

# Medical Informatics

## Medical Bioinformatics

Medical bioinformatics can be considered as an interdisciplinary field combining systematic processing of data, information and knowledge in medicine and healthcare. It is a rapidly developing scientific field that uses computers and information technology to gain, store, analyze, communicate and display medical information and knowledge. This aids the understanding and improves accuracy, quickness and reliability of decision making. The main aims of medical bioinformatics are to reduce medical risks, improve patient care and cut costs of treatment.

### SUB FIELDS

#### health care information systems

The European health care information systems can be separated in several sections which all have the common purpose to share data between all participants of the health care system, lower costs, reduce errors and improve patient satisfaction. To provide optimal efficiency in health care processes many disciplines such as informatics, management, law, design and social science work together.. Hospital information systems (HIS), electronic health record (EHR) and picture archiving systems (PACS) are the key terms from this field.

#### Computer Aided Diagnosis

The main aim of Computer Aided Diagnosis (CAD) is to assist healthcare professionals in providing an accurate, cost effective diagnosis within the shortest time possible. CAD systems are used as a decision support to the clinicians.

#### medical image processing

Signal processing- Is the process of obtaining measurements that enable us to have a better understanding of a person's health via physiological instruments. Image Processing processes images using mathematical operations by using signal processing of photos or videos. Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it. Images are also processed as three-dimensional signals where the third-dimension being time or the z-axis.

#### molecular bioinformatics

Molecular Bioinformatics -The Usage of the information processing system (Computer) to investigate the molecular structure of our bodies and genomes, which focuses on keeping, storing and using the information that gathered, but at a deeper biological level. This method gives tools for helping biologically to the human body. The data gathered can be expressed graphically to allow clear trends and links to be made. As a result of updated database new topics of investigation can be highlighted and as such more material can be added to the database. Over time one database can grow and develop to become more compact, detailed and easier to interpret. Bioinformatics is also known as computational biology, is the study of biological systems through computational and statistical models..

## History of Medical bioinformatics

### 1950-1975

The period from 1950-1975 can be classified as "reorganizing and pioneering" stage foreshadowing big technological ideas and achievements. It plays an important role in laying the foundation of the "new emerging information technology" and various applications concerning IT in healthcare and medicine. Typical for that time is the individual and still unrecognized work in small isolated groups of scientists focusing on signal analysis and laboratory applications with main aspects in databases, modelling and simulation of some biological processes, still considering analog computers.

### 1975-1990

The following 15 years (1975-1990) build upon the work and achievements resulting from the previous period. Referred to as "childhood and youth" these years confirmed that in the domain of medicine and healthcare the use of computer applications is inevitable. The establishment of the first national and international alliances together with bioinformatics courses and schools are followed by the foundation of specific conferences trying to systematize the leading areas of medical bioinformatics. The term EHR - "Electronic Health/Medical Record" shaped that period and the development of the generalization of Clinical and Hospital Information Systems accompanied with medical data analysis and protection.

## **1990 - 2000**

On the period of 1990–2000 (or can be called the Consolidation period), increased the idea that computer is an important and crucial tool in the medical world. In this term the subject of studying and learning got into the in most medical schools and several specialized medical/health bioinformatics schools have been created. Also, governments created national strategies for implantation of medical bioinformatics in their states. Another reason is the collapse of communist regime in East European countries, which all the governments of these new countries had the will to become modern, and made them to develop same technology like the western countries.

## **2000 - 2010**

In the new millennium (2000 - 2010), was understood the potential that has this subject. However, lack of success in the field, and support by the governments, by reasons of politics, made hard time to continue the research . Therefore, cooperation between the European countries and USA made to keep the research, which was successful.

## **The future of medical bioinformatics**

In the modern period we can make only opinions and thoughts about the procedures that will happen in the world of medical bioinformatics. Some believe that it is more likely to rethink about their health strategies, as a result of the new trend of this modern world, like integration of the data among people, the amount of data, the increasing number of users of the data etc.

## **References**

[1]<http://www.himss.org/clinical-informatics/medical-informatics> Warner, Sorenson and Bouhaddou, Knowledge Engineering in Health Informatics, 1997 [2] World Health Organisation. Facts about Cancer. Fact sheet #297. February 2006; <http://www.who.int/mediacentre/factsheets/fs297/en/> [3] American Cancer Society. Non-small cell lung cancer survival rate, by stage. Last revised 16th May 2016; <http://www.cancer.org/cancer/lungcancer-non-smallcell/detailedguide/non-small-cell-lung-cancer-survival-rates> [https://en.wikipedia.org/wiki/Health\\_informatics](https://en.wikipedia.org/wiki/Health_informatics) <http://searchhealthit.techtarget.com/definition/Health-IT-information-technology> <http://www.trbimg.com/img-5570b206/turbine/ct-electronic-health-records-perspec-krauthammer-0605-20150604> <http://www.embs.org/about-biomedical-engineering/our-areas-of-research/biomedical-signal-processing/> <http://www.cancer.org/treatment/treatmentsandsideeffects/treatmenttypes/radiation/radiationtherapyprinciples/radiation-therapy-principles-whats-new-in-radiation-therapy>