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S. V. Tolbatov

THE ARCHITECTURE OF INFORMATION SYSTEM COMPLEXITY ESTIMATION WORK

Information computer technologies Department, National Aviation University, Kyiv, Ukraine
E-mail: petrpav@nau.edu.ua

Abstract—The article deals with the approaches to the information system construction for analyzing work complexity. The author considers business logic and access logic to the database, as a basis of software implementation and in future presentation logic.

Index Terms—Information system; methods of work analysis; assessment of work complexity (types of work); architecture of an information system.

I. INTRODUCTION

There are several basic approaches to design an architecture of the corporate information systems in economic and financial activities filed. The following functional components of the information systems could be highlighted [1]:

1. Presentation Layer (PL).
2. Business Layer (BL).
3. Access Layer (AL), architecture of the system could be represented on the Fig. 1.

Development and implementation of the work complexity information system should meet the following requirements of the business:

thousands of users all around the world the reliability issue becomes very significant.

2. *Security*. The data that is stored in a database is usually a trade secret and any leak could lead to customers' losses as well as system owner. Complicated mechanisms and algorithms are implemented to avoid an unauthorized access, system corruption etc.

3. *System flexibility*. Due to large amount of users the system flexibility meaning possibility of new versions development and releases (for all three layers: PL, BL, AL) could be provided in two-layer or three-layer architectures only.

II. THE RESEARCH ANALYSIS

The analysis of the software and hardware implementation of the work complexity assessment technique [2], [3] concludes that there are no standards for information system architecture development as well as for different approaches for polls and further calculations.

Two-level information systems architecture should be implemented along with the relevant software in order to be used by medium business enterprises [4], [5].

III. MAIN BODY

The purpose of this article is to design the information system architecture to accommodate the work complexity software development. The input and output data should be determined before information system architecture development. This data will be processed by information system and finally passed to the user.

The data physical structure and its attributes are represented on the Fig. 2. It is used to develop the software for the mathematical model of the work complexity assessment particularly for the 'creative potential' aspect of the credit and factor model that is considered in the publication [6].

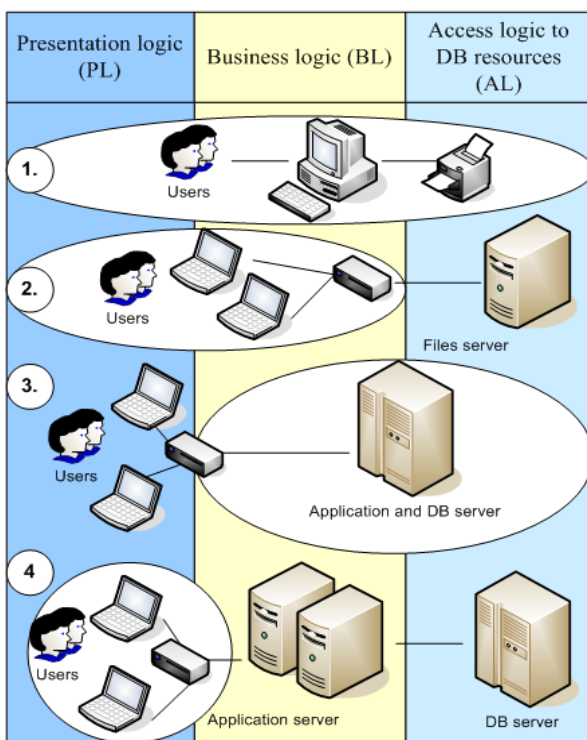


Fig. 1. The information system architecture: DB is database

1. *The reliability of system functioning and data storage*. As far as distributed systems of the analysis are intended to be used by tens of

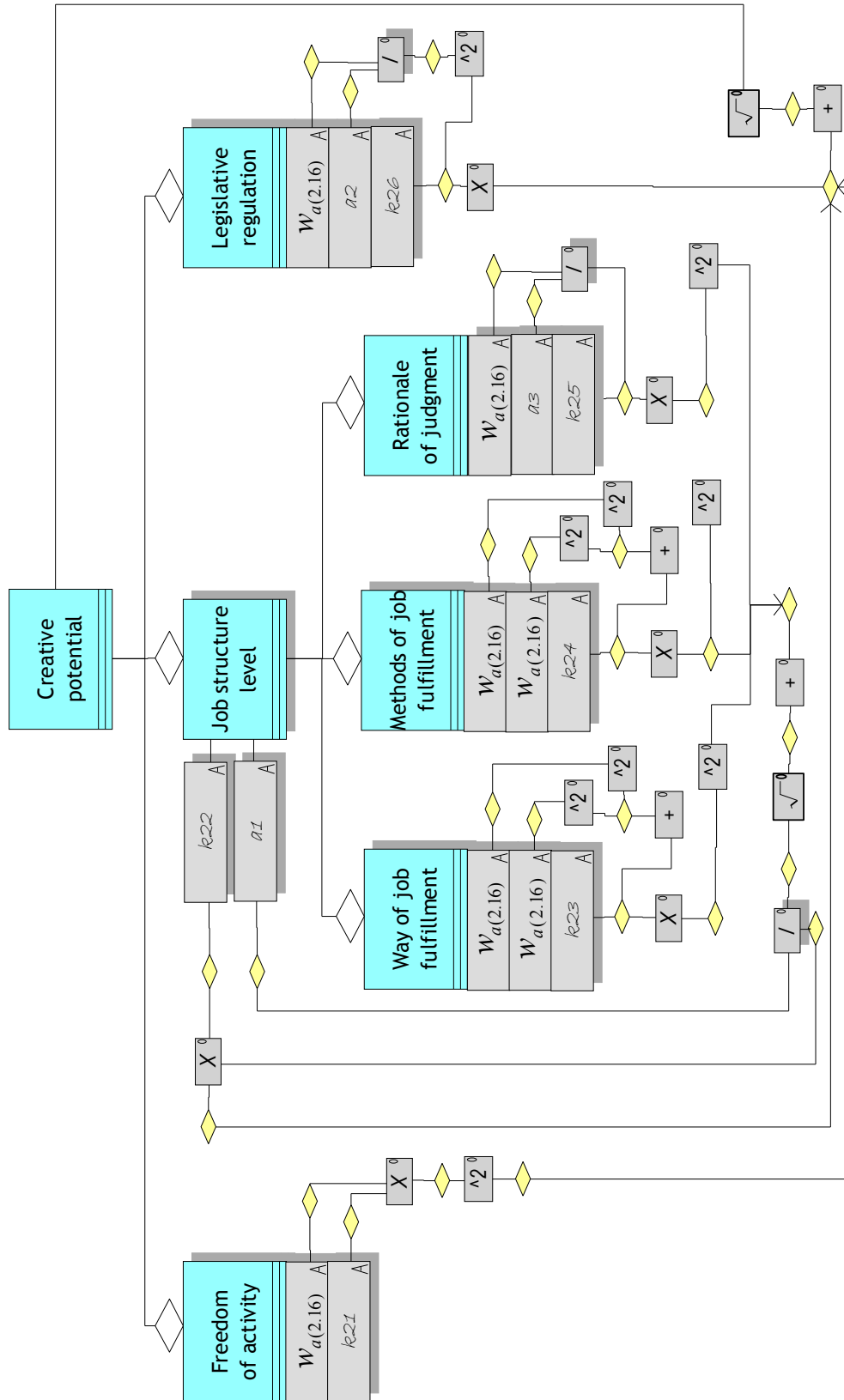


Fig. 2. 'Creative potential' aspect

The data structure and the data interrelations are represented by the ERM model (entity-relationship model) which is intended to describe the conceptual scheme of the domain. This model

helped to find out the quintessence and relations between them. Later during the database design and software development, the ERM model is transformed into the certain scheme of database based on the chosen model.

The certain entities and attributes that describe the aspects of the developed system are depicted on the schemes below. For the proposed calculations algorithms the business logic is represented as appropriate operators of the mathematical functions. The attributes are represented as relevant characteristics of aspects, namely evaluative judgments, value coefficient and observatory factor.

The data formats diversity (in terms of measurement units) that is used for work complexity assessment leads to issues of data integration within the common database with further processing.

Hence the information system structure could be represented by the software modules which are responsible for the data processing and calculations. The modular structure of the information system is depicted on the Fig. 3.

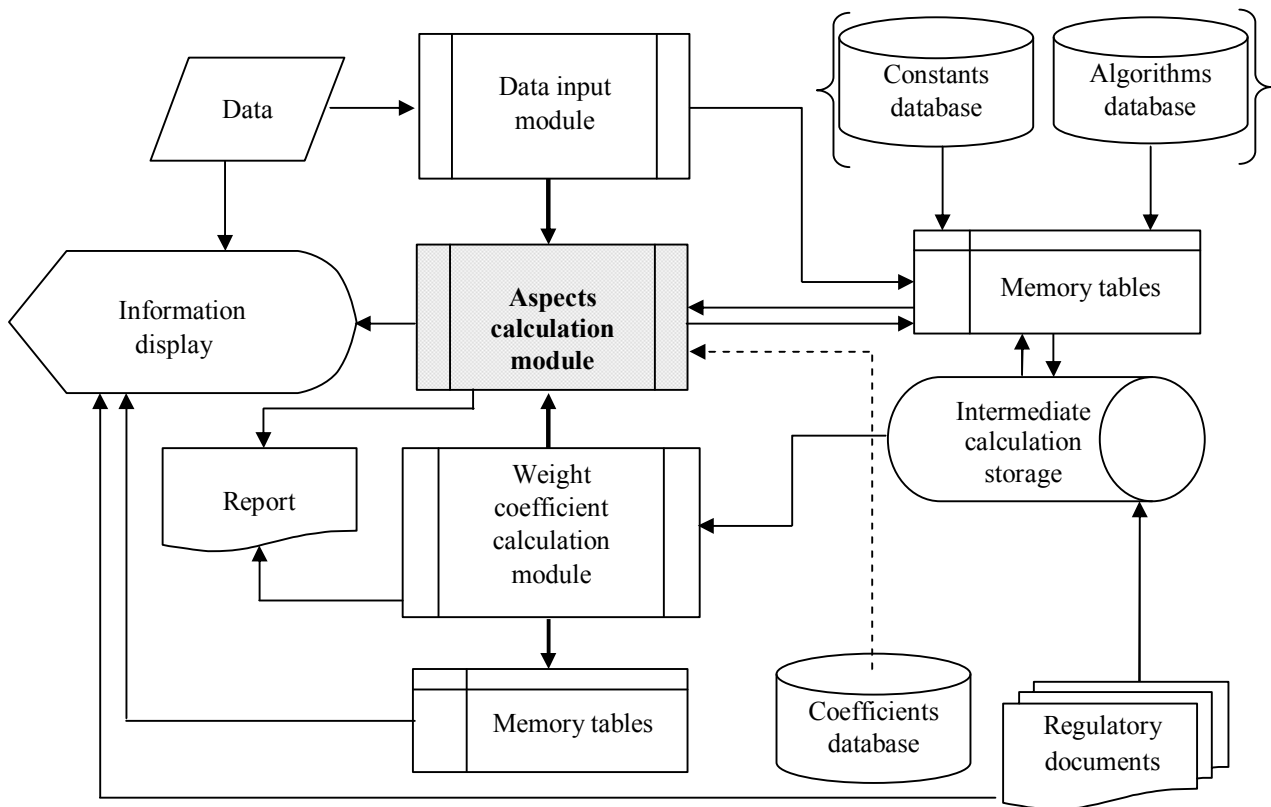


Fig. 3. Block diagram of the information system

The information system could be represented by the following main blocks (modules):

1. Data input module. This module is used for variable data input which characterizes the certain aspects of the particular work as well as necessary calculations. Basically this module represents Presentation Layer.

2. Aspects calculation module. Basically this is the main module of system calculations. It is responsible for the quantitative assessment of each aspect of the work model. The Business Layer is implemented here and servers to provide the necessary interconnection between all the modules as well as implementation of calculation algorithms.

3. Weight coefficients calculation module. This module belongs to BL as well. Pairwise comparison algorithms are implemented here for

aspects to calculate the weight coefficients. The author suggests considering this implementation as a separate module in order to meet the requirements for calculations stated in the given technique which will remain constant and will not depend on work features. Such approach should simplify the development process and further module operations and improvements.

4. Memory table. These tables serve as intermediate database for storing the entered values and intermediate calculations. These tables could be implemented in the relevant areas of the RAM (random access memory). Essentially all the data exchange between the calculation modules and database are performed through these tables. The access logic to DB resources (AL) is also implemented according to the approach mentioned above.

5. Database. The given group of modules comprises a wide range of databases which are responsible for the storing of constant values, different regulatory guides required for the data input and calculations.

6. Report. This module is responsible for data visualization and reports making. Reports could be designed and implemented in advance to meet all the customers' needs.

III. CONCLUSIONS

The author made the description of the main modules of offered information system, and their function for the subsequent realization in the form of information technology. Two-level information system architecture of the work complexity assessment has been developed. The architecture considered in the article could be used as technical design specification for the appropriate software development which could be used by enterprises experts as automated solutions for setting and definition of labor quotes and salary rates.

REFERENCES

- [1] Paterson of D., Khennessi. Computer architecture and planning of the computer systems. Classic Computers Science. 4th izd.: Piter, 2012. 784 p. (in Ukrainian).
- [2] Common-Metric Job Analysis. URL: <http://cmqonline.com/cmqonline/index.jsp>.
- [3] PAQ Services. URL: <http://www.paq.com/?FuseAction=Main.Home>.
- [4] Pavlenko, P. M.; Tretyak, V. V.; Tolbatov, S. V. "Model of criterion of efficiency of modern methods of analysis of works." *Announcer of the Tchernihiv state technological university*. Series: Engineerings sciences. 2013. no. 3. pp. 149–157. (in Ukrainian).
- [5] Tolbatov, S. V. "Model of analysis of methods of determination of estimation of complication of works." *Announcer of the Khmel'nickogo national university*. 2013. no. 3. pp. 58–64. (in Ukrainian).
- [6] Pavlenko, P. M.; Tolbatov, S. V. "Competence assessment method of the expert group." *Vesnik NAU*. 2014. no. 4. pp. 123–127. (ISSN 1813-1166).

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Tolbatov Sergey. Postgraduate.

Information computer technologies Department, National Aviation University, Kyiv, Ukraine.

Education: Sumy State University (2012).

Research interests: information computer technologies.

Publications: 4.

E-mail: petrpav@nau.edu.ua

С. В. Толбатов. Архітектура інформаційної системи оцінки складності робіт

Розглянуто основні підходи до побудови архітектури інформаційної системи оцінки складності робіт.

Ключові слова: інформаційна система, методи аналізу робіт, оцінка складності робіт.

Толбатов Сергій Володимирович. Аспірант.

Кафедра інформаційних технологій, Національний авіаційний університет, Київ, Україна.

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E-mail: petrpav@nau.edu.ua

С. В. Толбатов. Архитектура информационной системы оценки сложности работ

Рассмотрены основные подходы по построению архитектуры информационной системы оценки сложности работ.

Ключевые слова: информационная система; методы анализа работ; оценка сложности работ.

Толбатов Сергей Владимирович. Аспирант.

Кафедра информационных технологий, Национальный авиационный университет, Киев, Украина.

Образование: Сумской государственной университет (2012).

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E-mail: petrpav@nau.edu.ua