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Editorial

Prospects of Bioinformatics in Research

You have to imagine a world in which there is this abundance of data, with all of these connected devices generating tons and tons of data. In addition, you are able to reason over the data with new computer science and make your product and service better. What does your business look like then?

-Michael Dell

Bioinformatics is the science of using information to understand biology, as it is the tool that can be used to help us to answer these questions and many others like them. Bioinformatics and management of scientific data are critical to support life science discovery. As the biology is becoming *in silico* due to increasing computational models of proteins, cells and organisms, the biology research will migrate from wet lab to computer, however, requires access to a huge amount of information from across the research community. Much of this information is currently available from publicly accessible data sources and more is being added daily. Unfortunately, scientists feel problems to identify easily and exploit this information because of variety of sementics, interfaces and data formats used by underlined data sources. A single example is enough to explain problems, such as, the hype about mapping the human genome, bioinformatics has achieved buzzword status; the term is being used in a number of ways, depending on who is using it. Strictly speaking, bioinformatics is a subset of the larger field of computational biology, the application of quantitative analytical techniques in modeling biological systems. Providing biologists, geneticists and medical researchers with integrated approach to all of the information they need in consistent format requires overcoming a large number of technical, social and political challenges.

The ultimate goal of bioinformatics is to be able to predict the biological processes in health and disease. In order to acquire such an ability, a thorough understanding of the biological processes is necessary. Therefore, the proximate goal of bioinformatics is to develop such an understanding through analysis and integration of the information obtained on genes and proteins, as well as to develop new tools and continuously improve the existing set of tools for diverse types of analyses. Bioinformatics also aims to develop tools that help in the management of and access to data and information, including improved search and retrieval capability of genomic data and information from various types of databases. Data capture and storage capability; the usability of databases; data analysis; nucleic acid and protein sequence analysis and sequence annotation; structural analysis of proteins and prediction of protein structure, including three-dimensional (3D) structure; protein domain prediction; gene prediction; analysis of functional studies; analysis of gene and protein networks; and phylogenetic analysis are some examples of common bioinformatic-tools.

The analytical tools in bioinformatics are computer algorithms and statistics. Improvements in the capacity of existing tools and the development of new tools are both driven by the need for newer dimensions and greater speed of analysis, as well as the ability to handle an ever-increasing amount of data. However, the success and prediction accuracy of

bioinformatic-analysis ultimately depends on our knowledge of the biology of organisms. Therefore, as more data accumulate in the databases and more information that is scientific becomes available, the progress of science and its prognostic ability will require and hence dictate the development of new bioinformatic-tools. Acquisition of more data and information, storage of all that information, expansion of databases, new strategies needed for analysis, and advances in computing power are all expected to facilitate the analysis of large volumes of data and discovery of new biological principles and insights from which unifying principles of life and its evolution can be discerned. This editorial focus on the application of Bioinformatics among young researchers for broader interest which make easy to analyse data of research.

> *Simple molecules combine to make powerful chemicals, Simple cells combine to make powerful life-forms, Simple electronics combine to make powerful computers*
>
> -Scott Adams

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