ЛІКАРЮ, ЩО ПРАКТИКУЄ

Divinum opus sedare dolorem!

Working hypothesis modeling for development of Computer Ensured Communication in selected medical measurements

P.Mihova, J.Vinarova, I.Pendzhurov, S.Ranchev

New Bulgarian University, Institute of Mechanics, Sofia, Bulgaria

РЕЗЮМЕ, ABSTRACT
This paper describes the final phase in the creation of specialized telemedicine program - after a summary of theoretical and experimental results (personal and literary) to formulate the presented version. The main objective of the presented research project is to create Computer Provided Communication (CPC) for health and medical purposes by using specialized electronic health record (EHR) designed for telemedicine information system (TIS) in two categories: selection of candidates for operator actions in the army through biomechanical parameters, studied at the Central Military Commission in Military Medical Academy in Sofia; computed tomography results from pulmonary pathology in the Department of Computer Tomography in MMA, Sofia. The object of this work program is to structure the digital EHR for Medical Information System, which has a telemedicine functions in two specializations: professional selection for military and Pulmologic complex diagnosis (Ukr. z. telemed. med. telemat.-2012.-Vol.10,№2.-P.18-21).
Key words: telemedicine, electronic health records, military medicine

P.Mihova, J.Vinarova, I.Pendzhurov, S.Ranchev
РАБОЧАЯ ГИПОТЕЗА ДЛЯ МОДЕЛИ КОМПЬЮТЕРНОЙ СИСТЕМЫ ОТБОРА И УЧЕТА РЕЗУЛЬТАТОВ ДИАГНОСТИЧЕСКИХ ТЕСТОВ
New Bulgarian University, Institute of Mechanics, Sofia, Bulgaria
Статья описывает финальную часть проекта по созданию специализированной телемедицинской системы, которая базируется на обобщении теоретического и практического опыта, а также данных литературы. Основная задача проекта – создание компьютеризированной системы, включающей электронные медицинские записи и телемедицинский модуль. Система предназначена для отбора кандидатов на основе автоматизированной обработки биомеханических параметров для выполнения военных оперативных задач, а также для обработки и анализа радиологических исследований грудной полости (Укр.ж.телемед.мед.телемат.-2012.-Т.10,№2.-С.18-21).
Ключевые слова: телемедицина, электронные медицинские записи, военная медицина

P.Mihova, J.Vinarova, I.Pendzhurov, S.Ranchev
РОБОЧА ГІПОТЕЗА ДЛЯ МОДЕЛІ КОМП'ЮТЕРНОЇ СИСТЕМИ ВІДБОРУ І ОБЛІКУ РЕЗУЛЬТАТІВ ДІАГНОСТИЧНИХ ТЕСТІВ
New Bulgarian University, Institute of Mechanics, Sofia, Bulgaria
В статті наведена фінальна частина проекту по створенню спеціалізованої телемедичної системи, яка базується на узагальненні теоретичного і практичного досвіду, а також даних літератури. Основне завдання проекту – створення комп'ютерної системи, що включає електронні медичні записи та телемедичний модуль. Система призначена для відбору кандидатів на основі автоматизованої обробки біомеханічних параметрів для виконання військових оперативних завдань, а також для обробки й аналізу радіологічних досліджень грудної порожнини (Укр.ж.телемед.мед.телемат.-2012.-Т.10,№2.-С.18-21).
Ключові слова: телемедицина, електронні медичні записи, військова медицина

Bulgaria's total military personnel as of late 2010 is 34,500, of which 30,400 (88.1%) are active military personnel and 4,100 (11.9%) are civilian personnel. The

Land Forces are the largest branch, with at least 18,000 men serving there. In terms of percentage, 53% of all Army personnel are in the Land Forces, 25% are in the Air Force, 13% are in the Navy and 9% are in the Joint Forces Command [7].

The Military Medical Academy (MMA) Sofia is a large complex for medical treatment, as well as education, located in Sofia, Bulgaria. It has several branches and smaller clinics in other cities in the country. The center for psychological health and the military medical team for quick response at the MMA have participated in military missions in Cambodia (UNTAC), Bosnia and Herzegovina, Kosovo (KFOR), as well as in Afghanistan and Iraq. Since 2004 Bulgarian doctors participate in the NATO mission in Afghanistan in Kabul and Herat.

Based on commitments and missions, there are activities carried out by the army operators that require guaranteed result, which should be uniquely determined. Such activities are characterized by complexity, diversity and performance in extreme unpredictable conditions [1-4].

Our research project is based on the hypothesis that the effectiveness of the operator's work strongly depends on his motor skills. It follows that through based on study of quantitative and qualitative methods of operators` candidates, which afterwards are arranged and obtained into EHR, could be made optimal selection, transforming the set of candidate operators in subsets of groups of operators required for the formation or completion of army units in a given time period profiles [5,8].

The methodological study of the operators` biomechanical characteristics consists of performance evaluation, measured by using specialized equipment connected to a computer configuration.

We evaluate: explosive strength, courage, agility, flexibility, speed, strength, endurance, balance with physical tests, applied in different armies such as: Battle Fitness Test - BFT, Land Force Command Physical Fitness Standard-LFCPFS, «Fizicheskie Trebon k Kandidatom» and others.

The main tasks in our study are:
• Construction of hypothesis for motor and biomechanical characteristics for each specific operator
• Create a set of hardware and information processing tools for implementation of relevant research
• Establishment of necessary operator`s complex motor skills in correlation with specific activity
• Finding the best value intervals by objective assessments of the surveyed properties
• Develop methods for processing of survey data, assessment and selection operators.

The second part of the Information system is an EHR, designed only for specialized computer tomography study of lung that arrange visual results in a time sequence and transform 2D images to 3D models (Fig.1).
• Structuring the available archiv data bank unit in operational database
• Development of EHR Prototype for specialized telemedicine information system, which correlate visual pulmonary research (Fig.2):
o Detection of diffuse nodular pathology results
• Development functions of the TEC module with data monitoring, training, self-study and reference activities.

Provided methods - induction /deduction, analysis/ synthesis, analogy, comparison, experimentation, observation, modeling variants in the study of real events and operations, systematic analysis of expert decision - for professional selection and visual computer diagnostics.

Methods for biomechanical research are:
a) in a research laboratory where the appropriate technical equipment (treadmill, ergometer, power platform simulator) operator performs predefined movements in the test program,
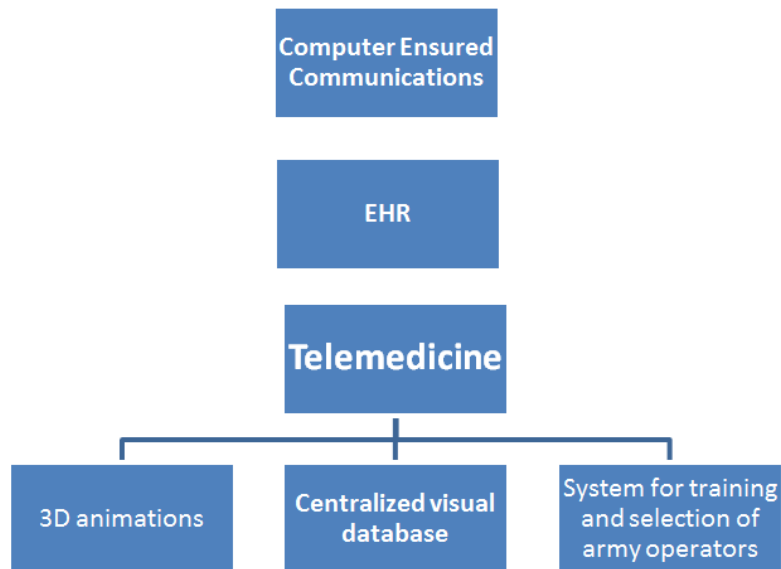b) "on the ground" which examines the actual implementation.

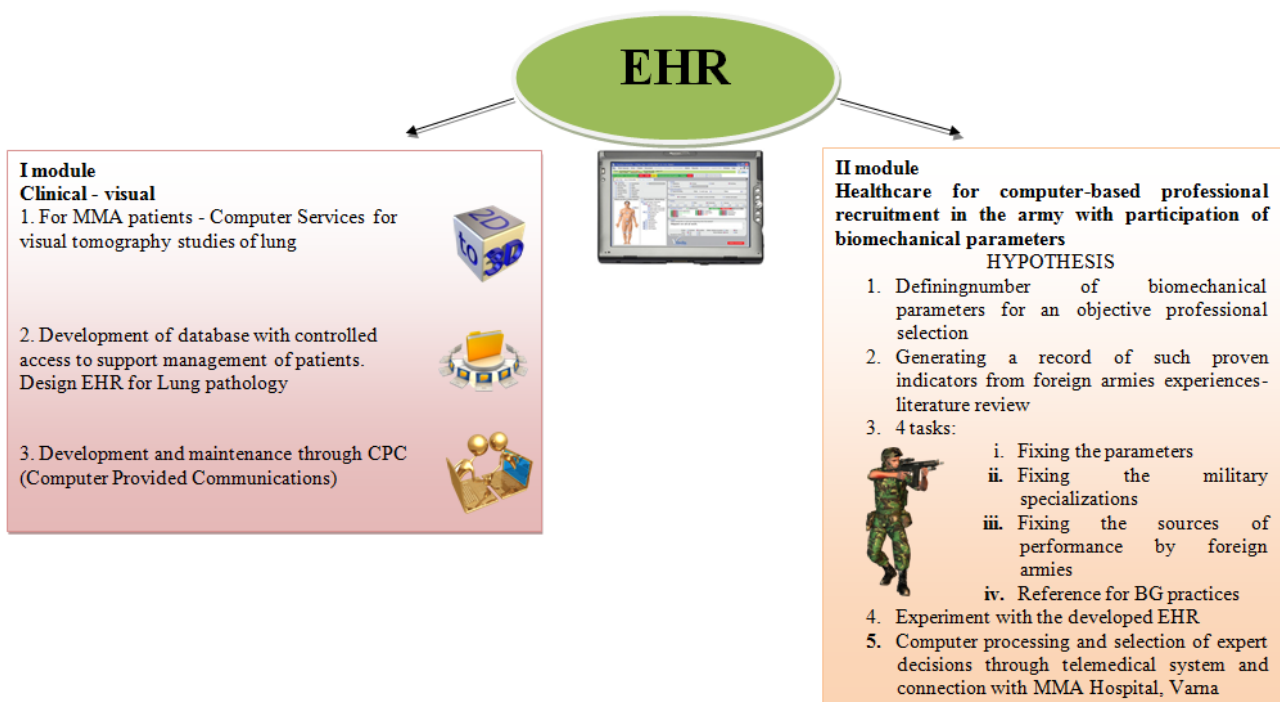*Figure 1. Computer Ensured Communications*

Figure 2. EHR model

Two research methods are applicable: direct (contact) and indirect. Direct is the method in which the applicant body is in contact with the instrument of his biomechanical parameters.

The indirect method is implemented through video and radar measurements.

The applied types of biomechanical methods are: direct and indirect measurements of average displacements of the body measuring small (visually noticeable), displacements of the body measuring temporal characteristics - duration, interval, rate, methods for measuring forces. Complex methods: particularly important modular principle - to create two models that develop stage. They will be used as electronic health records, as follows:

1) Health EHR - for professional selection of military operators.

2) Medical EHR - Visual pulmonary pathology - Computer tomography studies. Importance is the generation system -

design and programming Telemedicine Information System - computer modeling, experimentation, monitoring, management, training and retraining.

C o n c l u s i o n

Through the presented model is created new telemedicine methodology - combination of software and hardware medical methods (applied in the proper sequence), to carry out research in computer methods for the needs of healthcare and medicine. This is achieved by computing recognition procedures, processing and classification expertise and technological registered data source healthy or sick. Maintaining a tradition, established by clinical and Para clinical research standards and regulations, which do not change the administrative admission and evaluation of ptients and candidate operators.

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Кореспонденція: *P. Mihova,*
NBU,Montevideo 21, korpus 2, office 210, Sofia, Bulgaria
E-mail: pmihova @nbu.bg