CHAPTER 34

MEDICAL SCIENCES
BIOPHYSICS

Doctoral Theses

417.   RAVINDER KUMAR
       Subcellular Localization, Annotation and Classification of Eukaryotic Proteins Using Computational Tools.
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Abstract

The identification of the unexplored functions/properties of a protein has been one of the most challenging problems in the field of biological science. The key factor that describes the function of a protein is its annotation, subcellular localization and classification. This information can help in understanding and exploring the function, structure, and probable interacting partners of a protein. Since proteins, located in their respective cellular and subcellular compartments, are involved in their assigned cellular processes, like apoptosis, cell cycle control, cell division, morphogenesis etc., mis-localization of proteins may lead to several devastating states which further may result in cardiovascular disease, neurodegenerative disease, Alzheimer's disease, cancer etc. The function of a protein is also closely linked to the class to which it belongs. Therefore, the prediction and annotation of subcellular localization and protein classification can be considered as the pivot of modern biology. In the present thesis the main objective of the described research work is annotation of eukaryotic proteins in terms of its subcellular localization and classification. The thesis describes novel protein localization and classification prediction methods, which were developed using various machine-learning tools for this purpose. The thesis also describes the way to reduce the classifier bias towards the majority class due to the data imbalance. The thesis also includes the development of web based prediction methods that can be freely accessible for the researchers.

Contents

1. Introduction and review of literature. 2. Importance of protein subcellular localization, annotation and classification. 3. Results and discussion. 4. Summary. 5. Future propects. 6. Bibliography and annexures.