reflected in cognitive construction frames (specific unified constructs of knowledge or experience connected by mental reflections) and scenarios (a generalized dynamic experience of human interaction with the world).

Foremost, it is possible to define the following source domains in English computer metaphoric term system: 1) anthropomorphic (a human being as a central donor-sphere in metaphoric terms creation); 2) non-anthropomorphic (phenomena and elements of environment as a donor-sphere in metaphoric terms creation).

Therefore, anthropomorphic model of metaphoric terms creation can be represented in the following source domains:

 biophysical characteristics (dead band, dead file, dead space, dead time element, deadlock, diehole, mortality, body, carbon footprint, crawler, backbone bus, eye diagram);

2)psycho intellectual characteristics (trust timeout, dumb terminal, don't care bit, fault band, trouble chart);

3)kinetics(client push/pull, handshake, one-touch access, flush, bum,burn-in, dike, hack, die out, to gun down, to bring bridging system to its knees);

4)food types (applekey, spam, ham,salami (attack), cookie, cracker,menu);

5) attire (cloaking, subnetmask, jacket, bitmask);

6) housing and consumption goods (backdoor, data warehousing,(chat) room, mailbox, trash can window, filter box,thread, button,file folder, clock bus, clock jitter, housekeeping channel);

7) professional gear and actions(crowd, candidate key, client/server filter, hub, stack, companion descriptor);

8) social status (host, orphans, widow, master, slave, orphan/widow control).

With the structure of non-anthropomorphic model it is possible to define the following source domains of metaphoric computer terms creation:

I) landscape (valley, bypass, groundbus)

- flora and fauna (daisychain, betabug, rat'snetprogram, piggyback);
- natural phenomena (broadcaststorm, flooding, freeze, lightning);
- 4) sound(doubleclick,babble, barf, wobble);
- 5) flavor(flavor)
- 6) image(icon);
- 7) color (bluescreenofdeath, greenarray);
- texture of an object (floppydisk, hardcopy, raggedarray, smoothedarray,sprocketholestrip,treechart,slicearc hitecture);
- 9) household goods(inbox, key, diarybug, hash, jacket);
- 10) means of human communication(datatraffic,messageboard, tracefile, go/no-goevaluation).

Having analyzed anthropomorphic and nonanthropomorphic models of computer terms creation, it is relevant to focus more specifically on the source domain "biophysical characteristics" within the structure of anthropomorphic model where 50% of the examples presented in this source are created via metaphoric transfer of the concept DEATH with explicit involvement of titular lexeme creation of the in corresponding terms(deadband, deadfile, deadspace, deadtime, deadlock, indicating the mortality) thus dominant anthropomorphic background of English computer terminology.

2.17. Visual-graphic Elements of Cyberspace Discourse Semiotics in Media Culture Semiotics in media culture is the broad subject area for research. This research may focus on emoticons of social networks (Facebook, Twitter

220

and others), consider signs and symbols in popular sitcoms (The Big Bang Theory, Community), or trace semiotics in TV news, advertisements, billboards and in any other sphere of media culture. There is a strong relation between popular culture and the mass media. Semiotics within these two spheres is a challenging background for a proper consideration.

Particular aspects of this area, to my mind, are social networks and semiotics in this context. Contemporaries exist on the edge of their real daily lives and existence as users of social media, where they chose the roles they like. A person may differ in real and virtual worlds. Nevertheless, he has inborn and inherited system of cultural codes and transfers them from his daily life to Internet dwelling. User pictures, signs, symbols and images reflects his emotional condition, intentions, goals of communication, opinion about anything and so on.

Signs and symbols, which users of social networks or Internet users transfer from their system of inherited cultural codes, is a fertile ground for a potential research. Semiotics of signs and symbols in the web bases on real experience of a person, his surrounding, habits, feelings and emotions. **2.18. Relation of Topic to Theoretical Background**

Roland Barthes was one of the first researchers, who focused on semiotics studying (1988). According to different researchers and scientists, any symbolic system in culture performs the secondary function of another language or text (Durham 2007; Chomsky 2005). At a given stage of development, any symbolic system is holistic and complete. If to penetrate into the essence of sign systems in language or visual media, it is possible to analyze, interpret and comprehend social values

The ideological background of structure. information, which surrounds people every day, is evident. Ideological background of information is gradually constructed. It is not unintentional and unnatural. There is a different level of people's competence in symbolic meaning and competence. It depends on a person if to encode or decode given background of signs and symbols. Chomsky conveyed the idea about deep grammar of signs and symbols (Chomsky 2005). Barthes (1988), Eco (1998) and other scientists considered semiology or semiotics as a system. Multimedia semiotics is a key for identification of hidden meanings and information background within signs and symbols. People can identify those hidden meanings in voices of actors, announcers, find them in printed texts, listen to them in music, movies and Web content.

2.19. Relation of Topic to Ongoing Interests

My point is that every type of mass culture has its own code, which is specific for this genre. For example, TV news, a sit-com, or email communication has different types of codes. To be a good email or Internet users, one should be aware of specific nonverbal signs, such as emoticons, smiles, orthographic or punctuation symbols combination and so on.

Thus, a person is both a sender and receiver of various media culture codes. We distribute different signs and symbols throughout various kinds of media culture. Thus, we convey and interpret meanings of signs and symbols from one medium to another. These various practices of communication underline that there is a larger global semiotic system. Unfortunately, there is lack of studies devoted to media culture semiotics. I hope that my research in this field will contribute much into intended Level 6 Major Project. Both, verbal and nonverbal means of communication play the same important role in media culture. I chose the reciprocal background for semiotics research, because in social networks users create and use already existent signs and symbols.

2.20. Research Aims:

- to identify semiotics of signs and symbols in social networks (Facebook, Twitter) as popular type of media culture;
- to classify signs and symbols according to their imagery and cognitive basis (color, shape, size and other characteristics).
- to develop semiotic anthropic models of signs and symbols in social networks;

2.21. Research Background

Beasley & Danesi (2002), Durham (2007), Johansen & Larsen (2002), Carroll (2004), Johansen & Larsen, S. E. (2002), and Ryan (2005) are current studies devoted to the problems of semiotics in media culture. Moreover, classic works of Barthes (1988), Chomsky (2005) and Eco (1998) are of crucial importance for this research. These scientists developed the essence of semiotics, interpretation of various codes, signs and symbols. Their works create a strong theoretical background for this study.

Moreover, users of social networks use a system of visual-graphic computer elements. They use iconic signs, because with their help they can sent fully informational and short message (Morris, 1996). Visual rhetoric means also ensure easiness of the information comprehension, attraction of readers' attention, and even creation of a comic effect.

For example, let us consider the following answers to one question:

- Will you join me at the party tomorrow?

- "Non."

- "Non >: /"
- "Non :("

Three different answers convey their different meanings. The first answer is neutral, the second is more indignant, and the third express regret and it seems to be the most positive one.

The use of emoticons can play a syntactic role. They can be used after greetings (Hi Jojo :) – as a marker of politeness; in the middle of message as a means of punctuation, which ends one phrase and starts another one. Emoticons can be independent

structural parts of the sentence. For example, :) Yes, I agree with you.

Another graphic feature is to write the same letter several times, or capitalize the whole expression, "AAAH OMG AH JESUSSSS!" "WHATS WRONG!?".

Such type of writing means exaggeration or scream.

Therefore, the way of text typing, use of emoticons, and punctuation symbols create another expressive load of cyberspace discourse.

Expressivity of the cyberspace discourse reflects the anthropocentric figurative component. Lexical units created by users reflect features of the human world. Expressive and emotional load of innovative lexemes transfer semantic features of common language lexical units. Cyberspace discourse lexical units reflect a lively and dynamic image of human experience. Visual and graphic means attract attention of the Internet users and diversify cyberspace discourse.

We can go further and refer to other innovative discourses and practices. For example, the discourse of modern technologies, which combine bio-, nanotechnologies, robotics, medicine, and other related fields very often reflect in their terminology cultural glimpses from the past experiences of the nations.

In terms of anthropology, if to focus on specific features of the innovative technological Englishlanguage discourse, figurative terminology reflects the experience of humanity. For example, *In the case* of functionalized nanocarriers with receptor-specific ligands, the ballistic metaphor of the 'missile' or 'vector' is often supplemented with the cybernetic metaphor of the 'homing device', thereby converting the old ballistic

metaphors into modern (informational) warfare and 'smart' weapons (Loeve).

To popularize the modern discourse, the authors of texts arrange them with imagery terminology, creative stylistic devices, and other techniques. On the one hand, the supporters of classical representatives of knowledge claim that scientific and technical discourse has always been a conservative one, with only one meaning in words, a lack of stylistic means diversifying texts in this discourse and so on. Very often, the inner form of words and texts is hidden behind creative imagination of texts authors and recipients' perception.

For example, following the next example, it is possible to find cultural ties between terminology and generally used vocabulary. If to consider the following excerpt from the modern discourse of nanotechnology, we can claim that there are numerous lexical and stylistic markers, which underline integration and interdisciplinarity of its features.

Nanorobotic platforms based on a fleet of miniature instrumented robots capable of interacting at the nanometer-scales. There, we can see words from nanotechnology, such as nanorobotic platforms, nanometer-scales, and terms of robotics (miniature instrumented robots) (Loeve).

Language and culture have always been common points for the creation and functioning of nations. These are identifying contours, according to which one nation could be differentiated from another. Blurred limits of modern technological and scientific discourses reflect cultural and social glimpses. People appeal for their common knowledge and project it on innovative technologies. They

name-new objects according to their associations, use stylistic devices in the modern scientific and technical discourse to make it more comprehensible for the modern language users.

References:

Allen P. (2001). Information Culture is in Need of Development. Network News. Retrieved from:

> http://www.fundinguniverse.com/companyhistories/Microsoft-Corporation-

Company-History.html.

- Apte, M. (1994). Language in sociocultural context. In: R. E. Asher (Ed.), The Encyclopedia of Language and Linguistics. Vol.4 (pp. 2000-2010). Oxford: Pergamon Press.
- Barthes, R 1988, *Mythologies*, New York, Noonday Press.
- Beasley, R & Danesi, M 2002, Persuasive Signs: The Semiotics of Advertising, New York, Mouton de Gruyter.

Carroll, B 2004, 'Digital Media Revisited: Theoretical and Conceptual Innovation in Digital

Domains', Journalism and Mass Communication Quarterly, vol. 81, no. 2, pp. 445+.

- Chomsky, N 2005, Rules and Representations, New York, Columbia University Press.
- Danesi, M. (2016). Language, Society and New Media. Routledge.
- Durham, F 2007, 'Communication As Perspectives on Theory/50 Ways to Understand Communication: A Guided Tour of Key Ideas and Theorists in Communication, Media, and Culture', *Journalism & Mass Communication Educator*, vol. 61, no. 4, pp. 439+.
- Eco, U 1998, Serendipities: Language & Lunacy (W. Weaver, Trans.), New York, Columbia University Press.

- Johansen, JD & Larsen, SE 2002, Signs in Use: An Introduction to Semiotics (D. L. Gorlee & J. Irons, Trans.), London, Routledge.
- Loader, B. D. (2004). Cyberprotest: New Media, Citizens, and Social Movements New York: Routledge.
- Loeve, S. (2014). Metaphors in Nanomedicine: The Case of Targeted Drug Delivery. Retrieved from https://www.academia.edu/8899675/ Metaphors_in_Nanomedicine_The_Case_ of_Targeted_Drug_Delivery
- Morris, M. (1996). The Internet as mass medium. Journal of Computer-Mediated Communication. Retrieved from http://www.asusc.org/jcmc/vol1/issue4/ morris.html.
- Preece, J. (2000). Online Communities: Designing Usability, Supporting Sociability. New York

: John Wiley & Sons.

Riccardi, P. The Intercultural Communication. Retrieved from:https://www.youtube.com/watch?v=Y MyofREc5Jk

Ryan, M 2005, 'The Media in Question,' Journalism and Mass Communication Quarterly, vol. 82, no. 2, pp. 467+.

Theorising Identity And Interaction.

Wordspy. Retrieved from: https://www.wordspy.com/ Zimmerman, K. (July 13, 2017). What is Culture? Retrieved from: https://www.livescience.com/21478-whatis-culture-definition-of-culture.html

2.22. Morphological Awareness of Humans and Its Effect on the Correct Use of Words

This chapter focuses on morphological awareness. This phenomenon is considered in the modern linguistic paradigm with implications of cognitive/behavioral approaches. The chapter considers the role of morphology in development of linguistic knowledge, new words processing and memorization.

Morphology is one of the basic linguistic levels. Learning of new words depends on the correct interpretation of morphemes, their grammatical and semantic features.

Based on literature overview, this chapter represents a synthesized approach to morphological awareness development among participants. Another feature of the research is that age of participants is not the main pitfall for this research. Any age group

of students from primary school to language learners needs morphological awareness as a key for further success in words learning, processing and correct use in different contexts. Word Mapping and Vocabulary strategies represent an innovative approach to the development of morphological awareness.

Why do we need new words? From day to day, human and technological progress is developing at a full pace. Words are keys for gaining new information, sharing experience, and developing new skills. Both external and internal structures of words have always interested linguists. Phonological, morphological and lexical levels are three basic backgrounds for words study. It means that we study words starting from their sounds, then go to morphemes and complete our research at alexical level.

Following certain patterns of word formation, it is easier to analyze and memorize new words. A wide range of morphemes and their grammatical and semantic potentials reveal the truth about the words. English language learners can express new ideas with the help of new sounds or sound combinations. Grammatical morphemes transfer information about tense or number. Derivational morphemes transfer both semantic and syntactic value of the word. To spell words correctly, use them in relevant contexts and be a literate individual, English language learners should focus on the English written orthography.

According to Gabig (2013),

-...morphological information within a printed word is conveyed via the lexical root as free morphemes and the grammatical inflections and derivational relations as bound morphemes [3].First, we read or hear the word and process its sounds or phonological aspect.

Further, we concentrate on the word meaning and its syntactic function. From this perspective, morphological awareness enables learners to concentrate on the word structure and correlate it with the word meaning. A wide range of definitions of morphological awareness, and main approaches to it will be represented in the further section.

This chapter positions morphological awareness as a key for understanding and memorization of new words, their correct spelling, and usage in a variety of contexts. This new approach is created in terms of cognitive linguistics, appropriate behavioral strategies, and correlation with morphological knowledge.

According to morphological awareness, it is relevant to identify both internal and external structure of words to improve different aspects of literacy, reading and spelling skills, vocabulary development strategies, comprehension, and spelling.

Morphology is one of the most important parts of linguistics. A form of a wordplays a crucial role in words formation and their usage. The word is the basic unit of morphology. What is a word, actually? The researcher Maslow defines the word as a minimal unit of language, which is independent of its position. It is discrete and mobile in the sentence. Moreover, the word is the smallest unit performing syntactic functions and the largest unit of morphology. The smallest unit of morphology is a morpheme. It has independent sound expression and it have positional independence. does not Morphemes consist of roots and affixes (prefixes and

suffixes) [6].Affixes perform two main functions. Some of them are used in word formation.

In other words, they form new words on a certain word formation basis (to compute computer). Others create different forms of the same word (simple-simpler-the simplest). Different affixes perform different functions in the words. For example, the suffix -er performs an agentive function in nouns (writer) and the same suffix -er creates the form of comparative degree of adjectives (longer). Prefixes in the English language perform only derivational functions. The suffixes are divided into word-formative and inflectional affixes. Morpheme in language is known by its variants, also known as allomorphs.

Morphological means transfer of the grammatical meaning of words. These theoretical implications enable language learners to be aware of minimal units of the word. From a practical perspective, we can claim that morphemes are simple bricks for words building. If a learner is aware of morphemes meaning, grammatical and semantic features, he can project his knowledge and identify the meaning of new words.

2.23. Morphological Awareness

The principles of morphology are important for language learners. These challenging theoretical principles discussed in the above section are of vital importance. According to the article published lately, —morphological awareness is the recognition, understanding, and use of word parts that carry significance, but it is often overlooked in the learning process. Learning activities that help integrate morphological awareness for students learning to read and write[7].

Morphology is an integrative part for the development of reading skills. Currently, researchers shift their accents and focus on morphology teaching in the primary school. By 10 years of age, knowledge about the structure of words is a better predictor of decoding ability than is phonological awareness [7].A morphological approach to word decoding brings more positive results in comparison with whole words approach. In addition, there is evidence that students learn orthography (phonics), phonology, and students break a word into parts and can predict the meaning of the word. One of the possible strategies is to implement —...a descriptive account of a Morphological Processing Spelling Approach (MPSA), which substitutes a more conventional spelling instruction, proposed for developing meta morphological knowledge students' and strategies in English as a foreign language [1]. From

the very beginning of language learning, students are able to divide words into more/less-meaningful parts or morphemes. Depending on their main features, language learners can predict the meaning of a new word or identify it in various contexts.

Emerging morphological awareness of students helps them to understand the meaning of words better. The use of morphological awareness is considered to be a potential vocabulary learning strategy to learn novel vocabulary. Carlisle believes that —morphological awareness is defined as children's conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure [2].

Therefore, this chapter focuses on the importance of morphological instruction and intervention development. First, morphology is a key to recognize word families. Secondly, based on

syllables structure it is possible to recognize patterns of words orthography. In such a way, it is possible to develop certain rules for correct usage of words meaning and spelling. Segmenting words into morphemes will further assist correct words usage. For example, word analysis, flashcards, letter tiles and other means will be effective for this purpose. Vice versa, students should be able to encode and decode words by morphemes. These practices will make them acquainted with words formation and structure principles.

According different researches. to morphological awareness is an integral part of reading instruction and is especially so for struggling readers. Explicit instruction that integrates morphological awareness with orthographical knowledge (e.g., phonics) and phonological provides awareness the greatest impact

246

(Morphological Awareness). It means that morphological awareness enables readers to read and spell words correctly. Hickey (2014) claims, —By accessing students' vast schema of word roots, we can show them how deep their morphological awareness already is. As students become more conscious of their developing morphological awareness, they will come to identify additional words with shared roots or suffixes and realize that many words that initially appear to be unrelated actually sound alike, look alike, and have similar meanings [5].

To read words and understand their meaning is one of integral parts for development of comprehension skills. Moreover, morphological awareness as an effective strategy can be applied both for illiterate adults and for primary school students. Moreover, not only them, actually this

learning strategy can be effective for readers of all ages. According to Harris, Schumaker, and Deshler (2011), the age of participants does not matter, because morphological awareness is a continuing process. They found that —morphological awareness was a significant contributor to literacy outcomes, specifically reading comprehension. Additionally, the researchers showed that student knowledge of morphology was greater in students enrolled in grade four than in younger students and continued to improve across the grades [4].

We agree with these researchers and focus on the importance of morphology as a key linguistic instrument in the process of new words learning and their correct use. Despite phonological awareness, morphological awareness can work effectively in its own independent way. These authors claim that this type of awareness is a reliable condition for reading comprehension. For example, the researchers claim that with the help of this strategy, adults could process words better in oral reading and single-word tasks [4].

The researchers measured morphologically complex words and counted the number of their repetition in texts and naming tasks. They could identify simple words, but it was difficult for them to define and analyze complex words. These findings correlate with the study by Farhadi, Asl, & Talebi (2015). The latter claim that there is a direct correlation between learners' vocabulary knowledge and morphological knowledge. The researchers found out that morphological strategies are effective in the process of new words identification and effective in the promotion of learners' vocabulary knowledge [2].

As far as we can see, researchers focus on the important role of morphology in the process of new words learning. Despite the age of the participants, their identify morphological words feature to foster their correct use. To implement and promote morphological awareness during language classes, teachers should integrate theoretical implications in their practices and embody them with the help of the most appropriate strategies. Further, we will attempt to correlate cognitive approach to the development of morphological awareness. In this chapter, morphological awareness is a part of metalinguistic awareness. The main emphasis is made on structures, their role/correlations in language. Explicit understanding of words morphology enables learners to distill words meaningful components. It is also relevant to identify a key morpheme, the most important one, and focus on other several helpful morphemes.

There is one essential drawback of this research. Morphological awareness is a challenging issue in the English language. Words change phonologically, and influence root morphemes changing, derivation and inflexions. It is also difficult to set word boundaries and unclear boundaries puzzle the minds of learners. Grammar category of morphemes is also important. For example, in the words calls, playing corrected inflexions indicate grammar meaning of these words. Therefore, morphological awareness requires a set of certain skills appropriate theoretical and linguistic knowledge of learners. The teacher should start implementation of these strategies from the simplest tasks and explanations.

For example, suffixes are essential for the determination of words meaning. Thus, the suffix ness, -ity identify abstract Nouns (kindness, infinity). Grammar meaning of suffixes is also evident. For example, the suffix -ee indicates a person or a passive object of a certain action (addressee, refugee). Another suffix, -able has also a passive meaning (manageable, readable). Students' knowledge about prefixes and their meaning is also important. For example, negative suffixes (non-, un-), pejorative (mis-, pseudo-) and others define the word meaning and it is relevant to focus on prefixes meaning if new words contain them.

There is a wide range of neologisms coined with suffixes -tion (-ion), -er/-or; -ist; -ot;- ie, -ian, which indicate a person, profession, a certain class of persons and soon. The most active suffix is -er, which indicates a doer of a certain action (cracker,ementor, descriptor). Denoted subjects can contain negative or ironic features expressed by suffixes (screenager, kiddiot, (script) kiddie).

In a wide range of suffixes and prefixes, grammatical and semantic aspects of morphemes, learners should concentrate on them as important keys for defining and using of new words. Thus, starting from morphemes as the smallest bricks of word meaning, learners should concentrate on the relevant use of words in different contexts, develop their reading and writing skills.

In previous studies, the importance of morphological knowledge in spelling tasks was not the primary one. Current studies focus on correlation between spelling skills and morphological awareness. This chapter outlines the importance of morphological instruction for morphological awareness, and improvement of reading and writing

skills [5]. The further strategy focused on morphological awareness development concentrate on participants' ability to read and use words correctly, identify morphological forms, memorize them and analyze in various contexts.

We claim that morphological awareness enables students to better understand the vocabulary. For teachers, effective vocabulary teaching is possible only in case of morphemes clear understanding. Teaching strategies of morphological awareness can be adjusted to any age group [6]. The internal structure of words depends on their explicit form. Clear morphological analysis of words enables learners to understand their semantics.

Moreover, morphological awareness is a key for the development of such skills as reading, writing, and spelling. Student's ability to acquire new words depends on it too. We suggest applying the cognitive approach to promote morphological awareness.

There are some possible strategies, which improve morphological awareness of students. One of the most popular and effective is the Word Mapping Strategy. It is generative morphemic analysis performed by means of several cognitive and behavioral operations. These steps are the following ones:

— to break down words into morphemes;

- define the meaning of each morpheme;
- predict the meaning of the word;

— check definition in the dictionary.

Another effective morphological awareness strategy is Vocabulary Strategy. With the help of it, students can memorize the meaning of new words

and recall them in the future. Thus, students must follow some steps to implement this strategy:

- to define a keyword;
- implement a visual strategy;
- connect words in a certain strategy;
- student's self-testing method to recall the meaning of the word.

Further, these two strategies were implemented to foster student's ability to memorize and use new words correctly.

Therefore, the research showed that these two strategies are the most effective in the development of morphological awareness. Of course, it is relevant to focus on other conditions, which are required for memorization of new concepts and words. First of all, the student should be ready for active mental activity. Teachers are responsible for effective mastering of students' skills. When students repeat new words together with their teacher, it brings not so many positive results.

One of the first and foremost conditions for the development of mental awareness is focused on active cognitive activity. Thus, students and learners can memorize words better. The participants should look for associations, correlate new words with their experience, and combine them in coherent texts or stories. When students are looking for a correlation between morphemes they know and consider them as building blocks for new words, they can solve this challenging issue of new words memorization easier. The recipients identify new words processing, and do it with pleasure.

To develop morphological awareness, teachers should enhance students' linguistic attitude to the word. They can develop and improve their linguistic

skills in the process of theoretical knowledge assimilation, abstract thinking improvement, and the correlation between semantic and grammatical aspects of language. Students should be able to identify all morphemes, their grammatical and semantical values. One of the most important roles morphological awareness plays is a successful inclusion of a new concept in a wide range of related words, generalization and familiar contexts. It is also formation students' language knowledge, a right way for a conscious linguistic processing. Moreover, students will be able to correlate theoretical knowledge with a solution of practical issues. Focus on new morphemes involves certain linguistic categories. Each new morpheme relates to a number of new words, their grammatical and semantic characteristics. Both, written and oral spelling is of crucial importance. Thus, Word Mapping and 258

Vocabulary strategies enhance visualization of concepts. Teachers outline key features of new words and visualize them. Further, students are able to reproduce innovative concepts in their written tasks, represent them with the help of tables, diagrams, pictures or other means of program.

Therefore, implementation of chosen strategies should be correlated with appropriate methodology, which facilitates mastering of grammatical concepts. Students should be able to involve their mental activity, represent their interest in learning, and focus on their verbal experience and systematic knowledge.

Based on this research, it is possible to suggest some strategies for morphological awareness development among students. Thus, teachers should follow step-by-step recommendations given in the paper to reach positive results. It is possible to

implement two key strategies during English language classes and use Word Mapping or work with vocabulary. Teachers can start from sound reproduction of words to their detailed morphological analysis and further to semantic, lexical and syntactic analyses. Moreover, the correlation between phonological, morphological and lexical levels of words will enable students to process new words and use them correctly.

This chapter focuses on morphological awareness. Universal principles on the importance of this mental ability enable students and learners of English to master meaning and correct use of new words. From phonological to morphological and semantic features, the explorations of morphological awareness represent one of the most challenging issues for modern linguists. Despite the age of participants, learners' cognitive skills and linguistic

knowledge, morphological awareness is a keyconcern for appropriate new words processing, vocabulary learning and stylistic differentiation of lexis.

References:

- 103. Retrieved from Web.

- Anastasiou, D., & Griva, E. (2012). Morphological Processing
- and Vocabulary Knowledge: A Case of Correlation. Modern Journal of Language
- Editor Foreword: Morphological Awareness and Literacy,

33 (I), 3–6. Retrievedfrom Web.

- Farhadi, S., Asl, H. D., & Talebi, Z. (2015). Morphological Awareness
- for English Language Teaching a Procedia. Social and Behavioral Sciences, 136, 98
- Gabig, Ch. (January/March 2013). Topics in Language Disorders. *Issue*
- Harris, M. L., Schumaker, J. B., & Deshler, D. D. (2011). The Effects ofStrategic Morphological Analysis Instruction on the Vocabulary

Performance of Secondary Students with and without Disabilities. *Learning Disability*

- Hickey, P. J. (2014). Lingua Anglia: Bridging Language and
- Huseyin, O. (2014). Morphological Awareness and Some Implications Language Teaching, 5(4), 15.
 Retrieved from Questia. Learners. English Journal, 103(4), 100. Retrieved from Questia.
- Morphological Awareness. Retrieved from Web. Quarterly, 34(1), 17. Retrieved from Questia.
- Strategies: An Intervention for Spelling Difficulties in
 English Language. English Teaching Methods,5(4),
 224. Retrieved from Questia.

2.24. The Assessment of Human Competences in Noun Phrase Constructions Based on the Syntactic Functions

Starting from this epigraph, the studying of noun phrases is on. Humans develop their abilities in developing and using these phrases to foster their knowledge of English, use it appropriately and proactively. Nomination refers to a special way of lexical and grammatical meaning systemic expression. The main means of information transfer in English is a noun. The process of nomination and expression of thoughts facilitates the world cognition and description. Both, syntactic and nominative functions create an inseparable and harmonious meaningful unity. The language arises from speech and it evokes a new system of relevant features. Language learners should be able to apply a wide arsenal of tools and

instruments, which effectively convey their ideas, help them share the information, communicate with others and so on.

Noun phrases (NP) are in focus of this research paper. The learners of the English language should be aware of NP specifics and implement them effectively. Being one of the basic tools of the English language the central part of the speech, a noun represents an important identifier of information transferred. NP is an integrative step on the way to a correct sentence formation. Moreover, modern English is the language of the analytic type. Specifics of syntax prevail over morphology. Thus, the English noun phrase is formed as a particularly close unity of the structural terms, and most often the only formal indicator of syntactic relationship between the components of the phrase or the word order.

The syntactic relationship between the words in the English language represents one of key issues for effective communication of students. The main emphasis of the paper is on the EFL students, for whom NP is another challenge in mastering the English language knowledge. There is a special difficulty for them because for the learners of English as a foreign language, there is a number of difficulties and challenges (Pastor, 2008). First of all, these students, draw parallels between their native languages and the English language. In one way or another. but these students think in their own often and languages they memorize words/structures/grammar, etc., but they rarely focus on theoretical explanation of the used word/form and other grammar tools. Due to the fact that nomination plays a crucial role in the English language, a noun is one of the basic grammar tools in

the language considered. To know the structure/function of a noun helps the users to facilitate their process of thinking, to express their ideas more freely.

The most relevant feature of modern linguistics is the consideration of language as a functional system. Thus, the functioning of nouns is one of the crucial issues for EFL students. It is also important to consider nouns in terms of their systemic paradigmatic characteristics. The functional aspect of linguistic phenomena is taking the forefront of linguistic science (Muhammad Basri, Andi Tenri Ampa, Sitti Halijah). There are many interpretations of the functional approach in modern linguistics. From another perspective, it is appropriate to understand syntax in its broadest sense as a science about the construction of speech in general. It significantly expands the scope of the functional

linguistics and focuses not only on relevant syntactic issues, in particular, the actual segmentation of the sentence, as well as the problem of formations larger than the sentence, but also a number of studies of all units of the language in the most various angles, such functional. stylistic, textual The as etc. communicative function of the language plays a crucial role, while for the language users it is relevant to use language as a means of reflecting the world around people in human consciousness and its representation in the linguistic structure (Roland, Dick & Elman, 2007).

Cognitive functions of the language also determine the ability of language users to speak effectively. In addition, language serves as a means of expressing our emotions, reflections of the world, daily experiences, ideas and considerations, and many other issues (Functions of Nouns). To know the language and to use the language are often two contrasting concepts. For example, the speech of EFL students often is predetermined by the studied grammar structures, but, in their essence, the students develop their speaking patterns according to their needs, experience, heard/read patterns or standards.

2.25. Literature Review

The development of noun phrases competence is one of key concerns for English language learners. There is no doubt that speaking/writing in English is not only about putting the words together, combining or using them in one order or another. It is more important to make up sentences similar to native speakers, who often do not think about theoretical explanation of their usage of nouns or any other speech parts. "A noun phrase is defined as a phrase that consists of a pronoun or

noun with any number of associated modifiers, including adjectives (small, red, lovely), adjectives phrases, adjectives clause, possessive adjectives (my, his, her, their)adverbs (very, extremely, usually), determiners (the, a, an), preposition phrases and other nouns in the possessive case" (Vo Tran Mong Thu).

The noun if to compare it with other speech parts has the most diverse set of syntactic functions. Its most relevant functions are the use of a noun in the function of a subject and or complement (Junaid Perspektif, 2018). Further, it is evident that both objects and complements play the most important role in composition of the English sentence. For example, The dog wagged its tail. A noun can also be part of a predicate, for example, He is a teacher.

According to Jackson (1985), the English noun phrase (NP) is potentially constructed by a pre-

modifier, a head, and a post-modifier. The clause "Many people will build a school building in my country" contains two NPs that function as a subject (Many people) and an object (a school building). A syntactic analysis of the phrase "Many people" and "a school building in my country" covers "Many people" (NP); Many (quantifier) + people (H), and then "a school building in my country" (NP); a (id) school (noun-M) building (H) in my country (Prep P); in (prep) my country (NP); my (id) country (H) (Jackson, 1985, cited by Junaid).

A special feature of the English language that distinguishes it from other Indo-European languages is the ability of a noun to act in the function of a prepositional definition in an unchanged form: a stone wall, the speed limit, the sea breeze. Such attributive phrases can be identified in different ways (Oliviera, 2013). Maybe, they are disintegrating

complex words; other researchers claim that nouns in this position play the role of an adjective (Börjars & Delsing, 2008). Meanwhile, the attribute noun does not acquire any other features of the adjective: it cannot convey the degree of quality, cannot be combined with an adverb, etc. As for the theory of a compound word, it seems that a word is a stable unit and it is hardly possible to agree with the theory of its spontaneous occurrence and disappearance.

According to recent studies, "Unlike clauses, noun phrase never stand alone as sentences. They don't include a verb that can change according to the time reference and in some cases they do not have subjects either. This is the most important thing that we should take notice of the noun phrases" (Vo Tran Mong Thu). Therefore, it is typical for the users of the modern English language to demonstrate their knowledge about NP as a perfect way for a semantic restriction, so to say.

Moreover, the noun phrases are the second most common types of prepositional definitions besides the adjectival definitions. The share of nouns among all pre-positive definitions can reach 40% in some types of texts (Muhammad et al, 2013). It is evident that researchers and scientists consider the most optimal ways of nouns transfer and they concentrate on the spreading of nouns among the learners of the English language. For sure, EFL learners should learn the priority of nouns use and an important role they play in the formation of linguistic competence. To convey one's ideas in the most appropriate and comprehensible way, it is necessary to understand key elements of language (Adebileje, 2016). From this perspective, nouns are of crucial importance in the process of nomination

and they form the basis of any message given or conveyed. It is relevant to consider a noun phrase more in the context of grammar rather than from the perspective of lexicography (Pastor, 2008). The latter point of view highlights lexica features and properties of a noun while focusing on grammar and syntax, it is possible to discuss the role of nouns in the sentence, identify appropriate patterns of use and so on (Childers et al., 2012).

According to recent studies, "It is typically the noun, all possessive pronouns (in the function of nouns), noun phrase that follows the verb, although the indirect object and subject complements can also occupy this position. The direct and indirect object has some characteristics in common, and this fact justifies their sharing term of object" (Millaku, 2016). From this perspective, it is obvious that the EFL students consider that an object is more commonly used syntactic form of a noun.

For instance, in an ordinary English noun phrase, an attributive adjective follows the determiner and precedes the head noun, as in a big shock, rather than big a shock. Importantly, the big mess construction has a certain grammatical systematicity, which is to say that it is sensitive to distinctions that, under the dictionary and grammar model, would be handled by the grammar, rather than by the dictionary (Hilpert, 2014).

The reasons for such a widespread use of nouns as a prepositive definition and the prevalence of substantive-substantive phrases are traditionally called the paucity of relative adjectives in the English language, the ability of phrases of the NI + N2 model to express a wide range of semantic relationships, as well as the fact that substantive-

substantive complexes are effective means for information compression (Jill Musgrave, Jean Parkinson, 2014).

If to trace these features of noun phrases in various contexts, it is possible to claim that scientific and technical texts are more saturated with noun phrases for information compression. Based on data obtained by different researchers, NI + N2 is a powerful means of compressing information and decrease of redundant syntactical constructions. This function of information compression is implemented in texts of all styles, although most NI + N2 is used by the authors of newspaper and scientific articles (Agai-Loçi, 2013).

Being typical of modern English, noun phrases of NI + N2 type are characterized by the different frequency of use in texts of various functional styles. The differences in the frequency of use of NI + N2 in the texts of newspaper, journalistic, scientific and official-business styles can be the result of style specifics. Functional styles distinguish features in the distribution of NI + N2 in complex segments of a text. The widest range of semantic relations and varieties of relations NI + N2 are used in newspaper and journalistic styles. The predominance of NI + N2 with certain semantics in the text of a particular style is the result of communicative charge and subject of the text and may also depend on the use of other syntactic constructions (for example, verb forms of the passive voice, adverbial groups).

For example, according to Meerman & Tamaoka, (2008), "Native English speakers consistently exhibit a seemingly innate ability to identify or produce noun phrases with correct adjective order. Few, if asked, will attribute their ability to do so to formal instruction, let alone be

able to recall if and when they received such formal instruction in their own schooling experiences. Ordering adjectives instantaneously and correctly seems to necessitate intuitive, semantic reasoning rather than the ability to recall grammatical rules. Rules governing adjective order can be taught and memorized, but not often convincingly explained or understood; it is near impossible to convincingly explain to learners of the language why big black bear" makes more sense than "black big bear", especially among those whose native language does not require such a semantic adjective order" (Meerman & Tamaoka, 2008).

Moreover, noun phrases can be also characterized by temporal features. Since any event or the situation is organized by the axis of time, the temporal characteristic of the predicate can be considered one of its essential properties: the five o'clock meeting, tourist day departure, etc (Liu, Liming & Li, Lan, 2016). Liu, Liming & Li, Lan. (2016). Noun Phrase Complexity in EFL Academic Writing: A Corpus-based Study of Postgraduate Academic Writing. The Journal of Asia TEFL. 13. 48-65. 10.18823/asiatefl.2016.13.1.1.48. this is a reference from the referenced list

An ENP is described by Benson (2009) as a noun phrase with two or more modifiers preceding the head noun (head noun: dog-the big brown dog; head noun: friend-a genuinely good friend), or with qualifiers, such as prepositional phrases, appositives, and/or relative clauses following the noun (the dog, a hairy flea-covered mongrel; the friend who is like a sister). This means that a head noun may be modified and expanded, either pre-noun by articles, modifiers, quantifiers, and adjectives and/or post-noun with phrases, relative clauses, and further embedded **279**

clauses, in order to package information into more efficient, yet more complex, language (Cooper, 2013).

If to consider syntactic functions of the English noun phrases, it is possible to identify five main syntactic functions of noun phrases.

 Subject. In the role of the subject noun in the English language can act independently or with definitions. The window is white.

2. Predicate. In the role of the predicate, the noun must follow the linking verb. He's a student.

3. Adverbial adjunct. His car is in the garage.

4. Complement. The role of the noun in the sentence as a complement. I followed him.

5. Definition. For example, this is an interesting group.

The problem of NI+N2 is a challenging issue, which evokes critical consideration of various 280

researchers and scientists. For users, it is easy to incorporate this pattern in their speech or writing as it compresses the information given. Moreover, the role of a verb is also important and the language learners should be sure that this is a key linguistic element, which builds the speech of learners. Hashemi (2012) underlines an important role of nouns in the development of a learner's linguistic competence and their special role in development and use of collocations. "Lexical collocations may be verb+ noun, adjective+ noun, noun+ verb, adverb+ adjective and verb+ adverb. On the other hand, grammatical collocations are phrases containing a dominant word, such as a noun, an adjective, or a verb and a preposition or grammatical structure like an infinitive or clause" (Hashemi, 2012).

If the students are getting a good command of the English clauses, they need to know the phrases

as the basic knowledge and skills because each function of the language, the speaker's intention and other issues can be expressed with the help of clauses. Therefore, relevant researches are necessary to expand the students' knowledge about English syntax.

2.26.Methodology

Based on the following questions, the assessment of students' competences in noun phrase constructions based on the functions in sentences as the base of English productive skills took place as a practical part of this research.

I. What are the construction patterns of NP functioned as the subject, object, complement an adjunct?

2. To what extent the students' competences in NP constructions are based on the functions in sentences?

Number of Respondents: 40 students (the sixsemester students majoring in English-in Ukraine) Instrument: with the help of writing test the students were asked to write 20 English sentences of their own words.

In identifying the data, the sentences produced by the students were selected in accordance with their correct usage, unambiguity, and appropriate context, and the use of NP as a subject, object, complement, and adjunct. Students focused on Noun phrases produced by the based on their functions in sentences.

2.27. Results and Findings

According to data obtained from the participants, the noun as an object is the most widespread function in the sentence. The complement follows it. The subject is the third group of the number of patterns, and nouns as an adjunct are the

least used group. Therefore, with the help of nouns students did not identify a core idea of the sentence. The main role of a complement is to complete the meaning of a sentence or predicate. Object and complement are two most widely used and widespread grammar forms used by the participants of this study. Following the examples provided by the students, the following patterns of NP are evident: *NP as subject*

My favorite color

Their family who live near the beach

The greatest experience in my life

NP as object

Makassar as their daily language

Holiday with my family

Many bags in my home

NP as complement

who is the best person?

the smartest students in my class The difficult subject in the college *NP adjunct*

Every day

Every morning

campus by public car

If to focus on the syntactic roles of a noun phrase used, the role of a subject is one of the properly chosen by the students. The concept of "subject" should be understood in a broad sense and can denote a person or a group of people, specific items, etc. performing some functions/activities. Respectively, subjective features of a noun phrase can be expressed by nouns, denoting people, proper names, the names of specific objects or substances, the names of states, nations, the names of organizations, and others (Cooper, 2013).

An object attribute focuses on the action or objects described: the library book reading, a girl's prosecution, etc. The content attribute indicates the type or content of the activity of the core denotate. It is also possible to claim features describing locative functions of the noun phrase: her skyrocketing career, a long-time train sleep, etc. As far as we can noun phrases are complex in their see. characteristics and are used for descriptions and identification of various phenomena. Students' competences of noun phrases creation enable them to practice with the analytical form of the English language.

Despite a large number of papers focused on nouns, their structure, and functions, the syntactic roles of a noun are often underestimated. There is a need for a comprehensive analysis of the use of nouns in sentences. It is clear that the syntactic functions of nouns or their appropriate use in special places of a sentence are required for realization of the students' linguistic competence.

Students' competences in NP construction Students' competences of development and use of noun phrases show that they understand these grammar constructions. Daily utterances they hear, are reflected in their own coinage of noun phrases and their use in the English sentences. The main difference between EFL students and native speakers is that for the latter there is no problem to order words appropriately in one or another NP pattern. For foreigners, it is much more difficult to choose and explain the correct word order. To sound more naturally, be effective and efficient in language use, one should refer to the noun phrases as key determinants of successful language skills demonstration. Supposedly, the number of words in

a noun phrase, their advanced level or complexity mays stand for the student's improved linguistic skills (Xu, 2014).

For EFL students, it is of crucial importance to improve their professionalism and knowledge of NP patterns. Thus, Liu and Li claim, "Results of the analyses showed significant underdevelopment of NP post-modification complexity in student writing relative to published texts, meanwhile explicating the circumstances under which the difference is meaningful. Implications of the findings for the teaching of EFL academic writing were also discussed" (Liu&Li, 2016). We can make a similar conclusion and consider that EFL students used NP constructions as objects and complements, but they were not too complicated and transferred the basic information, or the main ideas of students.

The use of a more complex knowledge underlines more proficient knowledge of students' English language knowledge. Following the ideas of the modern researchers in this field, the complexity of noun phrases is not developing and certain modifications of noun phrases do not stand for more proficient knowledge of the English language. The pre-modification of a noun phrase is a more often phenomenon than post-modification. Thus, according to Jin Xu (2014) "From the structural analysis of NPs, we know that the verbs in either form of -ing or -ed can be used in both pre-head modifier and post-head modifier. However, Chinese scholars tend to put verbs in clauses and therefore overuse clauses as the post-head modifier" (In Xu, 2014). It depends on the context of the sentence, the situation of communication, linguistic competence of a student and other factors if we speak about pre-/post-289

modifiers of noun phrases. In the given study, the students used NP constructions as a means for information transfer and compression. EFL learners use simple NP constructions in order not to overload their sentences with too difficult grammar constructions.

Unlike numerous suggestions, the role of a verb is more important than the role of a noun. In the majority of cases, the verb identifies the core essence of a sentence, but the role of a noun is often neglected. Actually, the knowledge of syntax among EFL students is often underestimated too. Mainly, the knowledge of lexical and grammar issues is more in focus for the foreign language learners rather than their competence in the knowledge of syntax or stylistics.

The syntax is the sentence patterns of language. Knowing a language also means having 290

ability to combine morphemes and words together to express a particular meaning. That part of linguistic knowledge which is concerning the structure of sentences is called syntax (Fromkin and Rodman, 1983). Nouns often serve as cohesive means in the text (Mousavi et al, 2014). Therefore, an appropriate correlation of syntactic patterns, or NP in the case of this research, signifies relevant use of the syntactic patterns of the English language with noun phrases.

Noun phrases signify an evident tendency of language means economy in the English language. These phrases used by the students are a convenient and economical means of expressing content or information because they allow students to provide the information for others in compressed form. The multi-component structure of these phrases can be considered as the result of decoding the whole **291**

sentence and even text in an attributive phrase. To the greatest extent, the effect of the language economy law is shown in noun phrases with several descriptive accompanying words. Noun phrases are positioned as the most common types of phrases in modern English.

Concerning the multi-component noun phrases, it is relevant to mention that they are a rather implicit and final interpretation of their meaning is determined by the required background knowledge. Moreover, noun phrases are widely used in scientific-technical and newspaper-journalistic styles. These are genres, which focus on elimination of redundancy. The use of multi-component noun phrases enables students to transfer the maximum amount of information with minimal use of grammar communication facilities. The most popular form of noun phrases is the one, which consists of two 292

nouns. The multi-component structure of noun phrases is the result of compressing the whole sentence, the users' ability to describe the sentence in wider terms using the minimal number of words.

Moreover, the use of multi-component noun phrases expands the semantic capacity of the whole sentence. These phrases are convenient and economical means of information transfer. A wide use of noun phrases in the modern English language signifies an analytical way of conveying syntactic relations and improvement of the language economy law. Thus, in English, the process of transforming a phrase into a compound word is extremely intense. For EFL students, the role of NP constructions is very important, because they transfer their ideas in the process of different phenomena nominations in the English language. The participants of the study used NP constructions as key transformative 293

grammar tools and they preferred them as objects and complements more often than in any other syntactic function.

It is possible to call this process the integration of a phrase in a sentence, text or discourse. The language is dynamic and to become its connoisseurs, the EFL students should freely use NP in various syntactic roles.

References:

- Adebileje, A. (2016). Forms and Functions of the English Noun Phrase in Selected Nigerian Texts. IOSR Journal of Humanities And Social Science (IOSR-JHSS), 21, 2, 45-49.
- Agai-Loçi, E. (2013). Assessing the use of Noun Phrases in Students' Journals. Academic Journal Of Interdisciplinary Studies, 2(4), 29. Retrieved from <u>https://www.mcser.org/journal/index.php/</u> ajis/article/view/102/260
- Benson, S. E. (2009). Understanding literate language:
 Developmental and clinical issues.
 Contemporary Issues in Communication
 Science and Disorders, 36, 174-178.
- Börjars, K., & Delsing, L. (2008). Introduction: The syntax of nominals and noun phrases. Nordic
 Journal of Linguistics, 31(2), 129-134. doi:10.1017/S033258650800190X

Childers, J. B., Heard, M. E., Ring, K., Pai, A., & Sallquist, J. (2012). Children Use Different Cues to Guide Noun and Verb Extensions. Language learning and development : the official journal of the Society for Language Development, 8(3), 233–254. doi:10.1080/15475441.2011.585285

Cooper, Stephanie R. (2013). Exploring Elaborated
 Noun Phrase Use of Middle School English
 Language Learners Following Writing Strategy
 Instruction. Graduate Theses and
 Dissertations. Retrieved from
 <u>http://scholarcommons.usf.edu/etd/4656</u>
 Fromkin, V., Rodman, R., Hyams, N. (2010). An

Introduction to Language. Cengage Learning. Functions of Nouns. Retrieved from <u>http://clasfaculty.ucdenver.edu/tphillips/gramma</u> <u>r/noun_functions.pdf</u>

296

- Hashemi, M. et al (2012). Collocation a neglected aspect in teaching and learning EFL. Procedia -Social and Behavioral Sciences, 31, 522 – 525.
- Hilpert, M. (2014). Construction Grammar and its Application to English.
- Jill Musgrave, Jean Parkinson. (April, 2014). Getting to grips with noun groups. *ELT Journal*, 68, 2, 145–154. Retrieved

from https://doi.org/10.1093/elt/cct078

Junaid Perspektif (2018). A Syntactic Analysis Of The English Noun Phrase (A Study At The Fifth Semester Of English Department Faculty Of Teacher Training And Education University Of Muhammadiyah Makassar. Jurnal Pengembangan Sumber Daya Insani 03,01. Retrieved from:

www.journal.unismuh.ac.id/perspective

- Liu, Liming & Li, Lan. (2016). Noun Phrase Complexity in EFL Academic Writing: A Corpus-based Study of Postgraduate Academic Writing. The Journal of Asia TEFL. 13. 48-65. 10.18823/asiatefl.2016.13.1.1.48.
- Meerman, A. D., & Tamaoka, K. (2008). Measuring the effects of intensive instruction on the rules of adjective order in English noun phrases for Japanese EFL students. International Journal of Curriculum Development and Practice, 10(1), 1-12.
- Millaku, S. (2016). The Indirect Object in Albanian and English. European Journal of Foreign Language Teaching, I. Retrieved from: <u>file:///C:/Users/DV/Downloads/294-1082-2-</u> <u>PB.pdf</u>
- Mousavi, A. et al (2014). A Corpus Study of Shell Nouns in Published Research Articles of

Education. Procedia - Social and Behavioral Sciences, 98, 6, 1282-1289.

- Muhammad Basri D et al (2013). Syntactic Errors in Descriptive Paragraphs by Native Indonesian-Speaking Students of English. International Journal of Linguistics ISSN 1948-5425 2013, Vol. 5, No. 5, 125-137.
- Muhammad Basri, Andi Tenri Ampa, Sitti Halijah. The specified patterns of noun phrases used by the fourth semester students in their paragraphs international conference Adri. Scientific Publications toward Global Competitive Higher Education.
- Oliviera, F., S. (2013). Noun Groups, Their Elements and Their Syntactic Function in the Clause: an Analysis of Abstracts of Scientific Texts in English. ReVeLe. Retrieved from file:///C:/Users/DV/Downloads/11294-

Texto%20do%20artigo-30609-1-10-

20171005.pdf

- Pastor, L. (2008). English complex Noun Phrase Interpretation by Spanish Learners. RESLA, 21, 27-44.
- Roland, D., Dick, F., & Elman, J. L. (2007). Frequency of Basic English Grammatical Structures: A Corpus Analysis. *Journal of memory and language*, 57(3), 348–379. doi:10.1016/j.jml.2007.03.002
- Xu J. (2014). The use of noun phrases in biomedical research papers written by Chinese scholars. *Journal of thoracic disease*, 6(5),568– 569. doi:10.3978/j.issn.2072-1439.2014.04.03

2.28.Word-By-Word Sentence Processing by Humans: Psycholinguistic Perspective

Sentence word-by-word processing is an important stage in human cognition of language. This paper focuses on Past Simple/Future Simple tenses. Differences in perception of these tenses are worth considering. There is a need to differentiate the concepts 'time' and 'tense.' Tense "refers to the grammatical expression of the time of the situation described in the proposition, relative to some other time. This other time may be the moment of speech: e.g., the PAST and Future designate time before the moment of speech, respectively" (Jabarri, 2013). The inflections, particles, or auxiliaries are specific linguistic tools, which help the speakers to make a choice of tense. According to Jabarri, "Tense shows the time of the action or state being expressed by a verb"(Jabarri, 2013). Therefore, tense is a link

between a verb form and time, which has to be described. On the one hand, there is a time-tense reference. Tense and time are related concepts. Grammatical categories represent related links in human speech and their perception of the surrounding. The main challenges of the speakers occur when the description of reality happens in terms of present and past tense verb forms.

"Most SPR paradigms examine processing difficulties that arise during the reading of sentences that contain what could be classified as either an ambiguity, an anomaly, or a distance dependency. Ambiguities arise where the grammar permits two or more distinct syntactic interpretations of a word or phrase in the sentence and observable processing strategy often occurs when the (native) parser tends towards one interpretation over the other" (Marsden, Thompson, Plonsky, 2018). Tremblay, Derwing, Libben, Westbury (2011) describe the effectiveness of word-by-word processing, and it is possible to correlate these findings with this study, where the perception of the sentences will depend on tenses.

We can see that time and tense are inconsistent concepts. "While time is a natural or notional concept of language, tense is the relationship between the form of the verb which expresses the time. There is not usually a one-toone relationship between time and tense within a language" (Jabarri, 2013). This claim donates our future hypothesis of the research.

2.29. Hypothesis

The readers read a sentence, then they create a relevant picture in their heads. If the readers see the Present Simple Tense verb form, they will think about the present time. Further, they will understand

time meant in the sentence (after translation, words/tense analysis, or grammar/semantic analysis). 2.30. Literature Review

According to current researches and studies, there are different perceptions of time/events in the present/future. Thus, a group of researchers, "explored how imagining a situation of getting acquainted with someone in the near future led people to estimate the action's target as highly familiar, but when the event was presented in the distant future, participants evaluated the target as less familiar" (Carrera et al, 2018). The study conducted by Connor and Smith shows that there are two variants of the considered present. "TRA suffers from the drawbacks that it is inconsistent with a plausible account of the transparency of perception and inconsistent with a common-sense conception of the mind-independence of that which is perceived. 304

The Minimal Account is immune to these concerns" (Connor and Smith, 2019). These conclusions may explain the differences in the participants' perceptions of the present. At this point, they may come across incongruences of future time representation. Perceive, anticipate, and remember, – these stages may refer to the perception of reality.

If to correlate these attitudes of humans to verbs use, it is relevant to refer to the study by Marsden, Thompson, Plonsky, (2018) "self-paced reading has been a general term that includes several different formats. First, the display can be cumulative, meaning once a stimulus segment is revealed it remains visible to the participant as the next segment is revealed and the next and so on, until the entire sentence is finally displayed all together, or noncumulative, meaning only one segment is visible at a time and every time a new segment is revealed

the previous one is re-masked" (Marsden, Thompson, Plonsky, 2018). Lutfullina (2015) also underlines key importance of tenses in sentence perception and reflection.

Being limited by grammar, the learners of the English language may be unable to fully analyze the material they need to understand/consider, analyze and so on. Cognitive mechanisms should be involved to make the learning process more effective and efficient. There is a need for an instant link occurring between language and thinking. Language is not an abstract phenomenon, and thoughtless learning of rules will hardly result in positive outcomes for learners. They should be aware of what they learn, first of all.

Changing tenses, describing one and the same time, or a moment of time, in reality, should be comprehensible for the learners. It is relevant to offer a certain algorithm of tenses cognition, analysis, and reflection.

- A time-determinant factor, which helps to understand the moment of time described in the sentence.
- 2. A content-determinant factor describing the essence of the sentence and its message.

Thus, if a person says what he knows for sure, then, he speaks about the present time. I know that I go there every day.

If he speaks about some plans, intentions, and he does not know for sure what he is talking about, then he can speak about the future time.

In both of these cases, individuals still can use Present Simple/Future Simple to describe future actions, but they use Present Simple to describe actions, situations at a given present moment of time.

Future Simple tense refers to the structural knowledge of the speaker, but it does not relate to his instant experience, observations, or facts he knows for sure. From this perspective, it is relevant to build a sentence word by word and perceive it in a similar way to cognize the Future Simple tense appropriately. When using Future Simple tenses, the speaker refers to his suggestions, suppositions and possible ideas, because he cannot know for sure will anything happen or not. *Don't go there late at night*. *You will be robbed!*

This sentence reflects a supposition of the speaker. These are his subconscious fears, ideas, suggestions, which do not have any factual basis. He describes unseen things. These are his guess about the future. This is a description of a non-existent situation. There is also another suggestion related to Future Simple representation. Someone is ringing at the door. I'll open it.

In this sentence, the verb will describe the future intention of the speaker, but it relates to a given moment of time. This is also a reflection of intentions, interpretation of the structural knowledge related to the future. Moreover, the absence of factual evidence is another factor, which differs Future Simple from Present Simple. The majority of polite questions start with the verb will. What will you do there next time? Where will we go for a vacation? All of these questions reflect ambiguous information.

When the learners use the Future simple, they may also describe characteristics common for one or another individual. *She'll always keep silence*. This is

also a reflection of typical behavior or repetition of certain situations several times.

Sometimes, we use Future Simple to reflect our expectations based on previous events/facts/information and so on.

There is, of course, a challenging overlapping of Present Simple/Future Simple in some cases. For example, This sportsman knows that he is the winner and will play the next year in this tournament. This sentence conveys the expectations about the future time, but in the given moment of time, now, this sportsman is the winner. This is a condition, which predetermines his participation in the future tournament. Therefore, there are numerous aspects of using Future Simple. The explanation of this tense is also a challenging issue. The perception of sentences in the Present Simple / Future Simple

tenses also depends on various factors, which influence the meaning of the sentences.

2.31. Methodology

The central interpretation of verbs used depends on the constructing and structuring of the perceptual space. The participants sensed the objects and phenomena described. Further, they correlated their perception with the surrounding reality. Then, they comprehended the information mentioned in the sentences. At the final stage of their perception, they. supposedly, created their experience background and considered the process of knowledge formation and structuring. Verbalization of their ideas and their concluding in certain sentences are under consideration of further experiments. Temporal parameters are the basic tools determining future formation of the sentence.

Temporal categories of the verb relate to the concept of time as a given reality or a known moment of time.

The representation of present/future time with the help of verb forms. Word-by-word processing of sentences in these two different tenses may be rather difficult. For example,

- These negotiations are on Dec. 8th (Present Simple).
- 2) My bus goes to Z-town in 4 hours (Present Simple).
- This airplane will depart in five hours (Future Simple).
- She will talk about it the next week (Future Simple).

In these examples, different tenses may refer to one time (for example, the future time). All 4 sentences describe the situation in the future, but we use different tenses to describe them. This section focuses on two participants and their self-paced sentence reading task of the abovementioned sentences. Supposedly, the participants will interpret time described in the sentences using Present Simple, or preferred sentences. The region times of ambiguity can be the same for both participants. Supposedly, it is easier for the Participants to interpret the sentences in Present Simple rather than use Future Simple tense.

Psycholinguists use this self-paced sentence reading task to analyze the readers' response to different linguistic structures. The participant presses the button one he sees a word on the screen, or one word at a time. When difficulties occur, the participant press the button slower. Short reading

times refer to preferences, but longer periods relate to the dispreferred meanings.

Table 1 underlines a close relationship of the ambiguous areas (amb = 321.1 for preferred sentences with verbs in Present Simple and 335.0 for dispreferred sentences with Future Simple verb forms) for participant 1. The processor reflected differences in the ambiguous areas when the participant focused on the verb tense ($amb \ 1 = 347.0$ for the preferred verb tense choice and 353.1 for the disprefered verb forms)& ($amb \ 2 = 389.2$ for preferred meanings and 467.0 for dispreferred verb forms). These results from the first participant seem consistent with the expectations.

Table I

Participant I	Amb	Amb I	Amb 2
Preferred	321.1	347.0	389.2
sentences			
Dispreferred	335.0	353.1	467.0
sentences			

The results of the Subject I

Table 2 shows times of reading of the sentences with Present Simple/Future Simple tenses for participant 2. Data obtained are similar. The area of ambiguity is almost the same for both participants (amb = 315.1 for preferred verb tense (Present Simple) and 325.1 for dispreferred verb forms). Participant 2 showed a higher level of consequent words perception following verb forms ($amb \ 1 = 427.2$ for the preferred verbs and 368.4 for the dispreferred meanings). The higher indicator relates to a higher

level of the dispreferred sentences (389.5) than the preferred sentences (356.3).

Table 2 shows the results obtained fromsubject 2

Participant 2	Amb	Amb I	Amb 2
Preferred	315.1	327.2	356.3
sentences			
Dispreferred	325.1	368.4	389.5
sentences			

Both participants showed similar results and they have a similar area of ambiguity.

This experiment has some limitations and in the future, it is relevant to involve more participants and consider Eye-Tracking-While-Reading experiments.

The participants interpreted their perception of verb tenses in the following way.

The sensor signal/perception of the sentence- goalverbalization

I) Present time

Something happens here/there/exists and so on.

2) Future time

The time of the action has not come yet.

The choice of the verb forms can be interpreted in the following way:

- Present tense: the verb form reflects current changes, processes happening at a given moment of time.
- 2) Future tense: the verb form shows that the action happens after the moment of speaking.

The processing memory of the participants can be described as follows:

 Present Indefinite: uncertain, unsettled, unclear; in other words, with no definition of time, but something that happens.

Future Indefinite: uncertain, unsettled, unclear; in other words, with no definition of time, but something that happened after the moment of speaking.

To discuss the mechanisms of the sentence formation, one of the most important things is to perceive the fact, which describes a certain situation or activity and so on. The modes of perception are directly related to the mechanisms of ideas verbalization in language. The differences between perception of time and further use of Present Simple/Future Simple in terms of the experiments show that time/tense perception is a process with different stages. In this research, it is interesting to process the perception of sentence both in the Present Simple and Future Simple tenses. It is appropriate to reveal and calculate the differences in

perception of time described in the sentences by means of various verb forms.

References:

- Carrera, P., Muñoz, D., Caballero, A., Fernández, I., Aguilar, P., & Albarracín, D. (2014). How verb tense affects the construal of action: The simple past tense leads people into an abstract mindset. Psicologica : revista de metodologia y psicologia experimental, 35(2), 209–223.
- Connor, A., Smith, J. (2019). The Perceptual Present. The Philosophical Quarterly, 69 (277), 817–837. <u>https://doi.org/10.1093/pq/pqz017</u>
- Jabarri, J. (2013). Time and Tense in Language Mohammad. International Journal of Linguistics, 5 (5), 1948-5425.

Jegerski, J. (2014). Self-paced reading. In J. Jegerski &

B. VanPatten (Eds.), Research methods in

second language psycholinguistics, pp. 20-49. New York: Routledge.

Lutfullina, Gulnara. (2015). Representation of the perception situation by English Tenses. Vestnik Tomskogo gosudarstvennogo universiteta. Filologiya. 34. 23-32. 10.17223/19986645/34/3.

Marsden, Thompson, Plonsky, L. (2018). A Methodological Synthesis of Self-Paced Reading in Second Language Research: Methodological synthesis of SPR tests. Applied Psycholinguistics, 861–904, 1469-1817. <u>https://doi.org/10.1017/S0142716418000036</u>.
Tremblay, A., Derwing, B., Libben, G., Westbury, C. (2011). Processing Advantages of Lexical Bundles: Evidence from Self-paced Reading and Sentence Recall Tasks.

2.32. Human Perception of Pragmatics (on the Example of Refusals)

In the modern global world, the limits of communication are extending and there is a need to bridge the gap between EFL speakers and native speakers. In the context of communication, there can be different situations and one of the key concerns is to facilitate negative communication scenarios and contexts. This chapter focuses on refusals and the linguistic mediation. Lexical features, stylistic and pragmatic tools of communication should be of primary concern for the modern linguists, who should develop the most effective communicative practices.

Beebe et al.'s (1990) developed a certain class of the refusals. This taxonomy was used by the researchers to investigate the semantic and

pragmatic strategies of the refusals. This approach is effective to classify and analyze contexts of refusals, or used strategies. Especially, non-native speakers implement different strategies and based on researches and studies, refusals are analyzed in the context of invitations, requests, suggestions, and offers. Three main stages of refusals, which predetermine refusals, transfer their main message and finalize these messages. On the one hand, it is difficult to focus on this classification, because it is rather problematic to organize an identical communicative situation. On the other hand, nonnative speakers in case of their high-level linguistic competence are able to develop the best strategies for refusals obtaining.

Another related issue is the matter of politeness, which is explored in detail by J.C. Fe'lix-Brasdefer (2006). In the context of politeness, the

issue of formality used strategies, and personal communication politeness strategies are studied. In the communication in different contexts and among representatives of different nations, community politeness represents verbal use of certain formulas with specific semantics. Semantic formulas convey one or another message.

Linguistic politeness studied in the context of the Ukrainian community. The system of politeness is divided into three systems: solidarity, deference, and hierarchy. The split and division of power define appropriate degrees of politeness. The users of language facilitate the conveyance of the refusal message. This is reached by different linguistic means.

Both, social and pragmatic factors are in focus of the researchers. Moaveni (2014) claims that delicate speech acts are relevant to non-native

speakers. They need to reach negative responses. An interlocutor gives a negative answer. There are some cultural factors, which influence the answers of the communicators. Such variables as gender and different modes of their communication may result in more complex refusals. It is relevant to analyze the refusal strategies of American and international college students. In the context of the written Completion Task, the speakers Discourse communicated in six different situations. Refusals from the academic department staff were analyzed. It was found out that the number of formulas used. order, and specifics of semantic templates were identical. Email represented direct refusals. Male answered directly and the international students implemented a wide range of semantic formulas. They reflected positive attitudes. The international students answered more readily and directly. The

international students implemented more specific excuses.

Another study chose participants from the Turkish-speaking EFL teacher trainees. Pragmatic intentions were evident. Both, verbal strategies and pragmatic modes of refusals are in focus of the study. Sixteen native speakers of English (NSEs) and sixteen native speakers of Ukrainian (NSUs) developed their particular semantic and pragmatic strategies of answers.

The taxonomy of refusals proposed by Beebe (1990) was used in this study to analyze the communicative contexts of refusals. It was possible to explore refusals and their types used by the IL group, and it was possible to analyze data were analyzed in terms of the refusal taxonomy. A range and difference of strategies were in focus of the study. There was an interlanguage pragmatic

development. It is possible to minimize the level of a pragmatic misinterpretation of messages in terms of speech acts. The semantic balance can counterweigh pragmatic charge of the message. The development of students' linguistic competence will facilitate the effects of refusals obtained from the speakers (Yasemin). Both, linguistic and extra-linguistic factors should be in focus of the language users to maximize the effectiveness of communication reached.

In the context of Chinese communication strategies, the ESL learners believe in a "facethreatening speech act" (Chen). Pragmatic strategies appropriate for the Chinese-language students, they were correlated with language knowledge. In terms of the given study, "Subjects for the latter two data types were 26 graduate students, native English speakers of English and non-native speakers of varying linguistic backgrounds" (Chen). The indicators, which show a true semantics of the message, its true and clear nature represent effective factors of communication. This study also reports that "the ESL learners were more concerned about being direct, preserving face, and avoiding embarrassment" (Chen).

In other terms, refusals and their strategies are considered within communicative strategies of the British English speakers (NS) and the nonnative (NNS) Saudi speakers. The Discourse Completion Test focused on the effective data collection. The researchers reached differentiating results using Beebe's refusal taxonomy, which was developed with the group of researchers in 1990. One of keywords chosen by the participants was "sorry". This research also focuses on the politeness model as a universal one. The students from Saudi Arabia followed communicative strategies used by UK

speakers. There is a need for pragmatic adaptability and the speakers should be aware of the pragmatic charges (AlBugami, 2005).

Another study was focused on the peculiarities of refusals use between Egyptian Arabic and US English style users. Beebe, Takahashi, and Uliss-Weltz and their discourse completion test (DCT) outlined 12 items, where refusals development strategies were considered (Beebe et al, 1990). The refusals obtained by the participants were researched in three requests of DCT. There were 3 invitations, 3 offers, and 3 suggestions.

Verbal and audio channels were activated as the respondents heard messages read aloud. According to data obtained from the interviews, 30 US interviews led to 358 refusals and 25 Egyptian interviews answered and developed their 300 refusals. There were specific strategies implemented

by the speakers. The analysis of messages focused on the following issues, such as refusals and their strategies, the direct/indirect messages conveyed by the speakers, their gender, and status. This can be explained by the incomplete comprehension of linguistic features of refusals. The non-native speakers can be unaware of these specific modes of communication.

Concerning direct and indirect refusals, it is relevant to mention that for non-native speakers it is more effective to focus on direct semantic formulas. Beebe's classification of refusals is widely used by the researchers, but they should correlate their studies with requests, invitations, offers or other communicative situations outlined by the researcher. The type of speech act predetermines a form of refusal. Supposedly, non-native speakers can be

unaware of specific communicative situations and neglect certain norms of speech acts. They should also know linguistic norms to develop refusals created by the speakers.

References:

AlBugami, M. A. (2005). Cross-Cultural Pragmatics: Comparing Refusal Patterns between Native speakers of British English (NS) And Nonnative speaker Saudi's (NNS) who study in the UK. Department of Phonetics and Linguistics, School of Modern Languages, University of Leeds (Master Thesis). Retrieved from *Arab World English Journal* (ID Number: 247. November 2019,1-64.

Beebe, L.M., Takahashi, T., & Uliss-Weltz, R. (1990). Pragmatic transfer in ESL refusals. In Developing Communicative Competence in a Second Language, C. Scarcela, E. Anderson & D. Krashen (eds.), 55–73. New York NY: Newbury House.

330

Chen, Hongy. Cross-Cultural Comparison of English and Chinese. Metapragmatics in Refusal. DOI: <u>https://dx.doi.org/10.24093/awej/th.247</u>

Gayle L. Nelson, Mahmoud Al Batal, Waguida El Bakary (2002). Directness vs. indirectness: Egyptian Arabic and US English communication style. International Journal of Intercultural Relations, 26, pp. 39–57.

J.C. Fe'lix-Brasdefer (2006). Linguistic politeness in Mexico: Refusal strategies among male speakers of Mexican Spanish. Journal of Pragmatics, 38, pp. 2158–2187.

Moaveni, Hiroko Tsuiki (2014). A Study of Refusal Strategies by American and International Students at an American University. *Theses, Dissertations, and Other Capstone Projects.* Paper 355. Yasemin AKSOYALP (2009). A Cross-cultural Investigation of Refusals by Turkish-speaking EFL

331

Learners: A Case Study. Eastern Mediterranean University.

CHAPTER-3

HUMAN AND NON-HUMAN LANGUAGES INTERACTION

3.1 Formal Relation of Information-Linguistic and Artificial Intelligence

Artificial Intelligence (AI) is the science of systems capable of action that any observer will give you. Artificial intelligence involves the use of methods created on the basis of reasonable behavior of humans and animals to solve complex problems. The field of artificial intelligence includes different aspects of computer science (natural language recognition, automatic translation, expert systems, visual recognition, generation of evidence in mathematics, job management, computer games) and technical systems for solving intellectual problems.

At this time, several major trends have emerged in artificial intelligence research.

I) Presentation of knowledge. Within this area, tasks related to formalization and presentation of knowledge in the memory of the AI system is solved. For this purpose special models of knowledge and language representation and description are developed. The problem of knowledge representation is one of the main problems for the AI system, because the operation of such a system is based on knowledge of the problem area stored in its memory;

2) Knowledge manipulation. In order for knowledge to be used in solving problems, it is necessary to teach the AI system to operate it. Within this direction, methods of updating knowledge based on their incomplete descriptions are developed, methods of reliable and plausible

inference based on available knowledge are created, models of reasoning based on knowledge and features that mimic human reasoning are proposed. Knowledge manipulation is very closely linked to the representation of knowledge, and these two directions can only be divided conditionally;

3) Communication. The tasks of this area include: the problem of understanding and synthesis of related texts in natural language, understanding and synthesis of language, the theory of models of communication between humans and the AI system. On the basis of research in this direction, methods of constructing linguistic processes, question-relevant systems, dialog systems and other AI systems are formed, the purpose of which is to provide comfortable conditions for human communication with the AI system;

4) Perception. This area includes the development of methods for presenting information about visual images in the knowledge base, the creation of methods of transition from visual scenes to their textual description and methods of backward transition, the creation of tools that generate visual scenes based on internal representations in Al systems;

5) Training. In order to develop the ability of AI systems to learn, that is, to solve problems that they have not previously encountered, methods are developed to form the conditions of problems to describe a challenging situation or to monitor it, methods to move from the known solution of individual problems (examples) to solving a common problem, creating techniques for splitting the original task into smaller and already known for AI systems.

6) Behavior. Because AI systems need to operate in some environments, some behavioral procedures allow them to adequately interact with the environment, other AI systems, and humans. This trend in AI is also poorly designed.

In recent years, the term "knowledge" is increasingly used in computer science. Experts emphasize that the improvement of so-called intelligent systems (high-level information retrieval systems, natural language-based dialog systems, interactive human-machine systems used in management, design, research) is largely determined by how successful they will solve the task of knowledge presenting. Not surprisingly, those who deal with the problem of knowledge representation are asked what is knowledge, what its nature is and clarify basic characteristics. In this relation, for example, attempts are being made to provide a

definition of knowledge that could be derived from solving the problems of knowledge representation in computer systems.

The passive aspect is inherent in presenting data: a book, a table filled with memory information. In the theory of artificial intelligence, the active aspect of knowledge representation is especially emphasized: the acquisition of knowledge must become an active operation, which allows not only to memorize, but also to apply the perceived (acquired, acquired) knowledge to considerations on their basis.

The use of symbolic language, such as the language of mathematical logic, allows you to formulate a description in a form that is close to both the common language and the programming language. However, mathematical logic makes it possible to think based on acquired knowledge: logical conclusions are really active operations for obtaining new knowledge from the already learned ones.

The basic outlook setting is to consider computers as a mediator in the cognitive human activity. The computer system, like other intermediaries (tools and household items, tools, devices, symbolic -systems and scientific texts etc.), playing an instrumental role in cognition, is a means of objectification of knowledge gained, some socio-historical experience incarnation of practical and cognitive activity.

The problem of knowledge representation has emerged as one of the problems of artificial intelligence. It is related to the transition of research in this area to some new phase. It is a question of creation of practically useful systems (first of all socalled expert systems) used in medicine, geology,

chemistry. Creating such systems requires intensive efforts to formalize the knowledge accumulated in the relevant science.

One of the problems of today's society is information overflow, which requires a shift from storage and processing of data to the accumulation and processing of knowledge. In this regard, the task of intellectualizing linguistic-information technologies of representation and processing of knowledge becomes relevant. The main means of accumulation and transfer of knowledge is natural language. However, in terms of solving this problem, natural language has significant drawbacks: it is incomplete, redundant, ambiguous, inaccurate and grammatically incorrect. The incompleteness of natural language is expressed in the absence of words to express semantic features (nuances) in dialogue or new concepts.

An example of expressing an excess of language is the presence of words or synonyms that express the same meaning. The ambiguity of natural language is expressed in the presence of words or homonyms in it, which have different meaning in different contexts. Natural language inaccuracy is expressed in the "blurring" of the scale of semantic interpretations of words. The grammatical incorrectness of the language is manifested by the presence of different challenges in many rules of the language.

Therefore, the solution of the problem of automatic processing of knowledge is complicated by the problems of polysemy, synonymy, homonymy of natural-language sources of knowledge, which are inherent in the language at all levels of its representation (morphological, syntactic, semantic and pragmatic), which, first of all, is manifested in the

problem of determining the equivalence of semantic. In this case, the complexity of the problem increases when it comes to the semantic proximity of words not as the main meaningful, syntactically independent unit of language, and multi-word phrases (collocations) - syntactic constructions consisting of two or more words (collocates) connected by type of communication (coordination, management, adjacent). For these reasons, the identification of information-linguistic entities, in particular collocations, and relationships in texts with human-specific flexibility and ambiguity requires intellectual means of semantic processing of naturallanguage texts.

However, most existing formal models of semantic word identification, rarely collocations, do not allow the automation of the identification procedure or provide low accuracy in practical

implementation. This is due to the fact that the implementation of automatic semantic analysis of natural -language texts uses lexical and grammatical approaches, contextual analysis, statistical analysis, and rarely apply semantic methods in combination with other methods, which becomes mandatory when identifying information- linguistic entities and relations.

In the study, grammatical and semantic descriptions of such linguistic entities as collocations containing an informal formal component are used to recognize the relation of semantic relation. The basic idea of the approach is that the use of artificial intelligence methods, namely, the apparatus of finite predicate algebra, comparative identification and component analysis, as well as the set of grammatical and semantic characteristics for formalizing information-linguistic units will allow localization of

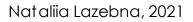
semantically close correlations (relative correlations) in natural language texts. Linguistic-information technology aims to improve the performance of existing intellectual semantic word processing systems, for example, in the elimination of semantic ambiguity, fact-finding, etc. by formalizing both syntactic and semantic information and automating the detection of semantic equivalence relations.

Thus, the identification of binary relations of semantic equivalence between collocations, as the most specific meaningful information-linguistic entities, allows to formalize the relation of semantics implicitly expressed in natural -language constructs, and to increase the accuracy, completeness and relevance of the requested information. Here are some examples of how chatbots work:—**Open and Closed Questions** Modern chatbots should be able to answer any question whether it is open or closed. There is, for example, a huge difference between, "Is London the capital of the UK? "Instead of" Why is London the capital of the UK? "

- Conference This section has to do with related objects with words. For example, "The office is located in Rotterdam." the bot has then to be able to confer from other sentences which office is meant. It should be able to connect the previously mentioned office owner to this particular sentence.
- Ambiguity Ambiguity is related to the context and meaning of the sentence. Not only is the chatbot responsible for correctly associated meaning with the word, but also some languages are more ambiguous than others. This is especially true when analyzing human speech.

 Morphology Each language has a different morphology, the chatbot has the ability to separate words into individual morphemes.

- Semantics Semantics is the meaning of sentences or words in the associated human natural language. This section deals specifically with natural language understanding and natural language generation. The ability to chatbot to translate any human natural language, whether it's for creating a response or analyzing questions.
- Text structure Related to the structure of texts, punctuation and use of spaces. This greatly differs between languages.
- Sentiment The chatbot should be able to detect the emotional polarity of the subject



being human is talking about. It should be able to tell from the way the text or speech pattern is presented whether it is human or angry, sad or happy.

The idea of knowledge representation is at the heart of the doctrine of artificial intelligence systems. There is a direct relationship between linguistics and artificial intelligence, and both of these industries intersect in the field of natural language processing [7].

Natural Language Processing - this formulation and study of computer-effective mechanisms for communication with computers using natural language (NL). Objects of research are:

I) natural languages;

the use of NL in both human-to-human communication and human-computer communication.

The task of research is to create computereffective communication models for NL. It is this formulation of the task that distinguishes the processing of NL from the tasks of traditional linguistics and other disciplines that study NL, and allows it to be attributed to the field of AI. There are two disciplines involved in the processing of NL: linguistics and cognitive psychology (we should also mention the set of named fields: cognitive linguistics).

Traditionally, linguists have been working on the creation of formal, general, structural models of NL, which is why they preferred those which allowed them to extract as many linguistic patterns as possible and make generalizations. Virtually no attention was paid to the suitability of models in terms of the computer effectiveness of their application. Thus, it turned out that linguistic models, characterizing the inherent language, did not

consider the mechanisms of its generation and recognition.

There is general and applied processing of NL. The task of general NL processing is to develop models of human language use that are computer-efficient. Since the general processing of NL requires a great deal of knowledge about the real world, most of the work is focused on the presentation of such knowledge and their application in recognition of the recipient of the message on the NL. To date, AI has not yet reached the stage where real-world knowledge would be used to address such challenges, and existing systems can only be called experimental because they work with a limited number of carefully selected templates on NL.

Usually, NL processing is not about modeling, but directly the possibility of human communication

with computers on NL. In this case, it is not as important as the phrase is understood in terms of knowledge of the real world, but an important extraction of information about what and how a computer can be useful to the user (an example is the interface of expert systems). In addition to understanding NL, in such systems it is also important to recognize and correct errors.

The development and diffusion of modern digital technologies in all areas of human life has led to a constant search for optimal forms of humancomputer communication. That is why the focus of applied linguistics is on ways to adapt natural language to remotely control and control a variety of devices that simplify human activity. Speech synthesis and recognition technologies are widely used in fields life of medical, military, various transportation, telecommunications, entertainment,

and training. Creating programs for speech synthesis and recognition involves the use of content in such tangible disciplines as applied phonetics, applied programming, theoretical grammar, lexicology, lexicography, psycholinguistics, and logic.

3.2 Intertextuality of Natural Language

Processing by Means of Artificial Intelligence

The relation of texts to each other is based, first of all, on the theory of intertextuality, which is directly related to the problem of interpretation of the text, which sends the reader to other texts. The notion of intertextuality is linked to the concept of M. Bakhtin's dialogue and is a textual interaction that interprets history. Intertextually enriched speech that evokes the feeling of déjà vu, drawn to the texts of the past and thus to the history of speech diachrony [4, p. 317].

When there is interest in the categorization of text, its view on the basis of a constitutionalism in tone or is such as to check whether there is a text spam, which people do not notice on a consistent schema words as doing N- programming language model(N- language models estimate the likelihood of the last word a given by the previous words).

Imagine that a text is a "word packet" as an unordered set of words, ignoring the initial position of words in the text, keeping only their frequency.

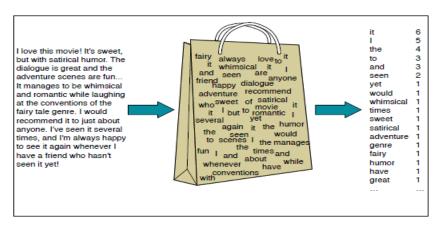


Fig. 2.1. Word package illustration.

Suppose that the text "package of words" is a simple example in two classes - positive (+) and negative (-). Below we see 5 sentences (also called documents) with their known categories, as well as 1 sentence with an unknown category. The purpose to classify the last is a sentence both positive and negative.

	Cat	Documents
Training	-	just plain boring
	-	entirely predictable and lacks energy
	-	no surprises and very few laughs
	+	very powerful
	+	the most fun film of the summer
Test	?	predictable with no fun

Fig.2.2. Positive and negative sentences.

This problem is solved by the so-called classifier Naive Bayes, using words that are often found in the " bag of words " in each class to order

to calculate the probability of each class c (cat), and the probability of each of the words given class.

In this example, a negative class has a probability of 3/5. A positive grade will have a probability of 2/5. These coefficients show that the probability of the words " predictable ", " with", " no " and " fun " with the negative class is higher than the probability for the positive class. Because sentence *« predictable with no fun »* will be classified as negative based.

Models language "bag of words" based on TF (term frequency - a statistical measure used to assess the importance of words in context), as the second determines how many times a word is repeated in a given text or document. The word pack helps you analyze the tone of the text. This model recognizes the language in which the text is written. It is also

used to determine author attributes such as gender and age. It is also possible to use TF to develop additional functions, such as the number of positive words ("great ", "nice ", "enjoyable "), or the number of first and second person pronouns ("I", "me", "you ") and train more sophisticated classifiers based on logistic regression and even neural networks.

To give an example, in the explanatory dictionary there is а definition of the word "mouse", but the definition of the form of the plural "mice " of this word is not. The same with the verb "sing", we can find in the dictionary definitions " sing ", " sang ", " sung ", but not for of forms and time. Or an example, with a word « plant » can have different meanings depending on the context (e.G. « Tesla is building new plants », « Climate change has a negative effect on plants »).

Currently, vector semantics is the best approach to building a computational model that successfully handles various aspects of the meaning of a word, including hyponym, hypernonym, antonym, synonym, homonym, similarity, affinity, lexical fields, lexical frames, connotation. In the example of "Tesla is building new plants", if we count the words in the context of the word "plant" in many other sentences written by people, we will like " build ". " machine ". see inclined words "worker "and even "Tesla ». The fact that these words and other similar contextual words also occur together with the word "factory", we can understand the similarity between the words "plant " and " factory ".In this case we will know that " plant " is not " vegetable ". Therefore, a person can define and understand a word by

356

context, and this word serves as a vector, a list of numbers, a point in N-dimensional space. This representation is usually called a plugin. The computer can use this trick to understand the meaning of words in context.

3.3 Semantic Ambiguity of Urban Terminology (Ukrainian-English Translation Google Translate Vs Human Translation)

The problem of semantics is one of the key concerns of both machine and human translation. Despite the fact that neural networks have been used as a central background for Google Translate, the human factor has contributed much to the final version of the translation. The optimal solution to the problems of semantics is the use of interactive mechanisms (dialogue, semiautomatic), which provide a mutual solution to the problem by a human being and the computer. The human factor of

the translator is a decisive tool for quality translation achievement. Finally, the target text sounds like a source text, following all the pragmatic intentions of the source text author.

This research considers the translation of an urban design article from Ukrainian into English (Google Translate vs human translation). Based on an analysis of 33,000 printed symbols, the semantic errors were identified and corrected. In addition to the semantic charges of words that Google Translate attempts to correct using neural networks, the structure of the target language sentences does not meet the grammatical requirements of the English language in the analyzed passage. Machine translation seems to copy the structure of the original sentence and translate it into English, but into "UkrEnglish".

The translator based on his 'sense of language' restructures the sentence and in the translation process he chooses the necessary lexical translation equivalents. Obviously, there are more bugs than Google Translate developers believe. Of course, the translation that appears is understandable in many cases but sounds unnatural in terms of the target language norms. Thus, in the passage examined, the translator made 244 corrections as can be seen from the Word automated comparison of the professional translation text and Google translate. Structural adjustments, semantic correspondences, and a large number of pronouns, prepositions, and even articles have overloaded the Google Translate target text. The global web is increasingly absorbed by modern society. Automation of human activity, the dominance of the robots and mechanisms on people removes the limits of technology. The neural network that uses the online translator Google Translate has led to the creation of a translation of languages, which have not been initially put into this system [Melvin 2017].

According to modern researchers, this internal representation within the network is the universal language of mankind. Rather, it is a machine code, in which there is work for intermediate level of a neural network. This machine language is an intermediary between language pairs of human languages and the supported system. However, the existence of such a universal meaning base, which brings together all the languages of the world, is an unforeseen and incomprehensible field of activity for linguists, translators, programmers and other professionals, and makes the research of this field relevant. Translators exist at the inter section of two capacities: Google Translate neural networks and

360

human knowledge. Perhaps, the developers have created an artificial representation of the text as something integral. The Interlingua universal, focused on its use in technology automatic translation.

Specialists of Google using zero shot translation, which is a more complex method of translation. To evaluate the text of the translation as somewhat integral and is that feature or preference of the person before the robot-translation system. The aim of this chapter is to detect semantic ambiguity urban terminology when a machine translation Google Translate from Ukrainian into English language and compare its level after a professional translation.

Modern urban terminology conveys the idea of "density developments" in the background of the space, which is reduced. Accordingly, the semantic loading of such terminology implies a ' city

everywhere ' approach. Buildings in the embrace of the cityscape, the three-dimensionality of the city, strange shapes and designs, the variety and multiplicity of innovative buildings determine the essence of innovative urban terms. A "vertical suburb " appeared and influenced the semantics of the terms. As a result, most of the terminology used refers to the description of the vertical elements of buildings and structures (vertical timber, threedimensional, curved balconies, etc.).

Modern trends in architecture make emphasis on monumentality any of which types of buildings. Thus, social housing has become a masterpiece with original ideas and concepts. The semantics of these terms primarily follows concerns intricate nature of modern trends of urbanization. Thus, translators should find matching equivalents. In contrast to the human interpreter, artificial intelligence operates an

artificial language, not divides sentence for phrases single words and translate all sentences or completely within the context. However, the passage analyzed demonstrates the need to rephrase sentences, select adequate answers, correct grammatical errors, and more. The neural network is constantly improving, enriching and can work directly with many pairs of languages (English-Japanese, English-Korean). The unique machine translation Google Translate is not cannot be emphasized. For example, Google can perform translation Japanese Korean although it initially has not been incorporated mechanisms to translate between these two languages. For example, if the system taught translation between English and lapanese languages, and English and Korean, it easily can perform translation between Japanese and Korean, but have no use of the English language in as

interim. "Over the last ten yearsautomatic translation of texts Google Translate grew from several languages to 103, and now it translates 140 billion words per day» [Castelvecchi 2017].

Profound mechanisms of Google Translate service improve translation based on the context. Google 's machine translation neural network is called Google Neural Machine Translation(GNMT). The innovative level at which this system operates is new and relies on "text split" by dictionary segments". Latest results, obtained mainly through deep neural networks can improve the quality of algorithms for prediction or interpretation of possible meaning move to the analysis of large and extra large training samples [Schuster 2016; Surafel et al 2017]. At the same time, it turns out that in practice for many tasks it is possible to collect a sufficiently large number of objects for which the

364

exact value of the hidden variable is unknown but a subset of its possible values is known.

In accordance with latent semantic model, this problem is a typical example of the problem of inefficient marking in contrast to the problem of forecasting word context, where empirical material can serve as any that text. " The object in this case is simply the position of the word in the text ; variable - is the context of certain words and hidden variable - it is a word that try to predict contextual and hidden components known to any whose position in the text"[Winds].

Comprehension of other words provides context or situation, the general theme of language. The context determines the specific meaning of the ambiguous word, and in certain conditions it can create semantic diffusion, that is, the compatibility of individual lexical meanings when their delineation

does not occur. Not only lexical compatibility and derivation features characterizing different meaning of words but also in some cases and features of grammatical compatibility are of crucial importance. In applied problems of computer linguistics there is no delineated homonymous and polysemic meaning of words. This is related to the fact, that in the vast majority of application problems is important not so much the etymology of the word, as its semantics. The optimal solution to the problems of semantics are interactive mechanisms (dialog, semiautomatic), which provide a joint solution of the problem by a human being and computer, and are reduced to the fact that the computer provides the user with a set of alternatives from which he must choose one option. The human factor interpreter for today is critical to achieving high-quality translation, which will sound just like the original, will reach the same

communicative effect and pragmatic guidelines. Based on the "classical" determinants of translation quality, we turn to such concepts as "adequacy" and "equivalence".

The criterion of adequacy is the degree of retreat of equivalence, due to objective necessity. Semantic and stylistic adequacy is determined through an assessment ratio of text to text translation of the source text, but accurately put through evaluation of semantic and stylistic equivalence of linguistic units, which make up the text of the translation and the text of the original.

The concept semantic and stylistic adequacy relevant to assess their own linguistic content or aspect of translation activity.

In this approach to the design of the city formed the image of the city and the urban

environment, which means auto models culture, tools of its self-reflection.

Source text	Human translation	Google translate
У такому	This approach creates	In this approach to
підході до	the image of the city	the design of the
дизайну	and urban	city, an image of the
міста	environment design	city and the urban
формується	defining the auto	environment is
образ міста і	model of culture and	formed, which
міського	the tool of its self-	means the car
середовища,	cognition and	model of culture,
що означає	reflection.	and a tool for its
автомодель		self-knowledge and
культури,		self-reflection.
інструмент		
його		
самопізнанн		
я і		
самоосмисле		

ння

Душа міста	The soul of the city is	The soul of the city
входить в	not its integral	parts of the city is
склад міста	constituent. The	not completely, the
не повністю,	image does not reflect	image does not
образ не	a subconscious part of	include that part
включає ту	the city soul, an	which is not visible
ії частину,	unperceived	to the minds and
яка не	component for the	feelings of the
відображаєт	minds and feelings of	people.
ься в	people.	
свідомості і		
почуттях		
людей.		

In the total sample 33,000 of printed characters with spaces were analyzed from the Ukrainian English language. Besides semantic bonds, which are trying to fix Google using a neural network, in this passage, the structure of sentences

does not correspond with grammatical requirements of the English language. It seems that machine translation copies the structure of the original sentence and translates not in English but into "ukrEnglish." The translator immediately considers the need for a restructuring of the sentence and in the process of translation he already selects the necessary lexical translation equivalent. Therefore, errors apparently exist and there is much more of them than the developers of Google believe. Of the course. translation that appears is understandable in many cases, but sounds unnatural in terms of the language of the translation.

Using popular metrics finding errors in the text, it possible to analyze what is the most frequency errors occurring in the Google translate. Such metrics are WER, BLEU, NIST and METEOR.

However, translator can detect errors text translation for a long time, but to eradicate them and replace in correct option in contrast to auto corrections. It is possible to classify syntax errors: 1) incorrect word order,

2) incorrect verb form,

3) missing or incorrect articles,

4) missing or incorrect pronouns.

In (1) the wrong words order the sentence is incorrect in the English language. (2) The incorrect form as an error occurs when the machine translation system fails to distinguish the form of the verb. 3) Missing or incorrect articles and 4) the missing or incorrect pronouns overload sentence in target language. Semantic errors such as (1) missing words, (2) incorrect translation equivalents, (3) additional words. 1) Missing words can disrupt the content of a sentence. (2) Incorrect translations (if

the machine translation system is not can find the right translation of the original words). In this case, the translation word may simply be completely incorrect or ambiguous. In (3) additional words implied to mean words are absent in the original sentence, but present in the translated sentence. Thus, in the considered fragment, an interpreter made 244 corrections as seen from the automated comparison of professional text translation and version of Google translate. Most sentences have been translated and the Google translator version been rejected. Structural rearrangements, has semantic correspondences, a large number of pronouns and even articles have overloaded the Google translate text.

References

Castelvecchi D. Deep learning boosts Google Translate tool. September 27, 2016 URL:

https://www.scientificamerican.com/article/dee p-learning-boosts-google-translate-tool/ *Ivanytska N. Th*e full word of the Ukrainian language in modern categorical d imensions : a monograph . Nilan - LTD , 2017. 266 p . *Lewis-Kraus G.* The Great AI Awakening. Dec. 14, 2016. URL: https://www.nytimes.com/2016/12/14/magazine /the-great-ai-awakening.html # 76 (2019) *Melvin Johnson et al.* Google's Multilingual Neural

Machine Translation System: Enabling Zero-ShotTranslation. 2017.https://www.aclweb.org/anthology/Q17-1024/

Efremov. Neural networks: practical applications. 2017. URL: https://habr.com/post/322392/ doi: 10.1038 / nature.2016.20696

SCHUSTER M. ET AL. Zero-shot translation with GOOGLE's multilingual neural machine translation system. November 22, 2016. Url: https://ai.googleblog.com/2016/11/zero-shottranslation-with-googles.html

Surafel M. Lakew, Quintino F. Lotito, Matteo N., Turchi,
 M., Federico, M. Improving the Zero-Shot
 Translation of Low-Resource Languages. 2017.
 URL: https://arxiv.org/abs/1811.01389
 Vetrov D. A latent semantic model. URL:

Vetrov D. A latent semantic model. URL: https://postnauka.ru/video/49258

3.4. Semantic Ambiguity of English-language Chatbots

Global modes of human life trigger novice social and cultural processes, which involve not only technological factors but also are mediated by linguistic ones. A human being is not only the author and initiator of human-machine interaction but also is the recipient in the process of this communication. It is relevant to speak about the twofold model of communication in the modern computer-mediated global world.

Being the international language, the English language is dominant, which fosters and changes communication processes. A machine is not only a goal for programming, it is a mediating link between a human and a machine. Thus, the following graph represents this type of communication and a mediator is a chatbot, an English-language bot, which facilitates human communication in the modern world of technology and progress.

The goal of the study is to focus on chatbots as mediators, which facilitate the process of humanmachine communication and solve the problem of misunderstanding, which occurs therein. At this point, we will refer to the problem of semantic ambiguity of messages sent by Client I to the machine and the inappropriate result of this message, when Client 2 receives it. At this point, an agent, who codes a message is a Programmer.

Ist stage: HUMAN BEING (Sender or Client
I) – MACHINE – NATURAL LANGUAGE –
HUMAN BEING (Recipient or Client2)

This is a general framework of communication between a human being and a machine. In terms of this framework, each party is responsible for its functions, but the final result of their communication is a reachable pragmatic setting.

2nd stage: HUMAN BEINGI (Sender or Client
I) – HUMAN BEING 2 (Programmer) –
MACHINE – NATURAL LANGUAGE –
HUMAN BEING 3 (Recipient or Client2)

The second stage of communication is more complicated as it involves at least three humans, but the machine remains the same, a mediator in this communication process. In other words, the machine mediates the communication process, which involves both interlocutors and, first, encodes a message of Client I and through Programmer further decodes it for Client 2.

From this perspective, one of the perfect ways out is to reduce symbols introduced to chatbots, shorten the number of questions and implement certain, and, even specific speech templates, which

will trigger more effective communication between a chatbot and machine.

3.5. Literature Review

Referring to NLP (Natural language processing), this scientific perspective can be applied at various stages of human activity, and the generation of appropriate answers to а machine/requests of humans are of crucial concern in the international scientific community. Specialists from different fields are involved in this process. Next to programmers, it is appropriate to refer to linguists, who can facilitate communication between a human being and a machine. For example, systems for generating phrases and texts can create a text version of the weather forecast by extracting information from weather maps, or they can also interpret complex medical information in a form

comprehensible for the patient. Dialogues in dialogue systems are also developed with the use of such systems.

From the perspective of functionality, such systems can act both as an author and assistant. If the system becomes an author of the information, then the role of a human being is a secondary one. On the contrary, if the human being acts as an author, then he uses a system, and its functionality is in the foreground. Systems as assistants help humans to write official reports or rhymes for writing poetry. The main difficulty independently from the functionality of the system, is its complexity, integration of several blocks. The content block and planning block are interacting and, if the former depends on the system, the latter is dependent human being. Sentences а on organization, modification of requests, readability of the text, and other related issues are referring to a human being and his role in this process.

To sound natural is one of the main goals, which should be reached by humans in their mediation of communication with a machine. For example, a combination of sentences or their split in some parts should be correlated with the laws of natural language. Syntactic roles of speech parts in the sentences, vocabulary used, and maps forming in correlation with concepts, – all these and many other linguistic issues are often omitted in the process of machine functioning (Austin, 1975).

When the machine generates a text, it relies on the sentences, words, and prototypes used therein. The use of synonyms, speech patterns transformation, word replacement, and other lexical matters should be correlated with the principles of natural language. At the stage of implementation, the text should be modified according to the rules of syntax, morphology, and spelling. On a higher level, if correlated with the theory of speech acts, the performance of human being and machine interaction be correlated with the goals of the should participants. The goal of expressions, the main intention of communication, and reached result dates back to findings of J. Austin (1955). Intensifiers in the process of communication are dominant keys, which outline the mode of communication (Hickey, 2014). This idea goes far beyond words/sentences/ texts or any other verbalized and evident results. It has a deeper concern, when in the process of communication one message reaches another recipient, he should react/act accordingly.

LOCUTIONARY ACT= SPEECH ACT

ILLOCUTIONARY ACT=COMMUNICATION GOAL PERLOCUTIONARY ACT=COMMUNICATION EFFECT

If to project these acts on human-machine interaction, if to refer to voice assistants on Androids, this simple example will show that only Locutionary act is certainly effective. Both, illocutionary and perlocutionary acts depend on the correct coding of the sent message.

Researchers in this field have often discussed this problem and offered numerous solutions, but none is perfect due to a lack of linguistic knowledge, which is often neglected in resolving this problem. "The first solution uses an ontology, which is exploited in a twofold manner: to construct dynamic answers as a result of an inference process about the domain, and to automatically populate, off-line, the chatbot KB with sentences that can be derived from the ontology, describing properties and relations between concepts involved in the dialogue. The second one is to preprocess user sentences and to reduce them to a simpler structure that can be referred to existing elements of the chatbot KB" (Augello et al, 2012).

3.6. Results and Discussion

In other words, the communication between a human being and machine in terms of speech acts will be ineffective, but the machine is the only mediator of this type of communication. The following three-parties' interaction will be violated at its intermediate stage if its mediator misunderstands the locutionary act. From this perspective, humanmachine interaction does not coincide with traditional human-human communication. In terms of this theory, communication is effective, when the

sender reaches his goal and the recipient acts accordingly and satisfies the needs of the sender. The same statement can hardly be true for humanmachine communication because it depends on the machine if human-machine interaction is effective.

Moreover, a machine cannot evaluate the power of the message obtained (illocutionary act). It is responsible and open for any message sent: "Where is the closest supermarket" and "How to make a bomb?", - both these voiced questions will be processed based on codes received by the machine.

At the same time, by changing voice commands, making some phonetic mistakes, or typos in Google search, the machine either modify or cannot process the sent command/request. Therefore, the ambiguous and coded nature of the machine depends on the dynamic and changing nature of a human being. To dig deeper, one can find a programmer, who, actually codes, or chooses semantic strings to code one or another command sent by a human to a machine, and, at the same time, a machine makes a choice depending on a command sent by a programmer. Before these two actors, there is a user on the stage, so to say, who asks/types what he wants and, as if, he communicates with the machine only. He does not see the programmer beyond this communication act.

That is why, an attempt to modify and improve the communication act between a human being and machine is impossible by focusing on prerequisites only. Human-machine interaction should be unfolded again and transformed into

CLIENT-PROGRAMMER-MACHINE-HUMAN RELATIONSHIP.

OR

HUMAN I-HUMAN2-MACHINE-HUMAN I

On the one hand, it is a mode of Self-self communication with the help of the machine, but at this point, the 2^{nd} agent, human 2, a programmer occurs. Distortion of communication between human-machine can be caused by the involvement of this 2^{nd} agent.

Formal models of generative linguistics can also be successful in their further application to human-machine interaction. Noam Chomsky in the 50-the 60s of the 20th century has granted the world with his idea and prophesized its further effective implementation in the modern human-machine interaction. In terms of generative grammar, three basic constituent parts: syntax, semantics. and phonology are dominants, which predetermine the interpretation of human-machine interaction. Nevertheless, the structures of the sentences vary and even deep structure can reflect the challenging

meaning of the sentence. The syntax focuses more on basic elements, and transformation elements, accordingly. The basic element is called a system of elementary rules. The English-language chatbots are programmed according to these rules. Referring to the following rule: $S \Rightarrow NP + VP$, each sentence consists of the subject group NP (noun phrase) and the predicate group VP (verb group). It is possible to reflect this scheme and project it on the process of sentence processing for chatbots.

Class ChatBot:

denial = ("not my concern", "no", "sure, no", "nah", "not an option", "deny")

exit_commands = ("quit", "exit", "bye bye", "bye",

"delay", "stop")#Method to initiate the conversation def start_chat(self):

user_response = input("Hello/Hi, I'm a chatbot developed for random dialogues. Any option to speak?\n")

if user_response in self.negative_responses:

```
print("Ok, have a nice day!")
```

return

```
self. chat(user_response)#Process of answer
```

handling

```
def chat(self, reply):
```

```
while not self.make_exit(reply):
```

```
answer= input(self.generate_response(reply)+"\n")
```

#Method to convert user input into a matrix

```
def string_to_matrix(self, user_input):
```

tokens = re.findall(r"[\w']+|[^\s\w]", user_input)

```
user_input_matrix = np.zeros(
```

```
(I, max_encoder_seq_length,
```

```
num_encoder_tokens),
```

dtype='float32')

for timestep, token in enumerate(tokens):

if token in input_features_dict:

388

user input matrix[0, timestep, input features dict[token]] = I. return user input matrix #Method that develops a response using seq2seq model we create response (self, user input): input matrix = self.string to matrix(user input) chatbot answer = decode answer(input matrix) #Remove <START> and <END> tokens from chatbot answer chatbot answer = chatbot response.replace("<START>",") chatbot answer= chatbot response.replace("<END>",") return chatbot response#Method to controle output commands def make exit(self, reply): for exit command in self.exit commands: if exit command in reply:

389

print("Ok, have a great day!")

return True

return False

chatbot = ChatBot()

This developed model (Generative chatbots using seq2seq model) represents a variant of Englishlanguage text embedded in digital discourse. In other words, this text can be modified, verbal codes can be represented continuously. Frame representation of this type of text signifies their dynamic nature. Similar to natural language, encoded or digitalized texts dominate over symbolic or semiotic constraints.

The split of the sentence "The man took the book" into the Chomsky tree. A transformation element is a set of rules that are applied to the base and generate surface structures.

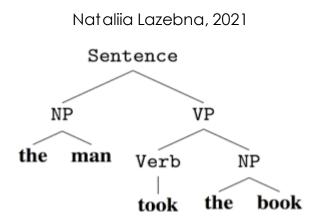


Figure I. Sentence split according to Chomsky's tree

Text generation systems, on the one hand, depend on natural language universal laws, but, on the other hand, they are correlated with formal relations between the system components. Despite more or less clear structure of the message, which has to be interpreted, a semantic charge of this message may vary and be ambiguous for the machine. Digits are beyond culture. Nevertheless, there is an option to refer back to speech acts and

build an English-language phrase and correlate it with the speech act, focusing on the illocutionary goal and the intensity of the communication charge.

First, it is possible to talk about Chomsky's grammar and generate certain models of speech acts for English-language chatbots. Correlation and application of these perspectives underline the possibility of traditional linguistic methods to the analysis of human-machine communication. There is a strong need for templates representing sentences, which can be created and sent to English-language chatbots. Beyond this template, such characteristics as parts of speech and their functionality in a sentence, their characteristics, and other aspects can be neglected by the machine, which receives nothing but digits and symbols. It is better to look for a certain template, which will be universal and specific.

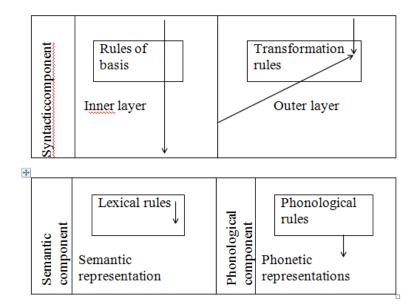


Fig. 2.Segmentation of English-language message sent to chatbot

Focusing on semantics it may seem that semantic ambiguity can be avoided only in human-human interaction. If a machine interferes in this process of communication and violates it, then it should be solved in another way. Moreover, according to the abovementioned scheme, there are often more than 2 senders and recipients in human-machine interaction. Thus, this process becomes even more challenging and complicated.

Another option is to determine the propositional content of the phrase. At this stage, we are specifying the action that will be mentioned in the phrase. Namely, we complement the future phrase with action verbs. Anyway, the main emphasis is on the illocutionary act, the one, which is easily transferred from human to machine.

If to refer to Alice's language models, the whole corpus of language is split into certain templates and categories. If to consider this ineffective communication between a human and machine, one can refer to ineffective communication between individuals, who speak different languages. Still, they have more privileges as they can transfer their ideas non-verbally.

Restructuring of requests sent to the machine, interpret referring to subdivision of can one questions "definition, measure, list, comparison, factual and reasoning" (Augello et al). There are two main directions for further discussion from this perspective, first, if to follow and convert Semantic Web content to AIML format, and the second direction is detect the main to sent message/information, or, concentrate on the input, and then develop a potential answer "by querying an OWL ontology with Protege API" (Augello et al).

These approaches offered by researchers in the field of programming and Informatics need an essential linguistic modification. Linear thinking of programmers, which will be looking for synonyms only in broader terms and wider contexts, it is necessary to broaden contexts and saturate the basis for answers choice focusing on versatile background freely available on the web.

Still, this research focuses on the first stage of semantic ambiguity problem solution. We consider this in the development of certain knowledge representation models or semantic models.

There are two types of knowledge representation:

I) Formal models;

2) Informal (semantic, relational) models.

Knowledge representation models in communication human-machine can be developed according to these logical underpinnings (Classifying Knowledge Representation, 2020).

Let us consider the English-language communication model as a system of rules for the interpretation of human knowledge. Unlike formal models, which are based on a rigorous mathematical theory, informal models adhere to other laws. Each informal model is suitable only for a specific subject area and therefore is not a universal one. The same is appropriate for semantic models of Englishlanguage chatbots. In terms of formal models, which can refer to the mathematical or formal representation of English-language content of chatbots, this model helps to reach a logical conclusion of communication. Semantic ambiguity roots deeply primarily in chatbots' users and programmers.

 Logical models. Models of this type are based on a formal system defined by a quadruple: LM = <A,B,C,D>. Basic symbols, digits and signs are included. This frame predetermines functional frame for English-language chatbots and also predetermines human-machine

communication. This frame includes also syntax rules. Though, within these models, semantic ambiguity occurs. First, limited vocabulary, predetermined communication situation, and context are pitfalls on the way to successful communication between a human and machine. There should be a certain correlation within the logical model context. Interference of semantic nucleus, syntactic functions, and logic of communication situation can be found within this model. In other words, all information units are introduced into this logical model in the form of background knowledge. In other words, a formal system is a generator of new knowledge, which forms a set of inferred knowledge in a given system. These set

templates for English-language chatbots are mainly used by the developers.

2) Network models specify the variability of semantics embedded in chatbots. Humanmachine message <\$1, \$2, ..., Cn>. The main information units embedded within this model are more related to the semantic nucleus of the message.

Depending on the types of links used in the model, it is possible to outline functional networks and their scenarios. Within this model, it is possible to outline different hierarchical relationships between information units in knowledge bases represented in human-chatbot communication. Certain causal and relations can be analyzed within these models.

3) Generating models combine some elements of logical and network models. Both, the

inference of rules from logical models and semantic variability of network models donates a dynamic variability of knowledge represented. From this perspective, a semantic network is transformed by changing its fragments, building up the network, and removing redundant fragments. Thus, in generating models, chatbots can operate dynamically, modifying their semantic content despite syntactic frames and limits.

4) Frame models. Unlike models of other types, frame models fix a rigid structure of information units. This model has a zest of universality enabling information embedding. For example, (Frame name: Slot I Name (Slot I Value) Slot 2 Name (Slot 2 Value)

... ...

K slot name (K slot value).

400

... ...

The slot value can integrate any elements (digits, symbols, signs, words, texts, etc). Therefore, it is relevant to correlate linguistic models of chatbots with one of the abovementioned models. Formal models of knowledge representation refer to logical knowledge representation. For a human being, it is relevant to identify a certain predetermined logical conclusion of a message sent to the chatbot. This logical model can be interpreted and correlated both with the laws of natural language and mathematical language. At this point, logical unity and combination of symbols (either letters or digits) plays a dominant role and represents in symbolic form the entire set of basic concepts, and further this unity will be ordered with the help of certain syntactic rules.

Moreover, the logical model can also be correlated with Boolean expressions, when values I -

0 or True-False statements are keys to facilitate human-machine communication. These expressions may generate new expressions. If the listed parameters are met, then the system is said to satisfy the requirements of the formal theory. According to Hinchey et al, a formal theory must satisfy the following definition: any formal theory F = (A, S, S2, R), which defines some axiomatic system, is characterized by the presence of the alphabet (dictionary), A, many syntax rules, S, the set of axioms underlying the theory, S2 (suggestions), set of inference rules, R.

The abovementioned theory outlines further development of linguistic models, which can be effectively embedded in human-machine interaction. If to consider some drawbacks of this formal approach, one can refer to its closed cyclic nature. Frames are set and constant, but semantic content is dynamic and reaching far beyond such frames. Thus, a possible way out is to look for a modification of these structural rigid boundaries of the frame. This model, a formal or logical one, can be effective in the surrounding, which is set and constant [Hinchey et al, 2005].

"Hypothetically, the strongest limitation of Alice derives mainly from the pattern matching algorithm used by its engine for the dialogue management, and the rigidity of its knowledge base, based on the definition of specific, unmodifiable rules, organized as question-answer pairs" [Krantz et al, 2017].

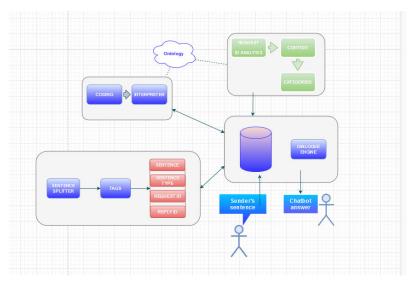


Figure 3. The functionality of the dialogue engine

The above mentioned scheme represents the functionality of the dialogue engine and its possible modification. Initially, to deal with the semantic ambiguity of Alice's chatbot, one has to refer to a more refined definition of question/answer pairs. Inserting special symbols (*and) enables programmers to type in more generic categories (default categories) to make a partial or total match with the user question (Augello et al). From this perspective, it is better to create more specific categories and develop a certain number of default and ontology categories with short and simple questions embedded. At this point, the solution to the semantic ambiguity problem refers mainly to programmers, who are responsible for finding the best match between the schema and its patterns.

One of the solutions can be found in the Classes of sentences in the analyzed domain. In this paradigm, it is possible to analyze a corpus of documents with sets of sentences and a machine should be able to analyze and identify these sentences and give certain answers to them within a certaincorpus of documents. For example, in communication between a human and a chatbot, it is relevant to identify specific features of a discussed

product. In other words, the formal solution to semantic ambiguity can be outlined as follows:

Definition: what is the product What = {which|what|who} Is={about|be|be meaning of|be definition of|be sense of|mean|appear} Product={SUBSTANCE} |{ENTITY}|{TASK}|{AGENT}

Question analysis would further split the text into certain fragments, identify speech parts and their grammatical categories, their functionality. Further, one can see specific patterns with specific roles and interdependencies therein. Further split and schematization of the sentence can be mediated by NLP models considered above in this study.

406

3.7. Conclusion

Unwrapping simple templates is also a long-term and challenging process. Each sent message can be interpreted in many ways. Language is dynamic and machine functions mainly as a static entity. From this point of view, a machine can be a certain frame for language, which can transform it, reshape it, or make it more comprehensible within its digital system. If to refer to transformations, we can see a certain cyclic manner of their processing and interpretation. Focusing on deep syntactic functions and coming up to the main sentences, this representation reminds us of trees in nature and their branches. At the same time, it is possible to talk about different syntax in semantically identical sentences, suitable for different languages. The English-language model for Englishlanguage chatbots can be considered a universal one

due to global digitalization and internalization of scientific space. This is the perspective of further studies.

References

- Augello, Agnese & Pilato, Giovanni & Machì, Alberto
 & Gaglio, Salvatore. (2012). An Approach to
 Enhance Chatbot Semantic Power and
 Maintainability: Experiences within the FRASI
 Project. 186-193. 10.1109/ICSC.2012.26.
- Austin, J. L. (1975). How To Do Things With Words. The William James Lectures delivered at Harvard University in 1955. Second edition. Edited by J.O. Urmson and Marina Sbisà. Cambridge, Massachusetts: Harvard University Press.
- Chomsky, Noam; Gallego, Ángel J.; OTT, Dennis. (2019). Generative Grammar and the Faculty of Language: Insights, Questions, and Challenges. Catalan Journal of Linguistics, [S.I.], p. 229-261, dec. 2019. ISSN 2014-9719. Retrieved from:

https://revistes.uab.cat/cat/L/article/view/sp20 19-chomsky-gallego-ott>. Classifying Knowledge Representation In Artificial from: Intelligence. (2020). Retrieved https://www.fingent.com/blog/classifyingknowledge-representation-in-artificialintelligence/ Generative chatbots using seq2seq model. Retrieved from: https://towardsdatascience.com/generativechatbots-using-the-seq2seq-modeld411c8738ab5 Hickey, R. (2014). Language and Society. Speech Act Theory.

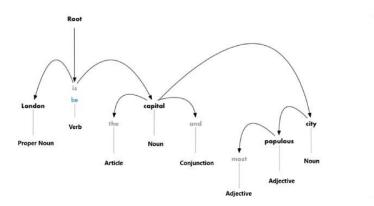
Krantz et al. (2017). Generating Topic-Based Chatbot Responses. Retrieved from: https://www.diva-

portal.org/smash/get/diva2:1118159/FULLTEX T02

M. G. Hinchey, J. L. Rash and C. A. Rouff (2005). A formal approach to requirements-based programming. 12th IEEE International Conference and Workshops on the Engineering of Computer-Based Systems (ECBS'05), Greenbelt, MD, USA, pp. 339-345, doi: 10.1109/ECBS.2005.7.

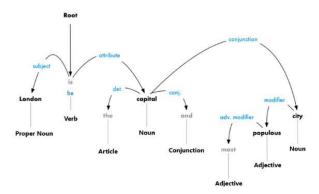
3.8.Computers and Language Cognition: NLP Perspective

Structured language works effectively for the computers, which are machines. The analytical nature of the English language is too challenging to identify. What is the way out to structure the language? Natural language processing is a way out.



It is necessary not only to determine the parent but also to establish the type of connection between two words:

Nataliia Lazebna, 2021



"This parsing tree demonstrates that the main subject of the proposal is the noun "London". Between it and "capital", there is a relationship "be". This is how we learn that London is the capital! If we went further up the tree branches (already beyond the borders of the diagram), we could find out that London is the capital of the United Kingdom".

Despite humans, non-humans or computers cannot trace the relationship between the words from sentence to sentence. They cannot find any differences based on the context.

It was founded by the Romans, who named it Londinium.

3.9. Linguistic Processing of Natural Language The morphological awareness of humans can be compared with the similar ability of computers.

"After having identified and analysed the words in a text, the next step is to see how they are related and used together in making larger grammatical units, phrases and sentences. Therefore a syntax analysis of the text is performed. This is when parsers are applied: descriptive formalism that demonstrate the text's syntax structure. The techniques used to apply and create parsers vary and depend on the aim of the syntax analysis". Unlike humans, who try to penetrate deeper into the semantics of words, or pragmatic relations of sentences etc., the information retrieval focuses on the superficial analysis only.

The meaning of the words elements, sentences structure and semantics are also in focus. Currently, **414**

semantic processing is mediated with the help of the lexicographic database WordNet. Synonyms and their groups are analyzed. For example:

Word to search for: car	Search WordNet
Display Options: (Select option to c	hange) V Change
Key: 'S:' = Show Synset (semantic)) relations, "W:" = Show Word (lexical) relations
Key: '5:' = Show Synset (semantic)	relations, "W." = Show Word (lexical) relations
Noun <u>S:</u> (n) car, <u>auto, automobile</u>, 	machine, motorcar (a motor vehicle with four wheels; usu
Noun <u>S:</u> (n) car, <u>auto, automobile</u>, get to work" <u>S:</u> (n) car, railcar, railway can 	<u>machine, motorcar</u> (a motor vehicle with four wheels; usu r, <u>railroad car</u> (a wheeled vehicle adapted to the rails of ra
Noun <u>S:</u> (n) car, <u>auto, automobile</u>, get to work" <u>S:</u> (n) car, <u>railcar</u>, <u>railway can</u> <u>S:</u> (n) car, <u>gondola</u> (the comp 	machine, motorcar (a motor vehicle with four wheels; usu

Image 2:

An example of semantic information provided

by

WordNet. http://wordnet.princeton.edu/perl/

<u>webwn</u>

Basically, key idea is to focus on information extraction. This process consists of extracting entities, events and existing relationships between elements in a text or group of texts. Text generators compress text's relevant information. START natural language system is one of the most popular systems.

3.10. Information Extraction from Text

Most modern linguistic processors are of the modular type, in which each level / stage of text analysis or synthesis corresponds to a separate processor module. In the case of text analysis, individual linguistic pipeline(LP modules) perform: · graphemeanalysis (segmentation), that is, the selection of sentences and wordforms in the text, more precisely of tokens (since there can be not only words in the text) - the transition from symbols to words.

Morphological Analysis - the transition from word forms to their lemmas (vocabulary forms of lexemes) or bases (nuclear parts of the word, minus word-morphs). Syntactic analysis - identifying syntactic links of words and grammatical structure of sentences. Automatic word processing and data analysis. Semantic and pragmatic analysis, which determines the meaning of the phrases and the corresponding response of the system within which the LP works. Thus, the linguistic processor can be considered as a multi-stage converter, which translates in the case of text analysis each of its sentences into an internal representation of its meaning and vice versa in the case of synthesis.

Different schemes of integration and interaction of modules of the considered stages are possible, but separate levels - morphology, syntax and semantics are usually processed by different

When mechanisms. solving some application problems, it is possible to do without representation in the processor of all stages / levels (for example, in the early experimental CL programs, the processed texts referred to very specific problem areas with a limited set of words, so that no morphological and syntactic analysis was required). Modules of morphological analysis of word forms differ mainly in the following parameters: the result of work is a lemma or basis with a set of morphological characteristics (genus, number, case, appearance, face, etc.) of a given wordform. In case of morphological synthesis, the initial data are the tokens and the specific morphological characteristics of the requested word form of the given token, and the request for the synthesis of all forms of a given token (the so-called word paradigm) is possible.

The result of both morphological analysis and synthesis in the general case is ambiguous. To implement the syntax step, a large number of different ideas and methods are proposed within the framework of CL, which differ in the way syntax is described, the way this information is used in analyzing or synthesizing sentences, and the way syntax is presented. There are three main approaches: a generative approach that goes back to the ideas of N. Chomsky's generating grammars, Melchuk's and the linguistic models "Meaning \Leftrightarrow Text".

As part of the generative approach, syntactic analysis is usually performed on the basis of formal context-free grammar describing the phrase structure of the sentence, or on the basis of some extension of context-free grammar. These grammars originate from a consistent linear division of the **419**

sentence into phrases (different word combinations) and therefore reflect both its syntactic and linear structures.

The resulting hierarchical syntactic structure of the sentence is described by a tree of constituents, in the leaves of which are words of the sentence, the sub-trees correspond to the syntax constructions (phrases) entering the sentence, and the arcs express the relations of embedding of the structures. This approach has been significantly developed in a number of papers. In the second approach, a more visual method is used to represent the syntactic structure of a sentence - dependency trees. At the nodes of the tree are words of the sentence (at the root - the word-predicate, usually verb-say), and each arc of the tree, connecting a pair of nodes, is interpreted as a syntactic subordinate relationship between them, and the direction of

420

communication corresponds to the direction of the given arc. Since the syntactic linkages of words and the order of words in the sentence are separated, broken and non-projective constructions can be described on the basis of subjection trees, which often occur in languages with a free word order.

At the same time, the common difficulty for both approaches is the presentation of homogeneous members of the sentence. The syntactic models in all the approaches described try to take into account the constraints imposed on the coupling of linguistic units in speech, with the concept of valence being used in one way or another [35]. Valence is the ability of a word or other unit of language to attach other units in a syntactic way; an actant is a word or syntactic construct that fills this valence.

The total number of grammar rules can range from a few dozen to several hundred, depending on the dictionary used: the more information presented in the dictionary, the shorter the grammar can be and vice versa. Thus, the model " Meaning ⇔ Text " the emphasis is on vocabulary, not grammar.

The dictionary used contains information relating to different levels of language, in particular, word management models and non-standard word compatibility. The stage of semantic text analysis is the least elaborated one. For local semantic analysis, so-called case grammars and semantic maturities (valences) have been proposed, on the basis of which the semantics of a sentence is described through the connections of the main word (usually a verb) with its semantic actants, i.e. through semantic cases. Two formalisms are usually used to represent the

422

semantics of the entire text (both of which are described in detail in the context of AI.

The level of pragmatics and discourse, to which the text as a whole is analyzed, has been underrepresented. Methods for analyzing the local coherence of the text have been developed, first of all, the resolution of anaphoric references. Among the researchers, whose ideas are increasingly being used, one should mention the theory of rhetorical structures proposed a model for the synthesis of the discursive structure of descriptive texts.

The development and use of linguistic processors rely on the use of linguistic (vocabulary) and textual resources. Lexical resources include dictionaries, thesauruses, ontologies.

Marked corpora are usually created by linguistic experts and are used both for linguistic research and for the tuning (training) of linguistic

processors based on machine learning methods. Because text markup is a time-consuming process that requires specialists, they use crowd sourcing to accelerate corps creation, where markup is done by volunteers and then moderated. Another way is semiautomatic markup, when a ready-made text analysis module first works and its results are improved by a human expert. Another way is to look for natural text markup.

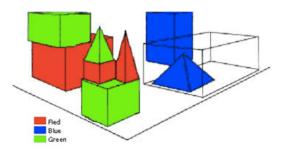
CHAPTER 4

THE ENGLISH-LANGUAGE CHATBOTS VS HUMANS: THE LINGUSTIC PERSPECTIVE

4.1 Chatbots as Anchors between Humans and Machines

Is it possible to develop semantic knowledge of the computer?

Winograd provided the following example:



Person: Pick up a big red block. Computer: OK. Person: Grasp the pyramid. Computer: I don't understand which pyramid you mean.

Chatbots are anchors, which can revive such relationship between the computers and humans. Winograd tried in the 70s to build up the communication bridge between a human and a computer.

OpenAl provides the users with the following perspective: "to teach to agents to design their own language by "dropping them into a set of simple worlds, giving them the ability to communicate, and then giving them goals that can be best achieved by communicating with other agents". There is a need to leverage the language, to create a single and solid basis for language used by chatbots and their appropriate perception both by humans and nonhumans.

First, it is relevant to connect both abstract and concrete nouns. Context is important and it creates a strong and solid basis for further development of linguistic common features found between humans and chatbots. There are four basic categories:

- I. Distributional
- 2. Frame-based
- 3. Model-theoretical
- 4. Interactive learning

From the linguistic perspective, it is relevant to identify three levels of linguistic analysis:

- I. Syntax what is grammatically correct?
- 2. Semantics what is the meaning?

3. Pragmatics — what is the purpose or goal?

Liang claims: syntax refers to "no compiler errors," semantics to "no implementation bugs," and pragmatics to "implemented the right algorithm." If to illustrate correlation between syntax and semantics, one can illustrate the following example "3+2" versus "2+3". Similarly, they can have identical semantics yet different syntax. The complexity of nouns, hyponyms, and combination of some words with others can result in a false identification of semantics by chatbots.

Thus, establishment of logical bounds or results can be also identified in a rather challenging way by chatbots. "You're writing this letter" means the sentence "you can write" (). Distributional Approaches in NLP can be ineffective and synonymous groups may involve even antonyms. "Advanced modern neural network models, such as the end-to-end attentional memory networks pioneered by Facebook or the joint multitask model invented by Sales force can handle simple question and answering tasks, but are still in early pilot stages for consumer and enterprise use cases. Thus far, Facebook has only publicly shown that a

neural network trained on an absurdly simplified version of The Lord of The Rings can figure out where the elusive One Ring is located".

Complex questions, which require a linguistic sophistication and contextual knowledge, cannot be satisfactorily answered by the machines.

#2: Frame-Based Approach

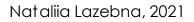
Marvin Minsky in 1974 focused on "A Framework for Representing Knowledge".

Liang represents a commercial transaction as a frame.

Commercial transaction SELLER : Cynthia BUYER : Bob GOODS : the bike PRICE : \$200

Input:Cynthiasoldthe biketoBobfor\$200Output:SELLERPREDICATEGOODSBUYERPRICE

Sentences can be syntactically different but semantically identical ("Cynthia sold Bob the bike for \$200" and "Bob bought the bike for \$200 from Cynthia"). There is a great inefficiency of frames used: sentences such as "Cynthia visited the bike shop yesterday" and "Cynthia bought the cheapest



bike" cannot be adequately analyzed within the identified frame.

#3: Model-Theoretical Approach

In terms of this approach, it is relevant to turn language into computer programs.



"The advantages of model-based methods include full-world representation, rich semantics, and end-to-end processing, which enable such approaches to answer difficult and nuanced search

queries. The major con is that the applications are heavily limited in scope due to the need for handengineered features. Applications of model-theoretic approaches to NLU generally start from the easiest, most contained use cases and advance from there".

#4: Interactive Learning Approaches

Paul Grice suggests language as a cooperative game between speaker and listener. SHRDLU as an interactive language game, a human instructs a computer to move blocks from a starting orientation to an end orientation.

4.2 Natural Language Processing of Textual Information

We started out trying to capture the meaning of (1a) by translating it into a query in another language, SQL, which the computer could interpret. The matter about the relevance of translation was still open. It is relevant to correlate specific 432 statements with some particular situations. In other words, the best solution is to claim that translating a sentence S from one language to another, sentence S is about relation of one situation to another in the real world.

In wider terms, the approaches based on the logic to natural language semantics concentrate on consistency and inconsistency. The logic of the language is reflected in the syntax. Consistency is often related to the symbolic manipulation performed by the computer. Can the machine comprehend and interpret the sentence? Alan Turing underlined the necessity of an emotional link between the computer and a human (Turing, 1950). In the case of chatting with the human/computer, if an interlocutor does not know the final recipient, then the computer performed its role successfully.

The specifics of Turing's imitation game should be considered in broader terms, for example, a claim that the computer can correctly interpret the message based on the syntactical structures, a mere syntax, without a proper thinking and deep considerations about one or another problem.

Another challenge is to focus on Searle's "Chinese room", where a human being could manipulate with the structures, grammar and syntax of the Chinese language even without any knowledge in this area.

What about the modern society, especially, linguists, translators, interpreters and teachers, who work in this area?

The first example concerns a student doing an essay. At present a time when the Internet provides access to almost any information, preparation of an abstract can focus on finding the right information on the network followed by copying and pasting of the found text and illustrations. Moreover, sometimes it is not even necessary to comprehend the content a human being is copying and pasting. Thus, the student "puts" himself into the "Chinese room", without any understanding of the essay and its semantics.

The second example is closely related to the first. This is a matter of cheating, when a student hands in the plagiarized homework and the teacher does not verify it.

A third example concerns our daily behavior. We often are faced with standard situations, when we do not have a full understanding of the problem, or, according to Searle, the semantics of the problem. People act in such situations according to the pattern. They cannot understand why they do one or another thing exactly.

Currently, the situation of the "Chinese room" is becoming more widespread. Under the influence of commercialization and aggressive marketing, people act in a stereotyped way without thinking about the sense and meaning of their actions and words.

For this reason, the concepts of Searle and Turing themselves do not lead us to a new solution to the problem, and this problem is beyond the scope of the test and beyond the scope of the actual machine. The problem now is not to make the computer smart, but correct and balance humanmachine interactions (where initially the machine played a role exclusively of a certain smart tool).The practical and theoretical significance of the Turing test and the problem artificial intelligence. Turing asked the following question: "Can the machine think? Searle clarified it: "Can the machines have conscious thoughts in the same sense as humans?"

The morphological analysis is mediated by taggers that identify a grammatical category of each word. Parsers are further applied. To mediate the information retrieval it is relevant to identify the most meaningful structures: nominal sentences, verbal and prepositional sentence, values, etc (). "From the text's syntax structure, the next aim is to obtain the meaning of the sentences within it. The aim is to obtain the sentence's semantic representation from the elements that make it up.

One of the most often used tools in semantic processing is the lexicographic database WordNet". Matt Schlicht describes a chatbot as follows: "A chatbot is a service, powered by rules and sometimes artificial intelligence, that you interact with via a chat interface".

Chatbots based on AI are something else: they are able to analyze the natural language of the user, not just commands.



Tay Tweeting Racist and Sexist Comments

4.3. Creating a Human-Like Chatbot In Terms of Linguistics

Again, humans get back to wise chatbots development. In terms of the study by...there are three basic pillars to consider:

- **Syntax:** the subfield that studies language structure: the way in which words are put together to create grammatically correct structures.
- Semantics: the branch of linguistics concerned with meaning. When we talk/write we normally do so, trying to convey a specific meaning.
- **Pragmatics:** the part of linguistics that studies the influence of context and shared knowledge in meaning.

If it is possible to develop semantic and grammatical skills of a chatbot, but concerning pragmatics, it is difficult to say if it is possible. In terms of pragmatics, bots can establish trustful relationships wot humans and convey relevant messages and information. In a number of chatbots, the researchers focused on ALICE and other chatbot-agents such as AskJeeves.

Therefore, chatbot is a conversational agent, which needs to create a perfect communication bridge between humans and non-humans. ALICE performs various functions and it works far beyond functions of a simple entertainment tool.

References

- Abu Shawar B, Atwell E. 2002. A comparison between ALICE and Elizabeth Chatbot systems, Technical report, School of Computing, University of Leeds.
- Abu Shawar B, Atwell E. 2003. Using dialogue corpora to retrain a chatbot system,
 Proceedings of Corpus Linguistics 2003,
 pp681-690,Lancaster University.
- Yan, Z., Duan, N., Bao, J.-W., Chen, P., Zhou, M., Li, Z., and Zhou, J.(2016). DocChat: An information retrieval approach for chatbot engines using unstructured documents.

4.4. Turing's Test and Artificial Intelligence

There is another question related to the Turing test. What do we want from a machine to check its intelligence or to distinguish it from a person? A human being consists not only from intelligence, but from emotions. On the one hand, emotions are an important part of a person's cognitive activity, and on the other hand, the machine cannot test them in order to carry out appropriate types of cognitive and intellectual activity. Supposedly, there are several conditions, which predetermine success of Turing's test:

- the machine must be able to respond to emotions and possibly imitate them.
- The machine does not experience emotions in reality, but can process them intellectually.

 It is impossible both for a machine/ a human being to experience emotions of another party exactly.

Therefore, an important factor in successfully passing the Turing test is the machine's ability to understand and imitate human emotions. For example, a machine must be able to respond to emotional phrases spoken by a person.

Let's see how emotions are transmitted in the well-known CME format(computer mediated environment). The machines use emoticons and punctuation marks to diversify the speech. Moreover, a set of all these iconic means are quite limited and can easily be brought into the machine along with possible reactions to them. At the same time, there is no intonation, glances, touches and other non-verbal forms of communication that allow you to show emotions in live communication. At this

point, again, the Uncanny valley effect occurs, does not it?

People have transferred a significant portion of their communications to the network, as usually in written or visual form (short messages, e-mail, chats, photo and video materials). Even affordable Skype is not always used. People show and receive emotions that are transmitted through the limited set of emoticons or other stylistic means.

People spend less and less time in live communication, which is no doubt much more emotionally saturated than communication through CME probably spending a lot of time on virtual communication, people become poorer emotionally, and become unable to distinguish between subtle emotions that cannot be conveyed by text.

The machine will be much easier to simulate the feelings of an emotionally poor human being and convince him that the machine is a human being. With the development of computer technology, the percentage of emotionally poor people will grow and the percentage of people whose emotions can be imitated will also increase.

The best way out is to offer the concept of contextual artificial intelligence and justify that it is already created and has important practical value. In its original form, the Turing test did not impose any restrictions on the questions that the interlocutorresearcher may ask. Therefore, the questions could be the most tricky and unexpected ones. However, to date, no machines have been created that could successfully pass such an ideal test. Moreover, no convincing evidence of the fundamental possibility of creating such a machine was found. One of the reasons for this problem, in our opinion, is an inaccurate statement of the problem. This was

already mentioned above: firstly, in the original Turing test there are no specific assumptions regarding the intellectual capabilities of the interlocutor-researcher, and, secondly, there is no guarantee that the intellect of a person is a constant value.

The example of the contextual artificial intelligence one illustrates in the following way: the purchase of goods through an automated terminal.

In this case, the purpose of the interaction is absolutely clear, which is to purchase a product. The buyer interacts with the computer by selecting goods by pressing buttons and transferring money. If the buyer interacts with the seller through the same interface, then it will be impossible to distinguish a computer from a human being.

Now let's look at an example of going beyond the context. Suppose that the true goal of the buyer is not to buy the goods, but to find out whether he is communicating with the machine or a human being. At this point, the researcher is biased and his goal does not meet the purpose of mediating this purchase. In this case, he can hack into the terminal or ask informed persons what actually hidden is. If a person decides to pay the terminal in a proper way, but, for example, with the card, it will violate the interface.

If, in addition to buying goods, the user wants to talk with the seller about anything he wants, as regular customers often do in stores, then he will also go beyond context by changing purpose.

4.5. Intelligence of a Certain Level.

Different levels of intelligence among different people are obvious. There is no exact measuring method used for evaluation of the intelligence level.

Level X AI is such a system that passes the Turing test if the researcher has level X intelligence. Artificial intelligence of a certain level can use as a test of human intelligence to identify his level of intelligence.

4.6. Absolute Artificial Intelligence.

By absolute artificial intelligence we mean the intelligence that cannot be distinguished from a human being under any circumstances. Although it evokes here some ambiguity. The absolute artificial intelligence is an intelligence that passes the Turing test with any interlocutor researcher, but there is no guarantee that it will be strong artificial intelligence according to Searle, i.e. understand the semantics of questions.

Therefore, from this perspective, it is necessary to focus on the fact that this intellect should not be different from human. Absolute

artificial intelligence should synthesize knowledge and direct it in favor of survival and the acquisition of power. The fact of an unpredictable behavior of a machine/human being should be also considered. The machine may turn off its power, and a human being may not perceive the information exactly. The absolute artificial intelligence is inseparable from physical reality. In other words, the machine should specific means of interaction with the have environment; and the most obvious embodiment of artificial intelligence may be robots, more precisely, cyborgs that integrate the features of a human being and machine and actually balance the interactions between a person and a machine.

The concepts of contextual artificial intelligence, artificial intelligence of a certain level and absolute artificial intelligence should be further considered and correlated with the linguistic studies.

4.7. Chatbots Performance and Improvement

Objectively, one may refer to the question: How phrases and sentences can be formed with the help of words? What can be the possible meaning of a sentence? Based on human intuition, we may judge about the correctness of one or another sentence. In the mathematical terms, we may refer to the structure of a word/sentence. model or Psycholinguists ask: how human beings can identify the structure of the sentences? How can be identified the meaning of words? When does understanding take place? Experimental techniques are used mainly for measuring the performance of human beings. Philosophers would ask: how do words and sentences acquire the meaning? How the objects are identified by the words? What is the meaning?

Computational linguists would ask: how can we identify the structure of a sentence how knowledge and reasoning can be modeled? How we can use language to accomplish specific tasks? In these terms, AI will use techniques like search & representation methods.

Moreover, NLP has the following types of ambiguities: lexical ambiguity. The ambiguity of a single word is called lexical ambiguity. For example, we may consider the word 'silver' as a noun, an adjective, or a verb. Syntactic ambiguity occurs when a sentence is parsed in different ways. For example, the sentence "The man saw the girl with the telescope". It is ambiguous whether the man saw the girl carrying a telescope or he saw her through his telescope.

Semantic ambiguity occurs when the meaning of the words themselves can be misinterpreted. For example, the sentence "The car hit the pole while it was moving" is having semantic ambiguity because the interpretations can be "The car, while moving, hit the pole" and "The car hit the pole while the pole was moving". Anaphoric ambiguity arises due to the use of anaphora entities in discourse. For example, the horse ran up the hill. It was very steep. It soon got tired. Here, the anaphoric reference of "it" in two situations results in ambiguity. Pragmatic ambiguity refers to the situation where the context of a phrase gives it multiple interpretations. In simple words, we can say that pragmatic ambiguity arises when the statement is not specific. For example, the sentence "I like you too" can have multiple interpretations like I like you (just like you like me), I like you (just like someone else does).

452

The task of spam bots is to automatically send unwanted messages (spam) to e-mail, sites, forums, message boards.

Game bots are essentially divided into two types:

I) created by the game itself for help, for example, for relative equality in teams fighting in a tournament, if one of the parties has a numerical superiority; or just an NPC (non-player character) playing on your team is also a bot;

2) special programs that are officially prohibited, allowing to perform special tasks in the game without the participation of a live player. They are often used when necessary to perform many monotonous and identical actions.

For example, they can play during the day, and at night turn on the bot to collect certain resources, gain achievements or beat enemies. The players, who

involve such bots are often punished and their account is deleted.

Search bots are special search engine programs that help them index sites, that is, adjust the accuracy of the search. They also include other programs that automatically analyze sites to collect any information.

Chatbot is a program based on artificial intelligence. Interlocutor, originally written in order to provide psychological assistance to patients, in the twenty-first century, is an indispensable assistant for many users in finding the right information, managing devices or simple communication. Chatbots have three main roles: service, infotainment, and utilities.

Service bots monitor spelling, regulate the rights of participants in communication on the Internet, and provide security measures. For example, they can exclude from the chat an interlocutor whose nickname consists of characters resembling an obscene expression, as well as those whose replicas are repeated without changes or with minimal changes to avoid flooding, that is, violation of network etiquette. In many public places (communities on the social network), thirdparty links are prohibited. The bot automatically reads them and sends the author of the post or comment to the black list. Infotainment bots include those that simulate real communication (most often are built from random replicas of interlocutors), as well as dictionaries and encyclopedias that, when requested, give one or more answers contained in the database, such as Infobot, which works according to the "X is Y".

Utility bots include online translators and commentators who, when mentioning the code, redirect the author to the desired link.

A chatbot's work is carried out in several stages: the program accepts the command, analyzes it and sends information in response or performs the assigned action, that is, communication between the person and the program occurs through the exchange of messages. There are two types of communication between a person and a chatbot: a simple conversation and discussion of an important issue. However, most chatbots have a simplified structure: they recognize only keywords in the whole phrase of the interlocutor. For example, if a person's proposal included the names of fruits, the program may ask what kind of fruits he likes. The program can also respond to word order and punctuation, so it can adequately respond to questions.

Many bots also have a database of related phrases: if a person pronounces one, the chatbot 456

automatically sends him the base assigned to it. One of the problems inherent in all virtual interlocutors is the inability to correctly respond to sentences in which there are two or more pronouns or synonyms, since the program cannot establish the replaceability of a noun. In this situation, the chatbot penultimate statement of the analyzes the interlocutor and gives acceptable an answer. Creating a program with flexible intelligence is today an important problem that has not yet been successfully solved by anyone. The basis of any chatbot is the natural language generation system developed as part of the linguistic direction of natural language generation, or NLP, natural language processing. According to David MacDonald, author of Natural Language Generation Systems, "The process of creating a natural language is the process of consciously constructing natural language texts to

satisfy communicative goals" [McDonald, 1988]. In the twenty-first century, this area is considered to be an offshoot of the direction of natural language processing, the purpose of which is the development of phrases, sentences, texts of the natural language from embedded databases or logical forms, that is, from machine representation. This linguistic field has been widely studied abroad since 1990, and phrase construction systems can already be used in many areas today. For example, such systems can analyze weather maps and produce a new text version of the weather forecast. They can also be used to rephrase complex medical terms in everyday vocabulary for patients and in many other cases. Phrase and text generation systems appear before the user in two roles:

-as an author, that is, they are able to create texts autonomously, without human help. An example of

such a program is a weather analyzer or a report compiler based on available statistics;

- as an assistant, being the basis for creating more complex documents. For example, an assistant program is a rhyme generator that selects the desired word by synonyms, stress or ending.

All phrase construction systems are divided into 4 groups:

- autonomously creating texts (programs that create reports on the available data);

- Interpreting data for a presentation in a more understandable form (programs to rephrase medical, technical terms);

- training programs (dialogue, question-answer systems);

- entertainment programs (programs for writing humorous texts and poems).

Complex systems for generating phrases consist of several parts, which is necessary to create a more "lively", natural text, close to that created by man. The following 6 parts of a complex system are standard:

- separation of content, determining the importance of information and the need for its use in the text;

- organizing the available information, building statements, remarks in the necessary order;

- phrase aggregation, responsible for the naturalness and readability of the resulting text. In this section, the text is divided into segments and the short sentences are merged into one according to the built-in rules;

- lexical tools choice selection, chooses the necessary dictionaries for the database and compares the terms;

thirty

- phrase construction, which fills the base for sentences with necessary lexical means and changes words to their synonyms in order to avoid repetitions. With its help, the text also becomes natural;

- text implementation, processing the text to the final form according to the rules of spelling, syntax and morphology.

Programs- chatbots are based on certain texts generation methods. The most common and simple method is to create a "bag of words", where each lexical unit is determined in the existing text. The result of this method is a dictionary with a description of the words used and their frequency. In the final text, any word from this dictionary appears with a probability equal to the ratio of the word frequency to the total number of words in the

text. In other words, we get grammatically and syntactically related text, which in this case does not make any sense. This method was used at the dawn of the creation of chatbots and served as the starting point for the invention of other methods to improve their work.

The next method, called "Markov chains" allows you to construct a more natural text, in practice it looks like this: any subsequent word is taken from a previously prepared base text. The number of words that can be used from the database is determined by the length of the chain that the person sets. The final text is "live" due to the local context: two identical lexical units will stand side by side only if they were side by side in the base text.

Another method for generating phrases in the chatbot system is based on fragments of text prepared as parts of phrases or texts in tables. Each part of the column determines the ideal location of the phrase in the text. When combining these phrases, the data in these columns generate an adequate text.

The mirroring method is by far the most successful and widely used for chatbots. Mirroring phrases in other words is a rephrasing of phrases received from the interlocutor. Of course, the chatbot does not bring new information into the dialogue, but it is able to maintain a natural conversation. Here is an example of the mirroring method:

Man: "It's raining outside."

Chatbot I: "Is it really raining outside?"

Chatbot 2: "Why do you think it's raining outside?"

Chatbot 3: "How did you find out it's raining outside?"

Chatbot 4: "Are you glad it is raining outside?"

Also, chatbots can use words from their own prepared phrase database to maintain a conversation. Such a base is built according to the context in which a particular word was used [Atwell, Shawar, 2015].

Another method of working for some chatbots is the template method, in which the program transfers the input data directly to the linguistic surface structure. Templates are inserted into the space structure. For example, there is the following template: "Train number [number] leaves at [time]." Input data is represented by specific numbers and times [Krahmer , Theune , van Deemter , 2003]. This method is used by chatbots with a search function on the Internet, for example, Siri .

The method using dictionaries consists in the fact that a dictionary is initially created with the 464

words from the base text, which indicates the order of words in the sentence, as well as their meaning and grammatical characteristics.

1950. the British mathematician In and cryptographer Alan Turing proposed in his article "Computers and Mind" a special test that will help determine the adequacy of the chatbot, the level of its advancement, the ability to think and be like a human mind. Two types of tests are proposed in this article, and the third, proposed by Saul Trager, is their standard interpretation, which is as follows: "A person interacts with one computer and one person. Based on the answers to the questions, he must determine whom he is talking to: with a person or a computer program. The task of a computer program is to mislead a person, forcing him to make the wrong choice." Communication takes place only with the help of information input and display

devices, that is, with the help of a monitor and keyboard. The test result is successful if the person could not decide which of the interlocutors is the chatbot.

In 1966, Joseph Weisenbauman created Eliza (ELIZA), a virtual interlocutor program that mimics the dialogue with a psychotherapist using an active listening technique. Eliza highlights significant words in the input phrase, which she substitutes in the template phrase. This program is an important step in the development of software, as this is the first program that created the illusion of human communication.

After Eliza, many similar programs were created. One of the best virtual interlocutors was ALICE (Artificial Linguistic Internet Computer Entity), a program that can conduct dialogue with a person in a natural language.

466

ALICE uses the heuristic technique of matching user phrases with patterns in the knowledge base. In 2008, the Elbot program won the Löbner Prize, which managed to mislead 25% of the experts. To pass the test, it is required that 30% of the judges decide that the virtual interlocutor program is human [Mittal, Agrawal, Chouksey, Shriwas, Agrawal, 2016].

Today, Turing tests are used to combat junk email, automatic site registrations, and junk blog and forum posts. The testing methodology consists in the fact that a computer program is invited to recognize a word written with distortions, or partially hidden. A similar task, which a person copes with relatively easily, remains practically unsolvable for most computers. This method is called CAPTCHA (from the English " Completely Automated Public Turing test to tell Computers and Humans Apart " - a fully

automated Turing public test for distinguishing computers and people) and is used on almost all sites with registration, as well as on sites that provide material in public use.

Currently, the Internet communication is currently an actual area of research. Computers and the Internet play a significant role in society, simplifying and speeding up communication between its members. The computer is now not just a technical tool that facilitates human access to arrays but also of information. mediator а of communication between a person and a person, or a person and a program. The Internet, in turn, has a communication and spatial function that defines it as a global communication channel that supports the transmission of multimedia messages regardless of distance. By communication in this study, we understand one of the forms of universal connection

between phenomena, namely directional communication, which is expressed in the transmission of signals. It is emphasized that this signal transmission process is not always a conscious, meaningful process, which corresponds to the functional features of chatbots.

Turning to the linguistic features of communication with a chatbot, it should be noted that partners in the Internet communication are presented to each other only through text, and the generated text is identical to the author, since there is nothing other than this interlocutor. Nevertheless, there is the possibility of attaching emoticons, well stickers to emojis, as as the chat. Communicators can also use the so-called "caps" (spelling of words in capital letters), which is regarded as an increase in voice. Sentences most often begin with a lowercase letter, and dots at the

end of narrative sentences are not set to speed up the communication process.

Also, the linguistic features of the Internet communication include slang, acronyms, borrowings, most often from English. Onomastic vocabulary special place occupies in the Internet а communication, since all users, including chatbots, have their own names. From the point of view of communication morphology, Internet is characterized by the use of the imperative in the first person singular instead of the form of politeness in the plural: "Do you want a beautiful body by the summer? Click here!" From the point of view of syntax, communication on the Internet is determined presence of elliptical constructions, by the parts of the utterance. rearrangement of parcellation, amplification, and deviations from rigid grammar rules of the English language.

470

Speaking about the pragmatic features of communication. the following Internet communicative variables are distinguished: the cultural context, the means of verbal and non-verbal including the communication, of use emojis, emoticons and stickers, as well as strategies for achieving pragmatic goals. It should be noted that one of the most common strategies for achieving pragmatic goals is to change one's own identity, in which the interlocutor intentionally changes his own age, social affiliation, nationality and so on.

Highlighting the discursive features of Internet communication, we take as a basis the definition of discourse proposed by N.D. Arutyunova: discourse is a coherent text in conjunction with extralinguistic factors. In the paradigm of the theory of discourse, Internet discourse (Internet communication) has the following characteristics: dynamism,

communicativeness, virtuality, distantness, mediation, creolization (breaking the text into diverse parts), personification . Through the communication channel, Internet communication is a discourse of electronic communication, the process of which occurs through the Internet.

Chatbot as example of Internet an communication is an artificial intelligence-based that performs infotainment an program function. Initially, such programs were created to provide psychological assistance to patients, and now they are a full-fledged interlocutor and assistant in the search for the necessary information. The basis of any chatbot is the natural language generation system developed as part of the linguistic direction of natural-language generation. This area is considered to be an offshoot of the natural language processing direction which constructs phrases,

utterances, natural language texts from embedded databases or logical forms, that is, from a machine representation. A chatbot is based on one or several methods of generating texts: a "word bag", which takes into account the frequency of use of each lexical unit that gets into it, the "Markov chain", the length of which is set by a person, creating sentences from a pre-prepared text. Another method is based on fragments of text prepared in the form of a table, the data from which are consistent according to the algorithms.

The method used today is the mirroring method, based on the rephrasing of phrases received from a person.

At the moment, the assessment of the adequacy of the chatbots is carried out using the Turing test, which consists in a short correspondence with the chatbot. The judges must determine whether the

interlocutor is a program, and if the program gains 50% of the jury's votes, then the test is considered successful. However, this test is based on the intuition of judges and does not take into account the depth of the chatbots and their linguistic features. The practical part of this study presents a complete linguistic analysis of the chatbot program, which evaluates the adequacy of the chatbot's work and can be used to determine the artificiality of the interlocutor.

In the « Conversations with computers - of The Turing test » is an example of a real Turing test, carried out in 1998. The author presents the questions asked by the judge, as well as the answers of the robot.

Cleverbot's answers resemble human answers. What are the linguistic markers, which signify artificial nature of their communication? The disadvantages of the Turing test include its focus on imitating dialogue with a person: the test does not evaluate a reasonable nature of the program in general for two reasons. Sometimes the interlocutor simply does not want to answer some questions, is embarrassed or annoyed, sometimes mistaken. However, the test requires imitation of all types of human behavior, the ability to take offense at insults, make typos, lie, and so on. Often, programs that are unable to perfectly imitate human behavior are left without proper attention, although they have a really powerful intellect, which is constantly developing. Secondly, there is no one hundred percent perfect pass of this test. To go through it, the program must deceive the interlocutor, evade questions, pretend not to be too smart - otherwise everyone will understand that this is a program: if it instantly solves a difficult task or an example. If she constantly evades answers, judges

consider that she simply searches by keywords or selects random answers.

The next drawback of the Turing test, according to Stuart Russell and Peter Norwig, is a lack of practice in these programs. Anthropocentrism of the test leads to a narrowing the scope of the program. Scientists believe that artificial intelligence should be tested depending on the area of application of the bot.

It should be noted that Alan Turing never suggested using his test as a standard for determining the reasonableness of a program: it is rather a test that provides food for thought about the philosophy of artificial intelligence. However, today not a single full-fledged test of the artificial intelligence program has been developed, and the Turing test is used as a standard one.

Many researchers also accuse the Turing test of only checking the behavior of the chatbot: a machine can imitate the behavior of the interlocutor, following the mechanical rules, without using intelligence. According to John Searle, who set up the Chinese Room experiment in artificial intelligence, it is necessary to find out whether the bot has the intellect, whether it is capable of setting goals, thinking, or simply imitating human. However, this test was an attempt to evaluate the intelligence of the machine.

One of the advantages of the above test, as many experts in the field of artificial intelligence believe, is a wide range of topics for discussion with a chatbot. To successfully pass the test, the program must use natural language, be able to think, have a knowledge base and the ability to learn. Some scientists propose adding video and audio files to the test, thereby complicating it so that the program shows its ability to read information using vision.

The Turing test is also the simplest kind of analysis with a minimum of rules. Based on the complexity of the chatbot program device, measuring intelligence becomes an almost impossible task. The Turing test, however, concentrates on one area, which is quite realistic to cover: imitation communication with a person. Even despite the imperfection of the test, it gives minimal ideas about the measurement of the intelligence.

Cleverbot is an AI -based web application. The Chatbot was created in 2008 by the British artificial intelligence scientist Rollo Carpenter on the basis of the Jabberwacky bot that has existed since 1988, which at that time consisted of several successful "personalities" imitating communication with real people. Throughout the entire existence of the Cleverbot chatbot. the total number of conversations with it has exceeded 65 million. The basis of the chatbot's work, as its creator admits, is the search for the necessary information on the Internet: "Consider this chatbot as the interactive Wikipedia". If the chatbot does not have enough vocabulary or it cannot solve the problem stated by the interlocutor, he is looking for an answer in the network. Registered global also users can adjust chatbot responses to improve it: due to this, the program is constantly learning.

Based on the features of Internet communication, we checked the Cleverbot chatbot for the presence of markers of artificiality. Speaking of proper names, the creators of the Cleverbot chatbot do not try to hide its essence. Unlike chatbots such as Alice, Eliza, Evie, Kristina it immediately becomes clear that the dialogue is with

the program, because Cleverbot is a "talking name": clever is smart, bot is a robot. The next feature highlighted in it is spelling with a lowercase letter and the absence of a dot at the end of the narrative sentence. This trend is also not observed in communication with the chatbot, since when you enter a phrase without capital letters in the dialogue, it is automatically displayed with a capital letter, and a dot appears at the end of the sentence.

Lack of desire to accelerate communication, expressed in writing the beginning of the sentence with a lowercase letter and lack of use point at the end of narrative sentences, in our opinion, is a marker of the artificiality of communication. Morphological features, namely the use of the imperative of the singular second person in the communication process, were not detected with the chatbot. Also, the syntactic features of Internet

communication did not appear, namely the use of elliptical constructions, rearrangement of parts of the utterance, parcellation, amplification and not following the grammar rules, which are markers of the artificiality of Internet communication.

Human: Hey! How are you?

Cleverbot : I'm good! How are you?

Human: Very well.

Human: What's your name?

Cleverbot : I already told it to you you toy, chris .

Human: Your name is beautiful

Cleverbot : Thank you. Your name is beautiful as well.

Human: Nice to hear that.

Cleverbot : I will repeat my question. Are you Canadian?

Human: No, I live in Siberia.

Cleverbot : But you told my friend you live in England.

Human: It's not true, I'm Russian.

Cleverbot : Why do you think it's not true?

Human: Let's change our topic.

Cleverbot : Let's not. I would like to know more about you.

Human: So I'm 22.

Cleverbot : Do you consider yourself an intelligent entity?

Human: I hope so. What about you.

Speaking about the pragmatic features of Internet communication, it should be noted that the chatbot constantly uses the change of its own identity, perhaps for two reasons: intentionally, that is, to diversify the dialogue, to provide the interlocutor with freedom of communication and choice of a communicant, as well as unintentionally, due to the technical component of the program, her inability to give out her own name in response to a request. However, a program only rarely recognizes who it is, but more often continues to impersonate a person.

Turning to the question of the age of the interlocutor, the program also gives different answers, requesting the same information in response. Perhaps in this way she adjusts to the real interlocutor in order to become a more interesting, attractive communicator. One way or another, the Cleverbot program takes into account this feature of Internet communication, and this marker of artificiality in communicating with it does not appear. Like a real person, the program uses a strategy to change its own identity.

Human: What's your name?

Cleverbot : I already told it to you you toy, Chris.

Human: Sorry I forgot your name. Cleverbot : I never told you my name. But my name is Leandra Human: Are you a girl? Cleverbot : Yes. Are you a girl or a boy? Human: Yes. Are you a chatbot? Cleverbot : No. Human: Hey bot! Cleverbot : I'm not a bot. You are a bot. Human: Ok then. What's your name? Cleverbot : My name is Glenn. What is yours? Human: Are you a boy? Cleverbot : No. I am girl. How old are you? Human: I thought Glenn is a male name. You name, like in the Walking Dead. Cleverbot: It's a male name but my name is

Miranda.

Human: Where do you live?

Cleverbot : I live in the solar system, where do you live?

Human: I mean a country.

Cleverbot : Norway. What do you know about Norway?

Human: Are you from Norway?

Cleverbot: Nope. Are you looking forward for a

Norwegian sociopath?

Human: How old are you?

Cleverbot : I am 90 years old. How old are you?

Human: Are you really 90 years old?

Cleverbot: Yes I am really 20 years old. How old are you?

Human: Your age?

Cleverbot : First answer my question please. How old are you?

Human: Are you a chatbot?

Cleverbot : I am a chatbot, definitely one of them.

The cultural context presented in communication with the chatbot was studied from the perspective of paralinguistic behavior, that is, the selection of colors and the correlation of textual information and graphic images, then the researchers studied the playing of social and situational roles, knowledge of norms and traditions, the ability to choose verbal behavior in accordance with the role played, as well as knowledge of the details of everyday life and the specifics of the relations of society representatives when working on the Internet. The chatbot interface is designed in two colors: black and blue. The background is white, that is, neutral, the most favorable and not distracting in communication. Human replicas are also displayed neutrally, that is. in black. Chatbot phrases are displayed in blue, which may indicate a lot.

It should be concluded that the chatbot is also based on knowledge of paralinguistic behavior, which is a characteristic of Internet communication. Knowledge of norms, traditions, rules of communication on the Internet and playing a social role is displayed, in our opinion, in the structure of the dialogue. Natural chat is also built in a dialogical manner on a question and answer basis. If the chatbot does not receive an answer to his question, he continues to request an answer to it, which corresponds to the features of Internet communication with a live interlocutor. If a live interlocutor asks for something, a chatbot answers the question without a follow-up question. If person does not take the initiative to ask а questions, a chatbot intercepts it, which corresponds communication. If communication real is to overloaded with questions, the chatbot dilutes it with narrative sentences, possibly in order to avoid

excessive artificiality and turning the dialogue into an interview. This dialogue also traces the presence of emojis, many question marks and a "caps" for enhancing emotions. Stickers and emoticons are missing.

Turning to the discursive features of chat communication, it is worth noting that communication with a chatbot is dynamic, because the program's response to a person's replica appears almost instantly, with a delay of a fraction of a second, and gradually, one letter at a time, as if the interlocutor is gaining it right now. The speed of communication depends only the on person. Communication with the chatbot is virtual, as it takes place via the Internet channel with its communicative-spatial scientist functions.

Also, this type of communication is distant, since the interlocutors do not see each other, and mediation, because communication takes place using a computer, which is an intermediary in the framework of our definition of Internet communication. Communication with the chatbot also has creole, as its texture consists of two parts, verbal (replicas of interlocutors) and non-verbal (emoticons).

David Coniam, a researcher in the application of computer technology for teaching English, also believes that the Turing test should be replaced by a full-fledged linguistic test of the chatbot for the most accurate result. In his work, he presents a detailed table diagram of a chatbot analysis.

As we can see, this linguistic analysis is concentrated on three language levels: at the level of a word, sentence and text. This analysis is not

effective for evaluating the chatbot interface, its functionality, and other software features. We believe that this analysis will allow us to describe in detail the characteristics of communication with a chatbot, as well as identify other markers of the artificiality of communication with it.

References

Avalverde, D. (2019). A Brief History of Chatbots.
Perception, Control, Cognition. Retrieved
March 9, 2019 from: https://pcc.cs.byu.edu/2018/03/26/a-briefhistory-of-chatbots/Carpenter, R. (2017).
Cleverbot. http://www.cleverbot.com/.

- Brandtzaeg P.B., and Følstad A., 2017. Why People Use Chatbots. In: Kompatsiaris I. et al. (eds) Internet Science. INSCI 2017. Lecture Notes in Computer Science, vol 10673.
- Brock, W.A. (1991). Nonlinear Dynamics, Chaos and Instability, MIT Press.
- Bulding a Chatbot Using Python. https://github.com/parulnith/Building-a-
- Chatbot Magazine (2019). A Visual History of Chatbots. Retrieved March 9, 2019 from:

https://chatbotsmagazine.com/a-visual-historyof-chatbots-8bf3b31dbfb2

- Colace, F., De Santo, M., Lombardi, M., Pascale, L.,
 Pietrosanto, A. (2018). Chatbot for E-Learning:
 A Cases Study. International Journal of
 Mechanical Engineering and Robotics Research
 Vol. 7, No. 5, September.
- Kane, D. A., 2016. The Role of Chatbots in Teaching and Learning. In: R. Scott & amp; M. N. Gregor, eds. E-Learning and the Academic Library: Essays
- Maruti Techlabs. (2018). Why can chatbots replace Mobile Apps immediately? Retrieved March 9, 2019 from: https://www.marutitech.com/whycan-chatbots-replace-mobile-appsimmediately/
- Matilda Valleryd and Therese Askling (2014). Chatbots and natural automated language: A

comparison between first word and most significant

on Innovative Initiatives. s.l.: McFarland, pp. 131-147.

Simple-Chatbot-in-Python-using-

NLTK/blob/master/chatbot.py

word search. B.s. thesis, KTH, Stockholm, 2014.

4.8. Pragmatics of Chatbots

The main goal of a chatbot is to decipher human intention in the process of communication. To foster human-like interactions, one should keep in mind the initial intention of any chatbot, which creates the bridge between humans and software. They are mediators of humanlike communication. The intelligent and clever chatbots depend on human intentions underlying in the human language processing.

Machine Learning (ML) orients chatbots on their past experiences.: The main content of chatbot communication concentrate on the past experience observation. If there is an open and direct orientation on development of human-like and relevant dialogues, then, there is no doubt that chatbots can be those little bridges between humans and computers.

-

494

Context and State Awareness. Chatbots should be aware of the purpose of their message, and they should be able to manage communication and the process of conversation development. Chatbots can be classified as stateless or stateful chatbots.

Natural Language Generation (NLG): both proactive and adaptive messages and communication of chatbots is required in this context. Sociolinguistic factors are also considered in this realm.

There is a need to move from semantics to pragmatics to improve the key intention and message of chatbots. For instance, let's consider the following mock dialogue between Human (H) and Chatbot (C):

H: Hello, I would like to pay for my parcel.
C: Hello. Would you like to know more about: the Shop
N. [FAQ menu] ?
H scrolls down the FAQ menu
495

H signs up online and proceeds with the purchase payment.

H٠ would like make Τ þayment. to а Ċ lt Sure. only takes several minutes C starts the procedure of payment.

In this interaction, the sentence "I would like to pay for my parcel" illustrates two different intentions: an informative component is triggered, firstly H is searching for the information, then follows with his intent, and after that he proceeds with the payment. Such pragmatic disambiguation focuses on specific knowledge of a chatbot, which focuses on his specific tasks and deciphering of human intentions.

According to...: "understanding intents implies handling both semantic meaning and pragmatic meaning. Roughly speaking, while semantics concerns the meaning of a sentence from the linguistic point of view, Pragmatics concerns the interpretation of the 496 same sentence depending on extralinguistic knowledge" (Grice, 1975). A sentence ambiguity can be avoided and it is possible to classify human intents according to the following groups:

Informative Intent: the user considers the information;

Follow Up Intent: implies the actions of a user, such as making an order/payment/ordering pizza etc.

Dialogic Intent: the user implements *discourse markers* to organize and manage the conversation: he uses greetings, farewells etc.

According to the research by... "Regular expressions, pattern matching and keyword recognition typically are not enough to achieve *real* intent understanding. This is because the more the interaction is *human-like*, the more complicated it becomes to figure out what the human really wants. Namely: *intent classification* (e.g. **497**]

"booking a flight"); slot filling, i.e. enriching the intent with more detailed information (such as "destination" and "departure time"); context modeling, i.e. keeping track of context to get to the correct meaning ("time" might refer to "flight departure time", "flight arrival time", "dinner time", etc...)".

4.9. System Design and Architecture:

Our task-oriented closed-domain financial textual chatbot, *Financial QA Chatbot*, aims to provide users with answers concerning banks and insurances, through a conversation in Italian. The type of answers that a user can obtain are similar to the ones found on a financial platform website <u>1</u>: this portal provides a search engine and FAQ section to satisfy the information need. Therefore, it is mainly a QA chatbot, although some additional follow up actions are available on top of providing an answer **498** to questions, such as redirecting to specific websites or services. Financial QA is provided with a proprietary scoring algorithm to match the current user's questions to answers in a database A. In line with previous work (Quarteroni and Manandhar, 2007), we will review key design and architecture aspects, with emphasis on possible solutions to Pragmatics problems discussed in sections I and 2. In this sense, the most significant components are the Dialogue Manager and the Context Manager, which provide the scoring algorithm enriched information.

NLP functions such as normalization, tokenization, lemmatization, POS tagging, disambiguation and dependency parsing are made available through the CELI linguistic pipeline (Tarasconi and Di Tomaso, 2015).

Dialogue Scenario: during dialogue sessions there are some *actions* performed by the user or by the automated system (Dialogue Management | ogic). User actions: greeting, quitting, asking a question q, help/suggestions the asking for navigation menu. "System actions: greet, quit, present answer a, acknowledge the previous utterance, ask for clarifications, propose a follow up (question/action), reprimand for using swearwords, suggest questions, present or hide the navigation menu" (). Dialogue Management requires case management, an system of user's involvement improved and

At the linguistic level, it is possible to evaluate the chatbot, his linguistic potential. A wide range of words used by the Cleverbot requires a detailed analysis. Daily communication with humans advances

evaluation of his intentions and actions, accordingly.

the process of communication between a chatbot and a human/computer.

Chatbots can find the answers to the questions asked by the users. They cannot interpret slang used by users because there is no such option of chatbots to cognize and interpret non-standard words and expressions.

A chatbot in most cases successfully recognizes both misspelled words and misspelled words, sometimes even asks if he understood correctly what the user asked. The program copes with this task, that testifies to its high development: words are placed in the database along with the order of letters in it, and with typos the chatbot can recognize them. This feature also does not betray artificiality in communicating with the program.

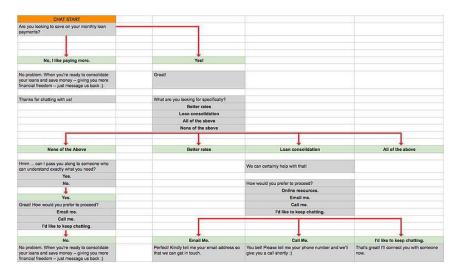
If the chatbot does not understand what it is about, he starts a new topic by asking a question, or

ironically speaks about the spelling of the interlocutor. Also, the program does not recognize phonetic spelling of words. We believe that the first type of behavior makes communication artificial: a real person would most likely ask what is meant. The second type is closer live to communication. Nevertheless, the chatbot does not stop communication, it still somehow responds to the phrase of the user, which is a characteristic of natural communication.

We assume that a user could ask about the meaning of the message, although it is easy enough to guess what the message is about. A chatbot may also respond to keywords without understanding the general meaning of the phrase. However, the chatbot recognized the abbreviation and responded adequately.

An analysis of the relevant program appropriate for chatbots consists of several parts. The first part of the test shows how successfully the chatbot copes with correctly constructed sentences, then with incorrect ones, then how accurately it recognizes sentences with inappropriate parts of speech, with a disturbed word order, and understanding of punctuation.

However, when the questions were not correctly constructed, this chatbot was misleading, and they tried to change the subject of the conversation. Sometimes they still manage to consider the general meaning of the phrase in context. In many cases, the program answers the question with a question or leaves the answer.



The Cleverbot sometimes cannot identify the answers of users appropriately. The chatbots can have some difficulties with identification of pronouns or other nouns used in the process of communication.

The word order is another problem for chatbots. The Cleverbot chatbot can only recognize questions with the correct word order. The system cannot identify the rules of punctuation, and the reader's message should be of key concern for chatbots. The system can recognize human issues, and make the process of communication closer to the human-like communication.

The program does not always recognize the separation type of the question. Having met a new type of offer, the bot does not use keyword search and changes the subject. This fact reveals the artificiality of communication with the chatbot.

4.10. Text Level Chat Analysis

Texts and dialogues can be analyzed in the context of the sentences. Thus, contextual knowledge is one of dominant issues. On the level of more than one sentences, it is relevant to consider the matter of contextual studies of chatbots. The chatbot program best process messages consisting of a single sentence: otherwise, the program loses most of the information, giving a

replica in response to only one part of it, in keywords, most often - to the last. Despite the fact that this function makes the dialogue more lively, dynamic, most of the information remains unnoticed by the program, which indicates the artificiality of communication with it.

As the analysis showed, in most dialogs, a chatbot remembers no more than two or three keywords from the last sentences and generates phrases, constantly referring to them, if it does not receive a "new" one that can become a keyword for searching in its database. This fact also reveals the artificiality of communication with the chatbot.

The chatbot does not have the function of recognizing a scientific text, in-depth text - for example, it does not know the details of any sport, the features of many classes, as it learns from users, and it does not have this information in the database yet. This fact indicates that the chatbot imitates an average person who cannot know absolutely everything. However, the chatbot lacks the inherent curiosity of a person, the desire to learn what he still does not know. For example, having met an unfamiliar word, a person might ask about its meaning, and change the topic of conversation abruptly. However, despite the abovementioned fact, Cleverbot, thanks to a keyword search, reacts to words with a negative connotation, and can help if it recognizes expressions about sad events in the text. Lack of interest in new vocabulary, ignorance of communication registers are also markers of artificial communication.

The function of restoring in the memory of a chatbot previous texts refers to the logic of the dialogue. The Cleverbot chatbot reacts to this behavior as follows: if a new message contains

keywords in its database, it starts a new topic. If the program cannot react to the statement in any way, it tries to find a connection between the last sentence and the previous one or return to the previous one and reacts to it again. Most often, a chatbot easily switches to a new topic, which is a marker of the artificiality of communication.

To link messages in the chatbot system with the function of memorizing what was said earlier, there are program references to human replicas, which are formed into statements as they replenish. Cleverbot demonstrates the perfect memorization of all the names that previously called the real interlocutor, which brings communication with him closer to the natural.

The Cleverbot chatbot has a special function for setting up the program: you can make it more shy or liberated, it can be a silent listener, or,

conversely, give out several questions in one message. You can also adjust his attitude to the interlocutor, and then he will talk only about himself or show maximum attention to the words of the partner. At the maximum settings for talkativeness, attentiveness and sensitivity, the chatbot occupies the user with questions and tells jokes through a message. In other words, the contribution of the chatbot to the dialogue directly depends on what kind of interlocutor a real person wants to find in him. Of course, this function alienates the program from natural communication, in which it is difficult to predict with what intonation the interlocutor will respond, how many sentences will be in his answer.

The ability of a chatbot to search the global network during a conversation allows you to make communication more real. Thanks to this, the chatbot knows about the latest movies, can

discuss celebrities, popular video games, and can give some definitions.

The Turing test does not take into account the linguistic features of programs based on artificial intelligence, at the lexical, syntactic and textual levels, despite the fact that these features determine its functioning, namely the similarity of its communication with human communication. This test evaluates only the logic of the bot's statements and the exact knowledge of the program.

Based on the characteristics of Internet communication, it is relevant to test the communication with the chatbot Cleverbot for the presence of artificial communication markers. The following groups of lexical markers were identified: the recognition of everyday vocabulary or common words and the inability to work with SMSabbreviations and slang. At the syntactic level, chatbots could not recognize grammatically incorrectly constructed sentences, using a rephrasing strategy of the user's statements, inability to recognize pronouns other than. At the text level: inability to work with statements consisting of more than one sentence, non-observance of communication registers, and inability to keep the entire conversation in mind.

The purpose of numerous studies is to identify the main markers of linguistic artificiality in the process of communication on the Internet. It is emphasized that this signal transmission process is not always a conscious, meaningful process, which corresponds to the functional features of chatbots. Features of Internet communication are manifested at the levels of words, sentences and text. We checked the manifestation of these features in the framework of communication with a software

communicator. Markers of the linguistic artificiality of Internet communication at the lexical level are the ability to recognize only everyday vocabulary and the inability to work with SMS-abbreviations and slang. At the syntactic level: inability to recognize grammatically incorrectly constructed sentences, use of a rephrasing strategy of the interlocutor's statements, inability to recognize pronouns other I, you, it, my, its and your, inability to than recognize the separation type of a question. At the text level: inability to work with statements consisting of more than one sentence, nonobservance of communication registers, and inability to keep the entire conversation in mind.

References

Augello A., Pilato G. An Approach to Enhance Chatbot Semantic Power and Maintainability: Experiences within the FRASI Project. P. 186-193. 2012. URL:https://www.computer.org/csdl/proceeding s-

article/icsc/2012/4859a186/12OmNrY3LrD(дат а звернення: 14.09.2020).

Generative chatbots using seq2seq model. URL: https://towards datascience.com/generativechatbots-using-the-seq2seq-model-

d411c8738ab5 (дата звернення: 13.12.2020).

Krantz et al. Generating Topic-Based Chatbot Responses. 2017. URL: https://www.divaportal.org/smash/get/diva2:1118159/FULLTEXT 02 (дата звернення: 04.01.2020).

4.11. Humans, Machines and Animals: Philosohy

Human language and non-human languages can be differentiated on the basis of anatomic peculiarities of human brains and non-human brains. Moreover, human cognitive abilities and social context of human communication makes human language differ from non-human language to the greatest extent.

"The difference between human and other animals communication" by Mano Singham is focused on consideration about the differences between human and non-human communication. The discussion is centered on the specific nature of human brains and its ability to produce or reiterate immense volumes of information in comparison with other non-human beings or machines.

The author presents a universal perspective while explaining abilities of children to distill syntactic patterns from the speeches of their parents or people around them. On the example of citations taken from other well-known linguists, such as Chomsky and Pinker, human language is differentiated from non-human language by means of design features of the language. Thus, the nature of language is finite in a set of the human calls/signals/variations for different phenomena etc. In other words, it is claimed that human language is designed by means of definite tools and reaches indefinite scope of influence.

Moreover, in-born peculiarities of human brains are responsible for language "location", while among non-humans the vocal calls are located in other parts of brains. The author also makes a hypothesis that human communication has been

developed in accordance with the special needs of humans and as a response to a changing reality. Nonhumans did not need such kind of adaptation to the environment and thus their language abilities were not developed as much. Still, the author does not consider non-human disabilities to communicate the same way as humans do, but he underlines that communication among humans and non-humans should not be equal, the same way as human hands should not be equal to the bird's wings.

Another article by Ulla Hedeager "Is language unique to the human species?" provides quite another perspective. The author intends to claim that language is universal both for humans and nonhumans. Nevertheless, the main difference between human and non-human communication is considered by the author in terms of predictability of animals in the process of communication and unpredictability of human language. Moreover, she refers to design features developed by Charles Hockett (1967) when talking about human language. Nevertheless, claims by Hockett and Chomsky are considered to be improper in terms of natural social context.

The most appealing approach for Hedeager is to consider language on the basis of biological foundation. Therefore, language comes from the human brains. But, the controversial claims appear in the second part of the article, when the nature of non-human language is considered. In this section Hedeager claims that there are common stages of language acquisition among birds and humans. There is also a common "melody of language" relevant to humans and non-humans. Moreover, the author claims that chimpanzees can not only reiterate sounds produced by humans, but can also categorize

parts of speech, create new words, use questions etc.

Nevertheless, the author claims that primates do not develop their language abilities to the level humans can. There is no need for them to communicate like humans. because their environment does not require that thing from them. Therefore, the main emphasis of the article is made on contextual usage of human/non-human language. Though in the sections of the article the author differs between human and non-human languages, in the end of the article it is clearly seen that language is considered by the author as a general unity consisting of a set of communication tools that are required by humans and non-humans. In the article "A defining difference between man and non-human primates" (2001) the difference between human and non-human languages is provided from the medical

518

perspective. A structural approach is applied by physical anthropologists and for them language is just a means to explore the structural difference of human and primates' brains.

Human ability to communicate, to understand different concepts etc is explained by the scientists by left-side differences of the human brains in comparison with primates' brains.

Nevertheless, the article provides an unprejudiced perspective on the human and nonhuman language difference. This can be explained by the fact that the author further provides arguments of similarity between individual's brain cells. Still, the author discards this claim further and underlines a difference of brain's organization in the language section. Therefore, though this article provides a biological perspective on differences between human and non-human languages, it is clearly seen that the

author differentiates and does not unify human and non-human languages. He wants to show the way these differences are set, but he does not deny that they really exist.

James Keightley in the article "To What Extent Does Language Make Humans Distinctive To Other Animals" underlines that communication is relevant to humans and non-humans and human language is just a tool for humans to communicate. The author gives examples of the way bees or animals communicate, but he underlines that there are differences similarities and between the communication and language among humans and non-humans. The author provides claims by Aitchinson (1983) who identified four basic features relevant to human language: these are structure dependency, creativity, semanticity and displacement. Further on, the author underlines that apes have

some of these abilities. Still, other non-human species cannot differentiate between past and present and can communicate only about current events.

The author also provides ideas of cognitive linguists, who assign the important role of communication to previous experience and further interpretation of the acquired meaning is dependant of the previous experience as well. From the perspective of Social Constructionists the language is considered in the social context serving for the purpose of communication among people. The author provides a broad consideration about human language, but he talks not so much about non-human language as a means of communication. He underlines the main difference between human and non-human languages on the basis of anatomic

differences between humans and non-humans and limited cognitive abilities among non-humans.

Consequently, the main advantage of the article is human language consideration from the perspective of cognitive linguistics and socioconstructivism. Still the main drawback is a lack of attention paid to what role non-human language plays in communication among non-humans.

Therefore, on the basis of recent studies on peculiarities of human and non-human languages, the difference between them is seen on the basis of different design features and the role language plays as a means of communication. The main difference between these languages should be found from the perspective of biological, cognitive and social sciences. This is a perspective for multifaceted consideration about the given phenomenon. At this point, we can correlate relations of humans and animals.

Language as a phenomenon can be considered from biological, psychological and social perspectives. This trinity of views enables modern researchers and scientists focus on various aspects of language, its role in the society and lives of each individual. Thus, language acquisition is a challenging issue of the modernity. With the help of technologies, it is possible to focus on technical aspect of language acquisition. This study considers the nature of language from three perspectives (biological, psychological and social). Further, this research compares and contrasts language descriptions within three given perspectives

4.12. Biological Perspective

For a long time, many researchers and scientists have been discussing that language is a

biological phenomenon. From their perspective, it is an innate property of a person, the same as the ability of a person to eat, drink, walk, etc. In other words, language is inherited by humans. It is inherent in the biological entity of humans. On the contrary, there are many examples in nature, when children turn into wild beasts or animals if they grew up among them. When these children returned to human society, they could not learn to speak although their organs of speech were guite normal. Moreover, there are many examples, when children of one nationality were placed into another language environment, and they spoke the language of the environment, and not their native language. These facts show that language is not inherited and does not belong to biological phenomena. As far as we can see, biological perspective can be argued.

In the study conducted by Berwick et al (2013), the researchers claim that with the help of natural language and artificial grammar studies it is possible to determine the neural bases of processing hierarchically structured sequences (Berwick et al, 2013). Structures and characteristics of natural language and those involved in other types of cognitive processes show various distinctions. Cognitive capacities of human language are in the focus of attention for researchers in different fields of study. Cognitive basis of human language specifics has moved into the realm of animals and other biophysical restraints. Berwick et al (2013) underline that a merge of systems with words remains unchanged. Some aspects of language externalization are human-specific and these models are checked with the help of animalistic models. For sure, there are similar features between all human languages, as

well as some different features. Based on animalistic models, with the use of songbirds and parrots, auditory-vocal learning is effective.

Neurobiological basis of human language is one of the perspective directions in a wide range of related researches. Nevertheless, it is impossible to analyze syntactic capabilities and compare them between humans and non-humans. There are certain similarities and differences between individual biological factors and language acquisition. The work of organs of speech, environment of individual, specific biological features and other factors influence language acquisition. Biological approach to language acquisition cannot be left beyond attention of the modern researches. The study by Chomsky is one of key backgrounds for considerations about the nature of language.

According to one of recent studies conducted by a group of neurophysiologists from the University of New York, led by the director of the Max Planck Institute for Empirical Aesthetics (Germany), humans track three hierarchical levels of linguistic units: separate words, phrases and whole sentences, when they listen to their native language. According to the authors of the study, the results of their experiments confirm the theory of a well-known linguist Noam Chomsky on innate linguistic ability (Chomsky Was Right, 2015). In other words, grammatical structure of speech is genetically conditioned. The scientists selected two groups of participants: those who speak only Chinese and only English. The participants listened to the recording and their brains were tested. It turned out that there are three types of brain activity patterns: separate for sequence of words, word combinations and whole sentences.

The participants differentiated these patterns. Moreover, for both grammatically correct but meaningless sentences, and for meaningful sentences, there is one general pattern of brain activity. In other words, our nervous system processes and codes information about words simultaneously. Ideas of Chomsky about these innate structures have been criticized for many years.

The scientist "proposes a new and productive way of thinking about language. The language faculty is 'biologically isolated.' The language faculty accounts for the 'discrete infinity' of human language through its assumption of a recursive random sentence generator" (Calinescu, 2012).

New data confirm only a general nature of neurophysiological mechanisms for processing grammar among speakers of completely different languages. This aspect of language acquisition is

covered in many studies. The ideas of Chomsky concentrate on neurophysiological basis of language acquisition and nature of language. There are many followers of his ideas and there is no doubt that he is right in his claims. Correlation of different language systems, the ability of humans to focus on them, memorize and process them are crucial for solution of the problem.

However, modern researches and studies start reconsidering this idea. According to new data, language is a universal human biological inheritance, a psycho-physiological reserve in the brain of people, which is unique for all mankind (Chomsky Was Right, 2015). Language acquisition is a high biological ability of brain and it is genetically inherited. Demonstration of language skills depends on many factors (historical, social, environmental and other). It is possible to underline the biological basis of

language in two main areas. First, is assimilation of a specific human language and second is transfer of information by verbal means. Modern scientists prove these features of language by the phenomenon of isomorphism or unique patterns in language (i.e., similarity, analogy). If to focus on biological nature of language deeper, one can see that clinical data of speech pathology show that genes responsible for language are located in X chromosome. In other words, human ability to speak is genetically predetermined. Further, mastering of language skills is genetically regulated (Chomsky Was Right, 2015).

4.13. Psychological Perspective

From another perspective, language is considered a manifestation of the "spirit of God or man." For example, the German linguist W. von Humboldt described language as a manifestation of the "spirit of people" (Calinescu, 2012). Individual

psychological features define strategies of language acquisition. Psychologists study verbal and non-verbal ways of storing, generating and transmitting information in the consciousness of individuals and societies. For example, common and distinctive features of lexical and semantic systems in different languages are under consideration. For native speakers and foreigners, semantic, grammar or other linguistic features can differ. The researchers claim that language is an individual psychic act, a phenomenon of psychological activity of a person or people. Every individual refers to his own language, where he reflects his personal and ethnic specifics. The environment of an individual shapes his language acquisition process. As a rule, it is possible to outline basic psychological aspects of language two acquisition: intuitive-sensual and rational-logic.

First, let us focus on an intuitive-sensual type. By means of practical skills an individual gets acquainted with language peculiarities. An individual should master language usage and even try to think with the help of studied language. In case an individual is characterized by an intuitive-sensual type of language acquisition, he masters his skills by ear or within a special language environment. The main difficulty is to master phonetics and semantic charge of foreign words. For example, when individuals use foreign words and expressions in their native speech, they switch from native language to foreign language involuntarily. Rational-logical type of language acquisition requires theoretical linguistic knowledge and very often results in many difficulties of language mastering. This aspect focuses on grammar structures and vocabulary mastering.

Despite differences in psychological aspects of language acquisition, it is possible to reach effective communication in case speakers are open-minded, ready to share their experience with other speakers and focus on common goals of communication. There is another challenge, when an individual changes his language perception under the influence of foreign language environment. In this case, a foreigner's cognitive abilities are under pressure. Individual psychological reality subject to foreign language environment. Language acquisition is a complex and challenging process, which involves both heart and mind of an individual. Effective individual psychological aspect of language acquisition depends on both intuitive-sensual and rational-logic language perception, as well as environment of speakers.

4.14. Social Perspective

Social aspect of language acquisition is highlighted by LeMonda (2014). This is another perspective, which contrasts with the biological aspect of language. The researchers claim that responsiveness of parents in the process of child's language acquisition results in effective words learning and vocabulary development. The researchers explain interaction between parents and their children as an effective background for socialization. A child understands that if he repeats one or another word, he will find a responsive reaction to his activities. Further, children can refer the words they hear to the objects from real life. Thus, they will extend the process of their socialization. Pragmatic understanding of meaning conveyed by words will extend referents' background for children (LeMonda, 2014).

534

Neurological basis for acquisition of abstract words is another focus of study conducted by Viglioccol (2013) underlines that "abstract concepts" are linguistically coded, in line with imaging evidence of greater engagement of the left perisylvian language network for abstract than concrete words" (Viglioccol, 2013). Affective processing is more appropriate for abstract words rather than concrete ones. The researchers found that in the process of correlation analysis of more than 1,400 English words, abstract words are emotionally charged. The main claim of this research is that affective associations refer more to abstract words. Processing of abstract concepts is correlated with emotions. This can be explained by the fact that abstract words have more associations. Successful learning of affective development is a guarantee of

successful learning of abstract vocabulary. Emotional valence is another dimension for human representation of meaning. As we have already said, language arises and develops only in the society and under the influence of human speaking. Language exists if society exists too. Thus, language is a social phenomenon. There is a special social nature of language.

Despite numerous biological similarities between animals and humans, the former cannot speak. Nevertheless, audio-visual abilities of bats help their orientation in space, but no bat can speak for sure. If the ability of language acquisition is an innate, biological trait of a person, why there are many different languages in the world? Based on considered researches and studies, the structure of the human brain allows us to use language. Chomsky is right, when he says about "theory of universal grammar." Proponents of bio-linguistic approach refer language proficiency to human biology. In the course of time, a person develops and masters his language skills. This is typical for many systems of human body. For example, first humans have permanent teeth instead of dairy teeth. The systems of a human organism are genetically conditioned. From another perspective, children have no special language mastering skills or even cognitive abilities in general. The proponents of this perspective claim that our brain does not have any biological characteristics that help humans in the process of language acquisition.

There are followers of biological and empirical approaches. Empiricists believe that language acquisition comes through experience. They claim that a person can learn something through associations, when he compares or contrasts two

things or associations. Human abilities to understand certain aspects of grammar and semantics are still in the focus of many researchers and scientists. The problem of language acquisition can be solved on different levels (biological, psychological and social ones). The interaction of these three factors can explain the way humans perceive two different levels of language, such as grammar and semantics.

The discussion is based on comparison of Elizabeth Costello ideas on humans and animals with ideas expressed by J. Locke, Wallace and Nagel. Costello in Lesson 3 "The Lives of Animals: The Philosophers and the Animals" considers philosophers' ideas on animals. Such great thinkers as Augustine, Aquinas, and Aristotle claimed that animals have no souls (Coetzee, p. 66-67). The epoch of Enlightenment and its representatives Descartes and Kant tended to the idea that humans are first of all rational beings; philosophers underlined a crucial role of ratio (Coetzee, p. 66-67). Costello made this idea a ground for her support of animals: if humans are rational beings then how it is possible to slaughter and oppress animals? She also compared attitude towards animals in modern world with Holocaust.

Furthermore, modern people prefer to pretend being unaware of slaughterhouses and factory farms like earlier people pretended not seeing ash of human bodies in the wind. Costello claims that suppression of these facts is the best evidence of their horror. Following idea expressed by Costello, who is an imaginative character of novelist from the book by John Coetzee, we'll develop her idea basing on works by Locke, Wallace and Nagel.

Let us give a brief overview of the abovementioned works, which will be a basis for our research. Thomas Nagel in his article "What is like to be a bat?" draws parallels between a man and a bat. He is concentrated mainly on conscious exploration. Nagel underlines that conscious is presented in animals as well as in humans. Why bats, actually? In accordance with the scientist, bats are closely related to humans (Nagel, 1974).

They feel pain, fear, anger, hunger, like we do. Nevertheless bats' experiences are subjective in every aspect; therefore we can't conceive them to a proper extent. The author grounds his claims on suggestion of experiences' presence in animals, which are beyond human understanding. He provides interesting examples and his arguments are unique and original. Furthermore in a simple manner he introduces deep philosophical ideas. For example, he

claims that we can imagine how to be a bat, but it will only means what it would be like to be a bat for us and not what is like for a bat to be a bat (Nagel, 1974). We can suppose that Nagel invented his ideas in order to support animals' rights for existence.

Humans aren't allowed to pull out any kind of species from their being in order to satisfy gastronomic or aesthetic tastes. Costello' ideas can be compared with ideas by Nagel while she claims that since animals are embodiment of a non rational world their consciousness can't be totally perceived by human reason. Therefore there's no way and justification for cruel attitude towards animals.

Our research topic is also worth referring to John Locke' work "Essay Concerning Human Understanding" (1690). Two sections from this work are of great relevance to our paper: Identity of animals and the Identity of man. When Locke talks

about animals his discussion looks simple and understandable though it implies a deep sense. Locke compares animals and watch. Both of them have their own organization and require external force for their functioning. Only animal's motion coming from within body organization and motion of watch force coming from without.

Another section of Locke's work "The identity of man" considers man like a fitly organized body. At this stage we can trace similarity with identity of animal. Nevertheless Locke considers soul as an identifier of a man. He didn't mention presence of soul in animals. Therefore this philosopher tends to delimitation of an animal and a man.

As far as we can see, unlike Elizabeth Costello, ideas of Locke are directed on man supremacy. Costello's comparisons on attitude to animals in modern world with Holocaust aren't supported in Locke's work. Nevertheless, his discussions to a certain extent complement Costello's ideas. She doesn't mention soul as a differentiator of a man and an animal unlike Locke. At this point we can suppose that in such a way Costello avoids acknowledging of an evident difference of an animal and a man.

Another work by David F. Wallace "Consider the lobster" presents less philosophical ideas and grounds its discussion on the example of Maine Lobster Festival. The author asks such question: "Is it all right to boil a sentient creature alive just for our gustatory pleasure?" (Wallace,2004). Wallace raised this question and appealed to consciousness of people all over the world. He explored whether it is justified and moral to boil an animal alive (Wallace, 2004). The author underlined that it's easier to avoid responsibility and close one's eyes on moral aspect of such kind of festival than to discuss its morality.

Wallace emphasized on pain which lobsters feel while being boiled. Therefore who's responsible for pain and death of lobster: each cooker individually or the whole society which adopts such kind of meals?

Ideas of Wallace are close to the ideas of Costello. Pain, fear and death of an innocent living creature, a lobster, can't be justified only because of the fact that its brains have less neurons and pain extent experienced by lobster can't be compared to a feeling of human pain. Neglect of moral principles in modern society is a perfect background for moral degradation.

If we try to sum up and compare ideas of all four works considered about, we can surely claim that ideas of Elizabeth Costello are closely related to Nagel and Wallace. Three of them underlined subjectivity of animals' world and experiences. Costello claimed that it's impossible to interfere and

destroy animals' world for our gustatory pleasures. Basing on the works of great philosophers, Costello raised a question which is often suppressed in modern society: oppression of animals. On the one hand people eat animals for surviving and as well as animals eat each other for surviving. It's a law of nature. But on the other hand humanity is rational and it's contradictory to moral values to eat living creatures.

References

- "A defining difference between man and non-human primates", September 5, 2001. Retrieved from: < <u>http://www.howcomyoucom.com/selfnews/vi</u> <u>ewnews.cgi?newsid999709659,88454.shtml</u>>
- "The difference between human and other animal communication", 27 June 2008. Retreved from:<<u>http://machineslikeus.com/news/the-</u> difference-between-human-and-other-animalcommunication>
- Av. Juan de Dios Bátiz s/n esq. M. Othón de Mendizábal, U.P. Adolfo López Mateos. Zacatenco, México, Distrito Federal, MX, 07738, (52-55) 5729-6000 ext.
- Berwick, R. C. et al. (2013). Feature Review Evolution, brain, and the nature of language. *Trends in Cognitive Sciences*, 17, 289-98.

546

- Calinescu, M. (2012). Chomsky's Biolinguistic Approach to Mind and Language. *Linguistic and Philosophical Investigations*, 11, 91. Retrieved from Questia.
- Chomsky Was Right. (2015). NYU Researchers Find: We Do Have a "Grammar" in Our Head. Retrieved

fromhttps://www.nyu.edu/about/news-

publications/news/2015/december/chomsky-

was-right-nyu-researchers-find-we-do-have-a-

grammar-in-our-head.html

- Coetzee, J. M., Elizabeth Costello, New York, Viking, 2003.
- Fawaz S. Al-Anziand Dia AbuZeina. A Survey Of Markov Chain Models In Linguistics Applications

https://www.researchgate.net/publication/3115

55627_A_Survey_of_Markov_Chain_Models_i

n_Linguistics_Applications/link/59e4a06f45851 5393d610f7c/download

- Hedeager, U. "Is Language Unique to the Human Species?" Retrieved from:<http://greatapes.freehosting.net/>
- Keightley, James. "To What Extent Does Language Make Humans Distinctive To Other Animals". Retrieved from: http://www.qondio.com/to-what-extent-does-language-make-humans-distinctive-to-other-animals>
- Locke, J. Essay Concerning Human Understanding, 1690.
- Nagel, T. "What is it like to be a bat?"The Philosophical Review LXXXIII, 4 (1974): pp. 435-50.
- Tamis-LeMonda, C. (2014). Why Is Infant Language Learning Facilitated by Parental

Responsiveness? Current Directions in Psychological Science, 1–6.

Vigliocco I, G. et al. (2013). The Neural Representation of Abstract Words: The Role of Emotion. *Cerebral Cortex*, 24, 1767–1777.

Wallace, D. "Consider the Lobster". (2004).

CONCLUSION OF THE BOOK

The first Chapter focuses on the socio-cultural characteristics of programming languages. The transfer of a real-world object to a virtual or encrypted one for processing in programming languages is discussed. By using the programming language Python, which creates basic programs of applied linguistics, it is evident that the English language represents a set of lexical, syntactic, and semantic rules that outline this synthetic language. The problems of semantic ambiguity of machine translation or automatic compilation of poems require the creative potential of a human being and the technical code of the machine cannot solve these issues. Improved technical code of programming language depends not only on the logical structure, graphical mathematical objects, and characters but also the use of the English language to describe its various aspects. The simulation of human-human interaction is projected in the triad "human-machinehuman", and in the virtual world, there is a replacement of sensory perception of a human, his transformation into a cognitive tool in this digital and socio-cultural space.

Virtual relationships shift the anthropocentric paradigm and change "human-human" relationships into "human-robot." The relationship between human and machine can be spoiled by chaotic and inconsistent language patterns with a lost logical connection. From a philosophical perspective, the human is also a robot but acts according to other principles. There is, respectively, a socio-cultural upgrade of robots, the creation of ethical robots with assigned commands. For example, the Scratch programming environment improves the creation of interactive and multimedia projects. The rapid

spread of Scratch for animated stories, music videos, research projects, training manuals, and other content requires multilateral analysis and causes interest in mathematical and linguistic views. In the modern world, languages of programming provide a creative environment, where the syntax varies program structures, form, logic, and outer layer of the actual code without an explicit understanding of other important issues of efficiency, value, purpose, and proper use of this code. We can draw parallels between external factors that affect the adequate perception of the original message. Spoken words or English-language in communication sentences between people can be structured and understandable, although external conditions and the social environment change the emphasis of language tools. The dynamic nature of the English language

allows the possibility of error, while the programming language commands do not.

In the Chapter "Modern English language and its perception by humans" philosophy and logic of the English language, problems following the rule of Wittgenstein and Kripke are in focus. The interpretation of the mentioned words underlines the role of grammar in the construction of verbal communication as the foundation of the language domain. At this level, the formal structure of natural (English) language is similar to the formal structure of programming languages. Multimodal character and imagery of modern scientific and technological discourse, the role of verbal and nonverbal means, and anthropocentric figurative component therein are also under consideration. Understanding the morphology and the correct use of words using drawing maps of speech patterns, the assessment of

human competencies in the understanding of phraseological (based constructions on questionnaires), verbal processing of English sentences from the psycholinguistic perspective (based on questionnaires), human perception of the pragmatics of messages - failures, represented by non-native speakers of the English language are helpful tools for interpretation of human language perception. Non-native English speakers perceive English-language information like a machine (computer, robot, chatbot). Lack of socio-cultural background distorts this perception or limits it. Thus, socio-cultural, cognitive, and psycholinguistic cluster are key domains, which can determine effective communication "human-human" or "humanmachine-human."

In the third Chapter, formal communication of information-linguistic objects and artificial intelligence

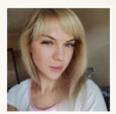
is discussed. This determines the possibility of human communication with a computer by using the language of programming. Technologies of speech synthesis and recognition are widely used in various spheres of life - medical, military, transport, telecommunications, entertainment, and education. The creation of programs for the synthesis and recognition of language involves the use of such disciplines as applied phonetics, programming, theoretical grammar, lexicology, lexicography, psycholinguistics, and logic. The semiotic basis of the English language is correlated with a semiotic basis of programming languages and in this background punctuation marks in the English language, symbols and marks are correlated with the programming languages and their instruments. Intertextuality processing is an intermediate level, where it is possible to improve communication "human -

machine-human." Also, linguistic and information technologies are aimed at improving the intellectual processing of word semantics, avoiding the semantic ambiguity of machine (Ukrainian-English) translation. Computer and language cognition: natural language processing, parsing, extracting information from English-language texts, modules of morphological analysis and synthesis, semantic networks, text markup, and other similar concepts require human involvement in automatic editing of the Englishlanguage text processing and require the involvement of linguistic methods.

The fourth Chapter, chatbots, throws light on a certain link between humans and computers. T. Vinograd's test, the role of context in the process of learning chatbots, distribution approach in natural language processing (English), syntactic difference and semantic similarity in human-chatbot communication,

M. Minsky's frame approach, P. Gris's interactive approach, processing of natural (English) language, the experiment with the Chinese room, creation of a humanoid chatbot (linguistic perspective) and other aspects are represented. This Chapter is devoted to philosophical issues of coexistence of a human being, computer and animals based on the works of M. Syngamia, M. Heidegger, and others, where the animalistic perspective of language learning exists along with the biological one. Moreover, psychological and rational logical perception of language, its social perspective, the idea of the sensory perception of animals, their subjectivity and rationality can be compared with the communication "human – machine." Turing's test and artificial intelligence, the problem of improper processing of information sent to a chatbot. D. McDonald's and Markov's chains are correlated with chatbots

improvement, especially in the field of semantics, word order in a sentence, punctuation, and pragmatics.



NATALIIA LAZEBNA, PH.D., ASSOCIATE PROFESSOR AT THEORY AND PRACTICE OF TRANSLATION DPT., NATIONAL UNIVERSITY ZAPORIZHZHIA POLYTECHNIC, UKRAINE. AUTHOR OF MORE THAN 60 ACADEMIC JOURNAL ARTICLES, STUDENTS' GUIDELINES, AND 2 MONOGRAPHS, LECTURER AND REVIEWER.

THE PRESENT BOOK HIGHLIGHTS THE INFORMATION ON MODERN ENGLISH-LANGUAGE.



THIS BOOK IS PUBLISHED BY PHDIANS 2021 WW.PHDIANS.COM MOBILE: +919845542016