

Research Proposal

BIG DATA ANALYTICS IN MEDICINE AND HEALTHCARE

To obtain the best services and care for the patients, healthcare organizations in many countries have proposed various models of healthcare information systems. These models for personalized, predictive, participatory and preventive medicine are based on using of electronic health records (EHRs) and huge amounts of complex biomedical data and high-quality – omics data. -omics data are heterogeneous, and very often they are stored in different data formats. The EHRs data can be structured, semi-structured or unstructured; discrete or continuous. Big data in healthcare and medicine refers to these various large and complex data, which they are difficult to analyse and manage with traditional software or hardware. Application of big data analytics provides comprehensive knowledge discovering from the available huge amount of data.

Regarding collection of large amount data, some challenging issues should be considered.

- Obtaining high-throughput – omics data is tied to the cost of experimental measurements.
- Concerning heterogeneity of the data sources, the noise of the experimental – omics data and the variety of the experimental techniques, environmental conditions, biological nature should be considered, before integration of these heterogeneous data and before employing of the data mining methods.
- Different data mining techniques can be applied on these heterogeneous biomedical data sets, such as: anomaly detection, clustering, classification, association rules as well as summarization and visualization of those big data sets.

Despite of these drawbacks of the – omics data, EHRs data are very influenced by the staff who entered the patient's data, which can lead to entering missing values, incorrect data as a result of mistakes, misunderstanding or wrong interpretation of the original data.

High dimensionality of the – omics data means, that there have many more dimensions or features than the number of samples makes data mining techniques to be more challenging task.

Two important issues towards big data in healthcare and medicine are security and privacy of the individuals/patients. All medical data are very sensitive and different countries consider these data as legally possessed by the patients