УДК 004.91

MAIN DIRECTIONS OF IMPLEMENTATION OF THE TRANSLATION SYSTEM HIGHLY SPECIALIZED MEDICAL CONTENT IN PATIENT-ORIENTED TELEMEDICINE SYSTEMS

E. A. Mashina (ITMO University**)**
Research supervisor-Ph.D., P. V. Balakshin
(ITMO University**)**

The paper describes approaches to creating a translation system for highly specialized medical content, designed to provide information to users who do not have the necessary medical qualifications, for further use in patient-oriented telemedicine systems created for information support directly to the patient and his relatives, based on the technology of machine translation based on rules.

The work aims to justify the choice of optimal mechanisms for bringing highly specialized medical texts to a form that is understandable.

The main feature of the patient-centered system PersonalMedHelper, implemented by a joint multidisciplinary working group of students of ITMO University, MSU, and St. Petersburg State University (PMH.Team), is a possibility to provide information support by providing non-professional users with data arrays built based on automated processing of highly specialized medical content [1]. In this regard, the most important area of work carried out at this stage is the implementation of the technology for translating highly specialized medical content to a form that is accessible to users who do not have medical qualifications [2].

The creation of such a mechanism will allow to solve the following tasks:

- data intended for unskilled users will be generated on an existing database of highly specialized medical information while solving problems related to the reliability of the original information.,

- the conversion of automatically processed specialized medical information into a form accessible to an unskilled user will eliminate the procedure for additional preparation of patient-oriented data sets, which will lead to faster preparation of systems for use and reduce the cost of pre-preparation of content,

- the availability of the translation solution being created will allow for constant updating of the information available to an unqualified patient, simultaneously with updating and expanding such highly specialized medical information.

When choosing the mechanisms for building this bidirectional translation system, it is very important to pay attention to the fact that the translation from "specialized medical" to "every day" will be carried out within a single language.

Given the high degree of risk of misinterpretation of highly specialized medical terms and concepts into the language of natural speech, the main requirements for creating the translator in question are the accuracy and unambiguity of the wording.

When choosing a general technology for automatic adaptation of professional medical content for the needs of a non-professional user, it is very important to pay attention to the fact that such highly specialized texts are well structured. And the terms and descriptions of actions used in them are mostly standardized into specialized chains, often called protocols [2].

In this regard, it seems appropriate to use the Example—based Machine Translation (EBMT) as a first approximation of the technology for building machine translation (from medical to every day) [3].
The effectiveness of EBMT technology for adapting highly specialized texts is since, on the one hand, it does not require extensive databases of "mirror texts" necessary for training, on the other hand, it does not require deep linguistic analysis necessary for creating rule-based translation systems.
When using EBMT, the sentences of the translated (adapted) text are divided into certain phrases, then these simplest phrases are translated, considering the previously accumulated translation experience. And after that, the final translation of the sentence is constructed from these phrases-fragments [4]. At the same time, the EBMT technology allows you not to pre-build a comprehensive system of rules and exceptions necessary for the construction of phrases. Instead, EBMT uses text fragments that have analogs in the language in which the translation is required. This allows us to speak about its universality for various branches of knowledge [5].

Since highly specialized medical terminology is based on a well-structured and grammatically studied the Latin language, the task of constructing.

The bi-directional translator created for patient-oriented telemedicine systems is greatly facilitated.

Further, as described, mechanisms for the implementation of the bi-directional translator as part of a solution PersonalMedHelper will allow unskilled users to quickly and clearly understand the meaning of provided specialized medical data and to generate requests for specialized information without the use of highly specialized medical terms.

References

1. Машина Е.А. Особенности создания пациенто-ориентированных телемедицинских систем // Сборник трудов VIII конгресса молодых ученых (Санкт-Петербург, 15-19апреля 2019г.) - 2019. - Т. 3. - С. 256-259.
2. Машина Е.А., Нелепко Л.Н. Структура и источники специализированных данных системы информационной поддержки муниципальных волонтеров, оказывающих доврачебную медицинскую помощь // Сборник трудов VIII конгресса молодых ученых (Санкт-Петербург, 15-19апреля 2019г.) - 2019. - Т. 3. - С. 267-270.
3. Somers, H. Example-based Machine Translation // Machine Translation, 1999. № 14, p. 113—157.
4. Bowker, L. Computer-Aided Translation Technology: A Practical Introduction: Univ.of Ottawa Press, Ottawa, 2002, p. 185.
5. Computers and Translation: A Transltor’s Guide. In: Somers, H. (ed.) John Benjaminus Publ. Company, Amsterdam, 2003, p. 351.