

Automatic Processing of Digital Images of Different Types of Human Cells

G.Shevchenko, S.Gerasimenko, V.Belozubenko

Association Noosphere, Ukraine

nikk.gena@gmail.com, sgerasimenko3792@gmail.com,

bvs910@gmail.com

The analysis of biomedical images has long become an integral component, both in diagnosing diseases and as applied to therapeutic purposes. This is due to the fact that a fairly large proportion of the total volume of all data in medicine is images. It is an important source of patient health data. Biomedical imaging technologies use a wide range of different opportunities such as X-rays, magnetism (MRI), computed tomography scan (CT scan), SPECT, OCT, ultrasound, endoscopy, etc.

Since recently, an analysis of digital images of biological fluids, primarily, blood cells, cerebrospinal fluid, buccal epithelium scrapings and others, has been added to this list. A biological fluid swab often provides the primary and, sometimes, the only evidence of a specific diagnosis, remaining an important diagnostic tool even in the molecular analysis era of molecular analysis with the ability to isolate DNA, RNA and other material in the cell structure. An interest in this topic is driven, first of all, by an opportunity to automate the process of diagnostics, which is reduced to analysis of digital images of the respective human cells.

At the present time, there are few automated tools that would help doctors fulfill the routine duties of analyzing images, helping to process and analyze such information. Most of these systems are built on the use of neural network data processing technologies (artificial intelligence) with their inherent disadvantages - the need for training on a very large amount of data and the inability to interpret the results.

Our approach is based on the extraction of various features of cells and the formation of a training sample from it for subsequent classification, provides visibility of the results and shows high accuracy on test data. The system was developed on the basis of the work results that are provided by our specialists in the field of image processing. As a result, we built a system, which is able to segment the images of cells and extract the necessary features from them to build an object-feature table.

The developed software is designed to improve the efficiency of medical personnel, (including research), in the diagnosis, treatment and monitoring of various diseases that have manifestations at the cellular level.