THE QUALITY OF DIAGNOSTICS OF BIOMEDICAL SIGNALS IMPROVING TECHNOLOGIES

Maryna Arkhyrei[1)], Oleg Melnykov[2)]
[1)] National Aviation University (Kyiv, Ukraine), Kyiv, str. L. Huzar,1, senior teacher, marina_arkhyrei@ukr.net
[2)] National Aviation University (Kyiv, Ukraine), Kyiv, str. L. Huzar,1, associate professor, melnykov_@ukr.net

As a rule, the quality of the process of diagnosing bioobjects depends on its main components - the determination and processing of a set of biosignals characterizing the relevant physiological indicators of the state of human health, and the formation and research of biomedical images of human organs for clinical analysis. Improving the quality of diagnosis is ensured by the quality of visualization of biomedical signals and images, which, in turn, requires the use of high-class medical devices on the one hand, and the use of special application software for processing signals and images on the other [1].

All biomedical signals to be analyzed are measured in a laboratory, office or other environment. Signal quality improvement - optimal filtering (removal or reduction of the noise component), extraction of information from signals or frequency separation of several signals, where semantically relevant parameters (also called features) are obtained, which can be used as input data for further diagnostic decision-making [2,3].

To implement adaptive filtering, an adaptive rejection filter is used; the impulse response of the filter has two coefficients [4,5]. Figure 1 presents the results of using ECG signal filtering methods.

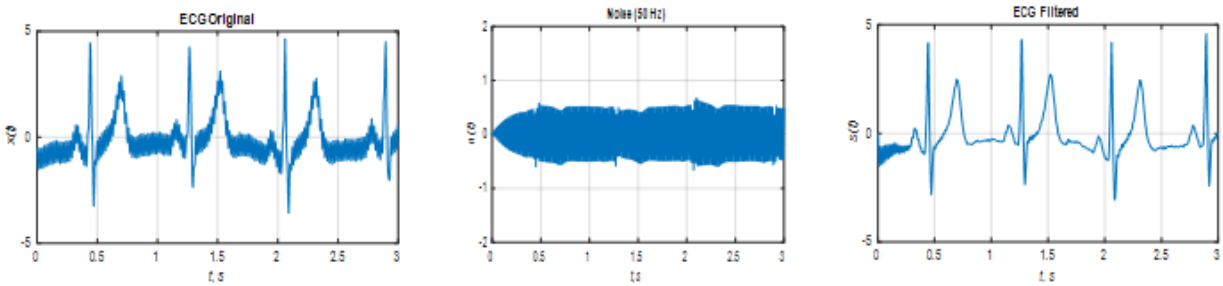

Figure 1. Original signal – interference – filtered signal respectively.

The efficiency of processing depends on the adequacy of the model describing the image, which is necessary for the development of processing algorithms. The image model represents a system of functions that describe the essential characteristics of the image:

- the brightness function, which reflects the change in brightness in the image plane,
- spatial spectra and spectral intensities of images,
- autocorrelation functions.

To form assessments [6] of image quality, the following image parameters are considered: the arithmetic average value of brightness, the completeness of the use of brightness gradations, the sharpness of the image and its generalized contrast. The results of the computer experiment are shown in Fig. 2, Table 1 presents the received numerical assessments of image quality.

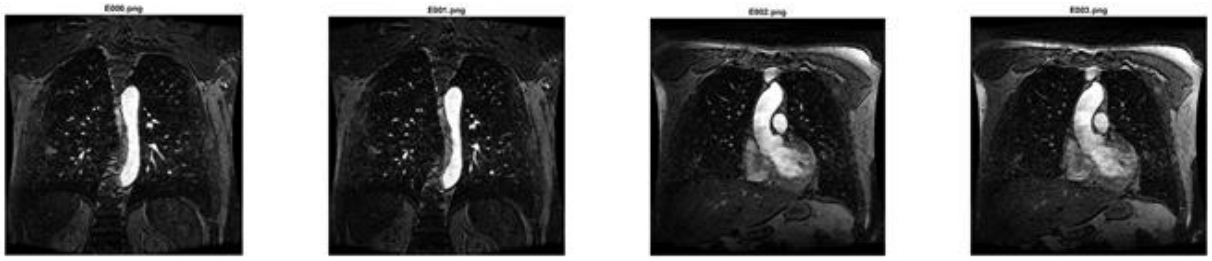

Figure 2. – X-ray images studied

Table 1 - Image quality indicators

Image	Quality indicators				
	The level of adaptation of the visual system LQ	Using KQ brightness gradations	Sharpness R	Contrast KC	Integral index Q
E000.png	0.2794	0.1608	0.5052	0.1810	0.4108
E001.png	0.2520	0.1608	0.4557	0.1673	0.3089
E002.png	0.3192	0.2863	0.4520	0.2545	1.0512
E003.png	0.3591	0.2666	0.5116	0.2889	1.4154

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