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Autore	Keedwell Edward
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Nota di contenuto	Intelligent Bioinformatics; Contents; Preface; Acknowledgement; PART 1 INTRODUCTION; 1 Introduction to the Basics of Molecular Biology; 1.1 Basic cell architecture; 1.2 The structure, content and scale of deoxyribonucleic acid (DNA); 1.3 History of the human genome; 1.4 Genes and proteins; 1.5 Current knowledge and the 'central dogma'; 1.6 Why proteins are important; 1.7 Gene and cell regulation; 1.8 When cell regulation goes wrong; 1.9 So, what is bioinformatics?; 1.10 Summary of chapter; 1.11 Further reading; 2 Introduction to Problems and Challenges in Bioinformatics; 2.1 Introduction 2.2 Genome2.3 Transcriptome; 2.4 Proteome; 2.5 Interference technology, viruses and the immune system; 2.6 Summary of chapter; 2.7 Further reading; 3 Introduction to Artificial Intelligence and Computer Science; 3.1 Introduction to search; 3.2 Search algorithms; 3.3 Heuristic search methods; 3.4 Optimal search strategies; 3.5 Problems with search techniques; 3.6 Complexity of search; 3.7 Use of graphs in bioinformatics; 3.8 Grammars, languages and automata; 3.9 Classes of problems; 3.10 Summary of chapter; 3.11 Further reading;

PART 2 CURRENT TECHNIQUES; 4 Probabilistic Approaches
4.1 Introduction to probability4.2 Bayes' Theorem; 4.3 Bayesian networks; 4.4 Markov networks; 4.5 Summary of chapter; 4.6 References; 5 Nearest Neighbour and Clustering Approaches; 5.1 Introduction; 5.2 Nearest neighbour method; 5.3 Nearest neighbour approach for secondary structure protein folding prediction; 5.4 Clustering; 5.5 Advanced clustering techniques; 5.6 Application guidelines; 5.7 Summary of chapter; 5.8 References; 6 Identification (Decision) Trees; 6.1 Method; 6.2 Gain criterion; 6.3 Over fitting and pruning; 6.4 Application guidelines; 6.5 Bioinformatics applications
6.6 Background6.7 Summary of chapter; 6.8 References; 7 Neural Networks; 7.1 Method; 7.2 Application guidelines; 7.3 Bioinformatics applications; 7.4 Background; 7.5 Summary of chapter; 7.6 References; 8 Genetic Algorithms; 8.1 Single-objective genetic algorithms - method; 8.2 Single-objective genetic algorithms - example; 8.3 Multi-objective genetic algorithms - method; 8.4 Application guidelines; 8.5 Genetic algorithms - bioinformatics applications; 8.6 Summary of chapter; 8.7 References and further reading; PART 3 FUTURE TECHNIQUES; 9 Genetic Programming; 9.1 Method
9.2 Application guidelines9.3 Bioinformatics applications; 9.4 Background; 9.5 Summary of chapter; 9.6 References; 10 Cellular Automata; 10.1 Method; 10.2 Application guidelines; 10.3 Bioinformatics applications; 10.4 Background; 10.5 Summary of chapter; 10.6 References and further reading; 11 Hybrid Methods; 11.1 Method; 11.2 Neural-genetic algorithm for analysing gene expression data; 11.3 Genetic algorithm and k nearest neighbour hybrid for biochemistry solvation; 11.4 Genetic programming neural networks for determining gene - gene interactions in epidemiology; 11.5 Application guidelines
11.6 Conclusions

Sommario/riassunto

Bioinformatics is contributing to some of the most important advances in medicine and biology. At the forefront of this exciting new subject are techniques known as artificial intelligence which are inspired by the way in which nature solves the problems it faces. This book provides a unique insight into the complex problems of bioinformatics and the innovative solutions which make up 'intelligent bioinformatics'. Intelligent Bioinformatics requires only rudimentary knowledge of biology, bioinformatics or computer science and is aimed at interested readers regardless of discipl