

Preface

Bioinformatics, a multidisciplinary subject, has established itself as a full-fledged discipline that provides scientific tools and newer insights in the knowledge discovery process in the front-line research areas and has become a growth engine in Biotechnology. It provides a better understanding of biomolecules, which is applicable at all levels of the living world starting from atomic and molecular levels to the higher complex of systems biology. The discovery of biomolecular sequences and their relation to the functioning of organisms have created a number of challenging problems for computer scientists, and led to emerging interdisciplinary field of Bioinformatics, Computational Biology, Genomics and Proteomics studies. Bioinformatics (Computational Biology) is a relatively new field that applies computer science and information technology to biology. In recent years, the discipline of Bioinformatics has allowed the biologist to make full use of the advances in computer sciences and computational statistics for advancing the biological data. Researchers in the Life Sciences generate, collect and analyze an increasing number of different types of scientific data, DNA, RNA and protein sequences, in situ and microarray gene expression including 3D protein structures and biological pathways.

This book aims at providing information on Bioinformatics at various levels to the post-graduate students and research scholars studying in the areas of Biotechnology/Environmental Sciences/Life Sciences and other applied and allied biosciences and technologies. The chapters included in the book cover from introductory to advanced aspects, including applications of various documented research work and specific case studies related to Bioinformatics. The topics covered under Bioinformatics in Life and Environmental Sciences include: Role of Computers in Bioinformatics, Comparative Genomics and Proteomics, Bioinformatics – Structural Biology Interface, Statistical Mining of Gene and Protein Databanks, Building Bioinformatics Database Systems, Bio-sequence signatures using Chaos Game Representation, data mining for Bioinformatics, Environmental clean up approach using Bioinformatics in Bioremediation and Nanotechnology in relation to Bioinformatics. This book will also be of immense value to the readers of different backgrounds such as engineers, scientists, consultants and policy makers for industry, government, academics and social and private

organizations. Bioinformatics is an innovative field in the area of computer science and information technology for interpretation and compilation of data and gives the opening for advanced research and its applications in biological sciences.

The book has contributions from expert academicians, scientists from Universities, Institutes, IIT, BARC and personnel from research organizations and industries. This publication is an attempt to provide information on Bioinformatics and its application in life and environmental sciences.

I am grateful to Honourable Vijay Khole, the Vice Chancellor of University of Mumbai for having provided facilities and encouragement. It gives me immense pleasure to express deep gratitude to my colleagues and friends who have helped me directly or indirectly in completing this manuscript and also to my family in particular my wife Dr. (Mrs.) Kalpana and children Jaya, Jyoti and Vinay and brothers Dilip and Kishor for their constant support and encouragement. The technical assistance provided by my PhD students is also greatly acknowledged.

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