METHODS IN COMPUTATIONAL BIOLOGY AND BIOCHEMISTRY

Volume 1

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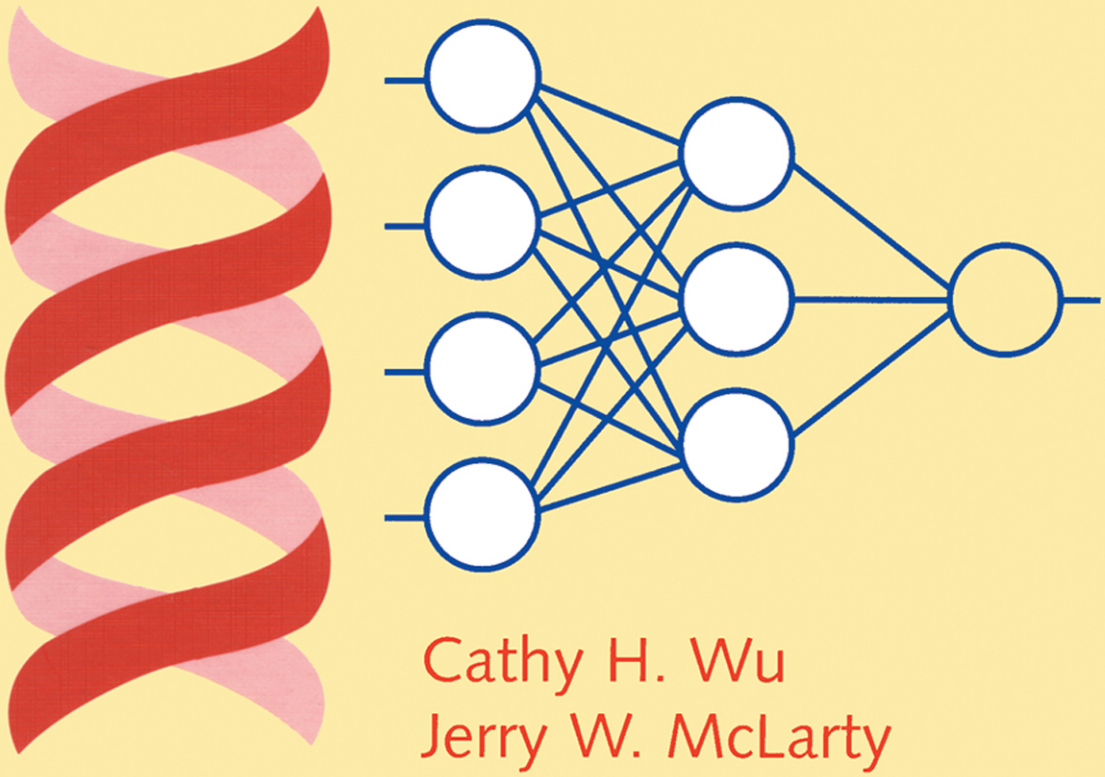
Neural Networks and Genome Informatics



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Neural Networks and Genome Informatics

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This book is dedicated to:

My late father, my husband, daughter, and son, for their inspirations. – CHW.

The late Allen B. Cohen, whose passion for science, generous spirit, inherent fairness and integrity and gentle leadership helped create a wonderfully productive environment in which to work. - JWM.

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Preface

The resurgence of interest in artificial neural networks fortunately coincided with the emergence of new technology in molecular biology and the explosion of information about the genomes of humans and other species. Many important problems in genome informatics have been successfully addressed with artificial neural networks, and a vast literature has developed within the last two decades. The purpose of this book is to introduce molecular biologists and other informatics scientists to artificial neural network technology and terminology; to review the major neural network applications in genome informatics; to address the important issues in applying neural network technology to informatics; and to identify significant remaining problems.

Part I of this book gives an overview of applications of artificial neural network technology. Part II contains a tutorial introduction to the most commonly used neural network architectures, network training methods, and applications and limitations of the different architectures. Part III reviews the current state of the art of neural network applications to genome informatics and discusses crucial issues such as input variable selection and preprocessing. Finally, Part IV identifies some of the remaining issues and future directions for research, including integration of statistical rigor into neural network applications, hybrid systems and knowledge extraction.

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Georgetown and Tyler, May1999

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