

# Automated system of biomedical image analysis

Oleh Berezsky, Yuriu Batko, Grygoriy Melnyk

**Abstract** - The article consists description of automated biomedical image analysis system. The examples of the system work are resulted.

**Keywords** – automated microscopy, biomedical image analysis.

## I. INTRODUCTION

Systematic morphometric analysis let us find the description of metric characterization the objects and describes it relationship. This information are used for further treatment.

Modern software complexes give to users the wide spectrum of tools for processing and analysis of biomedical images, in particular in genetic, cytological, histological oncology researches and so on.

Basic advantage of the software use is a change from a subjective and qualitative analysis to objective and quantitative. Basic disadvantage of such step is complication of parameters tuning and possible errors of image representation.

## II. STRUCTURE OF THE SYSTEM AUTOMATED BIOMEDICAL IMAGE ANALYSIS.

To design the model of modern system of biomedical images analysis exploration of existent software was conducted. In particular, comparison was made using next parameters:

- method of input of information: image input from real-time (technologies of MCI/TWAIN) from video-photo device or load from the database;

- image preprocessing – program provides possibility after treatment of image (noises suppression, correction of brightness and contrast, filtration, areas interest selection, etc.);

- segmentation algorithms – manual (operator in the manual mode selects objects of interest), automated (operator enters some initial information (conducts learning) after that the program conducts segmentation unassisted) or automatic segmentation (the system on the basis of the programmed algorithms and initial data conducts segmentation unassisted);

- detect contour – describe the object edge. Object contour is most important object feature. This feature describes the form of object;

- calculation of image features – feature matrix which compact describes image. Most used: perimeter, area, nucleocytoplasmic ratio (NCR), corners, etc;

Oleh Berezky- Ternopil National Economic University , Lvivska Str., 11, Ternopil, 46009, UKRAINE,  
E-mail: ob@tneu.edu.ua

Yuriu Batko - Ternopil National Economic University , Lvivska Str., 11, Ternopil, 46009, UKRAINE,  
E-mail: programer\_tang@ukr.net

Grygoriy Melnyk- Ternopil National Economic University , Lvivska Str., 11, Ternopil, 46009, UKRAINE,  
E-mail: mgm@tneu.edu.u

- calculation of statistical features of the group of objects. This class of features includes: mean square deviation, max (min) value, and others;

- method of visual representation of information includes: building of diagrams, histograms, charts, and others;

- method of saving output information. System can save results in data base, hard drive or print to paper;

- communication with third party software, such as: MS Word, MS Excel, MS Access, and FoxPro.

## III. RESULTS OF EXPERIMENTAL RESEARCHES

The software system of automated microscopy MorphoSys is designed for acquisition, description and analysis of biomedical images[2].

TABLE 1

OBJECT FEATURES

№ Cells	Nucleus area	Cell area	Cytoplasm area	NCR
1	568	10362	9794	0,057995
2	512	9565	9053	0,056556
3	408	6632	6224	0,065553
4	285	16269	15984	0,01783
...	...	...	...	...
Middle	384,33	15764	15380	0,030041
Min	215	6632	6224	0,013391
Max	611	33998	33387	0,065553
Average deviation	29,012	1924,6	1914,3	0,0042853

## IV. CONCLUSION

Developed software system designed to automate processes of biomedical image analysis. This is advantage in the view of modern tendency to increase degree of automation of processes in all spheres of human activity.

The use of modern algorithms for image processing allows increasing quality and speed of image analysis, resulted in overall system performance.

The automation of analysis process allows decreasing human factor influence on the research results and making them more objective.

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