# ОПТИКО-ЭЛЕКТРОННЫЕ ПРИБОРЫ И УСТРОЙСТВА В СИСТЕМАХ РАСПОЗНАВАНИЯ ОБРАЗОВ И ОБРАБОТКИ ИЗОБРАЖЕНИЙ

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The proposed algorithm was aimed at improving the HCC diagnosis [3]. In the further studies, it is planned to perform experiments with the application of the SVM, RL, LM classification methods based on the similarity of gene pairs and to select the method with better performance according to the performance evaluation.

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## CLASSIFICATION OF PATIENT REVIEWS BASED ON INFORMATION IN MEDICAL MEDIA RESOURCES

The article proposes an approach to the use of information collected in the medical social media environment for medical decision-making. Sentiment analysis of the information collected in the attitude segments formed in media resources and review classification algorithm are presented.

Currently, a large number of professional medical social communities have emerged in the Internet environment. The information collected in this environment becomes a valuable resource for decision-making in relevant fields, and intelligent technologies are the utmost required tool for achieving successful results in this field.

One of the important points here is the content analysis of the information related to the physicians, patient, medical institution, which are media subjects, and determining the opinion about media subjects in applications.

The expansion of medical social media, the activity of medical specialists, physicians, patients, and medical clinics on social media has led to the formation of

various stakeholders and the emergence of virtual medical relations between them. For example, physician – physician, physician – patient, physician – clinic, patient – patient, patient – medical institution (clinic) [1].

Depending on the nature of the information collected in these relationship segments, scenarios are formed for making different types of decisions related to the evaluation of the activities of media subjects, better organization of work, improving the quality of medical care. For example, based on the patient surveys collected in the segments of patient – medical institution (clinic) and physician – patient relations it can be defined which clinic or physician is the most consulted and in which field of medicine, the activity of women and men among e-patients, social media activity of e-patients by different age groups, regions, etc. However, based on these applications, determining "patient satisfaction" and "a physician who has won mass sympathy" for various diseases requires the analysis of the content of the requests, and therefore, the use of sentiment analysis methods become essential.

Sentiment analysis (SA) is a natural language processing that enables automatic classification of the content (opinion) expressed in a text [2]. Machine learning-based, lexicon-based and hybrid methods of SA are also available.

The Valence Aware Dictionary and Sentiment Reasoner (VADER) approach is a lexicon and rule-based system. The VADER approach classifies the text by giving scores such as negative, positive and neutral.

SA with the *VADER* lexicon is performed in the following stages:

1. *Data Collection.* A database is appointed that expresses the attitude (opinion) of patients about a certain doctor or clinic.

2. Data Pre-Processing. This stage performs the process of data cleaning (tokenization), i.e., spaces, special characters, symbols are deleted and the remaining ones are called tokens.

3. The stage of Extraction Opinions prepares processed opinions for analysis.

4. Application of Lexicon Based Sentiment Analysis algorithm.

5. The stage of Classification of Opinions applies the VADER approach for sentiment analysis of opinions and classifies opinions.

6. Result stage interprets the classification results.

Based on the proposed algorithm, 442401 patient reviews taken from the Kaggle cms_hospital_satisfaction_2019 database about a specific clinic were analyzed [3]. In order to represent the application possibilities of lexicon-based SA methods in the patient-medical institution segment of medical social media and Pandas, Numpy, Matplotlib, Seaborn, Nltk libraries were used, and the collected data were analyzed in the Python environment with the VADER lexicon. The procedures for achieving the final opinion by classifying the patient opinions collected in the database as "neg", "neu", "pos" are described, and the ranking of the patient opinions about the medical institution by the specified classes was

presented. According to the result of the classification of the viewed fragment, 218822 opinions were positive, 190280 opinions were neutral, and 33299 were negative. Such a classification of patient opinions about clinics can be used to evaluate their (clinics') activity, to determine a "popular clinic", as well as to make decisions about improving the clinic's activity.

Based on the analogous approach, the rating of doctors for a specific disease, "the doctor who won the sympathy of the masses", etc. can also be set.

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## APPLICATIONS OF THE APPROXIMATING K-ARY GCD ALGORITHM IN CRYPTOGRAPHY

In this paper, we will consider one of the tasks of cryptography, in which the use of an approximating algorithm is useful. The question is about the problem of finding strong pseudoprimes. Strong pseudoprime numbers (SPP-numbers) are composite natural numbers that the Miller-Rabin test erroneously determines to be probable prime.

### 1. Miller-Rabin primality test

The Miller-Rabin primality test is one of the most well-known probabilistic primality tests of a natural number, consisting of separate rounds [1–9].

This test was developed in 1976 by Gary Miller and modified in 1980 by Michael Rabin. Miller's test was deterministic, but relied on the unproven extended