

Preface

Biomedical Technology represents one of the most dynamically developed scientific area that supports research activities aimed to discover, create and develop innovative applications of technological solutions to handle different biomedical problems. Technology development often requires multidisciplinary and team-oriented approaches and may lead to the realization of new and/or improved instruments that have substantial influence on quality and reliability of medical and biomedical progress and further research. In general, the Biomedical Technologies developed by technicians are transferred into practice by specialists in medicine. Here, the physicians utilize such technologies mainly to help their patients solve their health problems as best as possible and return them back to normal life as soon as possible. On the other hand, the managers of various institutions included in the healthcare system can create proper conditions to support physicians in their innovative and advanced work by accepting of new methods and by personal or even financial interventions. Computational Intelligence and Informatics play a dominant role in Biomedical Technologies as it is an actual.

There are various scientific teams all over the world attempting to develop modern and innovative methods for this field of research. Most of them usually consist of members that are specialists in some areas of Biomedical Technologies, in development of special tools, devices, equipment, methodologies, etc. All such teams have their unique experiences and knowledge based on different backgrounds, mathematical approaches, and techniques applied in investigation activities to reach their goals. Exchange of scientific results and combination of experiences obtained by these scientific teams can be very useful to generate international cooperation based on professionals in their areas as well as for the next investigation and development in Biomedical Technologies. Therefore, the papers included in this book represent a good opportunity to present and to find the latest results in selected parts of Biomedical Technologies. Most of them deal with problems of Biomedical and Medical Informatics, ranging from theoretical considerations to practical applications.

The authors of these book chapters discuss a lot of specific aspects of development methods and algorithms in Biomedical and Medical Informatics.

Algorithms for medical image processing, modelling methods and tool, medical decision-making support, estimation of risks of treatments, reliability of medical systems, problems of practical clinical applications and many other topics are covered by individual contributions. Decisions of different problems in development of medical decision-making support system are presented. For example, decision-making process connected with the choice of right operation technique plays a big role as a risk decreasing factor taking into account the risk of post-operative mortality and morbidity as well. Having a good mathematical (statistical) model a decision-maker can assess and predict results of the expensive Phadiatop medical test. Cox analysis can be used as a useful tool for the incidence of cancer, etc. Interesting results are discussed for estimation of risk in treatment and examination of reliability of medical system.

The book is composed by selected contributions presented and discussed at the International Workshop on Biomedical Technologies that was organized under the 10th International Conference on Digital Technologies 2014 (DT 2014) and held in July 2014 in Zilina, Slovakia. The organization of this Workshop was mainly possible thanks support of the International Visegrad Fund by Standard Grant No. 21320401 “International Workshop on Biomedical Technologies”.

This book is intended for scientists interested in problems of Biomedical Technologies, for researchers and academic staff, for all dealing with Biomedical and Medical Informatics, for Ph.D. students, etc. Useful information is offered also to IT companies, developers of equipment and/or software for medicine and medical professionals as well.

We thank Jozef Kostolny for his help in the book pre-publishing preparation and technical support.

Radim Bris
Jaroslav Majernik
Krzysztof Pancerz
Elena Zaitseva

Applications of Computational Intelligence in Biomedical
Technology

Bris, R.; Majernik, J.; Pancerz, K.; Zaitseva, E. (Eds.)

2016, VIII, 251 p. 115 illus., 31 illus. in color., Hardcover

ISBN: 978-3-319-19146-1