

NEW TECHNOLOGIES IN BIOMEDICAL APPLICATIONS

Collected papers from MD Medical Review

For a very short time (just for two years) the Medical Review (MD Journal) has become well recognized journal, not only in the region of Serbia but also in the whole community related to the medicine and technologies supporting it. Owing to the enthusiastic work and high energy of Professor Petar Spasic, the founder and Editor-in-Chief of the MD Journal, many high-level experts submitted their contributions making this journal so successful. Good balance between general review papers, news, case reports, and original articles make this journal very popular both for professionals (medical and technical) and other readers.

Today, we are witnessing explosive growth of new technologies, materials, electronics, information and communication technologies (ICT), and computers. Can you imagine your everyday life without Internet? Can you imagine modern medical diagnoses without the support of electronics, computers and algorithms?

The synergy between medicine and technologies started just from the beginning of modern medicine. Apart from military purposes, new technology inventions always take place in medicine: for example, let us recall X-rays, ultrasound, radio waves, microwaves (radar), lasers, etc. Therefore, we decided to make some review of already published papers in the past nine issues of MD Journal, covering these topics. It was not easy to make a decision and select only fourteen from more than 130 papers published in MD Journal. We selected review papers, original articles and some reports describing the connection between medicine and technologies as follows.

The first paper by Hirofumi Nagashino gave us the review of the analysis of biomedical data time series by artificial neural networks (ANNs). By using the ANNs and an appropriate training algorithm, it is possible to model biomedical systems (possible nonlinear and/or non-stationary) from the time series data generated by the system.

The next paper by Ana Gavrovska et al. considers selected techniques for the analysis of cardio signals. Different cardio signals were assumed: electrocardiograms (ECG), phono-cardiograms (PCG), and ultrasound (US). By combining the analyses of different signals it is possible to derive more accurate diagnosis compared to the use of only one of cardio-signals.

The paper authored by Elena Pirgorova et al. is devoted to the influence of electromagnetic radiation on enzyme activity and effects of synthetic peptides on cell transformation. The Resonant Recognition Model (RRM) is one attempt to identify the selectivity of protein interactions within an amino acid sequence. By using this model and assuming that protein interactions are electromagnetic in nature and their selectivity, the authors evaluated biological activity of de novo peptides. This approach is applied in more details in the next paper by (almost) the same authors, where it was shown that the RRM approach can be an efficient tool for the computational analysis of the functional activities of the matrix metalloproteinases (MMPs).

Several papers described the introduction of new technologies in hospitals and medical centers in Serbia. The electronic hospital, an initial step in the Children's University Hospital in Belgrade, based on the implementation of the Heliant software, is the topic of the paper by Branko Marovic et al. The general review of the role and significance of PACS is described in the paper of Zoran Mitrovic and Vesna Spasic-Jokic, while the implementation of modern PACS, based on ASTREOS PACS server, at the Institute of Oncology and Radiology of Serbia was the topic of the paper by Nenad Trkuljic et al.

An interesting procedure for transformation of real-time numerical algorithms into variable precision ones is described in the paper by Senka Bajceta et al. This procedure, embedded into the CELL processor hardware, was applied on the EEG signals.

Several papers consider the actual topic of the influence of different radiations on human beings. The first paper by Stojan Velkoski studied the influence of electromagnetic radiations on human blood cells. Then, Vesna Spasic-Jokic et al. proposed the new approach in estimating patient effective dose from radionuclide Na¹³¹I, used for the therapy of some thyroid carcinomas, while in two papers by Vesna Spasic-Jokic and Gordan Nisevic the comparison of protocols for the determination of 300 kV X-ray absorbed dose in radiotherapy and the determination of radiotherapy output dose were described.

Finally, the last two papers gave us the information of the activities of our institutions in European telemedicine projects and in the organization of IEEE* supported conferences on the Neural Network Applications in Electrical Engineering (NEURELs), where the significant part is related to the biomedical aspects in neuro-computing.

We really hope that this special issue will clarify the role of modern technologies in biomedicine and encourage physicians and engineers to contribute to the MD Journal.

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