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Nota di contenuto	Front Cover; Concepts in Artificial Intelligence; Copyright Page; Contents; Preface; Overview of Volume 2; Chapter 1. Introduction; 1.1 Artificial intelligence in engineering; 1.2 Strong AI, weak AI and cognitive science; 1.3 Why build intelligence into machines?; 1.4 How much intelligence can be built into machines?; 1.5 What is artificial intelligence?; 1.6 How is AI applied to engineering in practice?; 1.7 The principles behind the applications; Chapter 2. Pattern recognition; 2.1 Introduction; 2.2 Theoretical foundations; 2.3 Relational patterns and graph matching 2.4 Hierarchical structure in pattern recognition 2.5 Data transformation in pattern recognition; 2.6 Pattern recognition using multidimensional data; 2.7 Multiple classifications and fuzzy sets; 2.8 Errors: non-recognition versus misclassification; 2.9 Rigorous procedures for training pattern recognizers; 2.10 Conclusion; Chapter 3. Search; 3.1 Introduction; 3.2 Tree search; 3.3 Calculus-based search;

3.4 Probabilistic search; 3.5 Conclusion; Chapter 4. Neural networks; 4.1 Introduction; 4.2 The artificial neural unit; 4.3 Pattern classification; 4.4 Feed forward networks
4.5 Learning in neural networks 4.6 Feedback networks; 4.7 Uses of the multi-layer perception; 4.8 Conclusion; Chapter 5. Scheduling; 5.1 Introduction; 5.2 Representation in scheduling; 5.3 Graphs and networks for representing scheduling problems; 5.4 Shortest paths; 5.5 Critical path analysis; 5.6 Critical path activity scheduling; 5.7 The 'travelling salesman problem'; 5.8 Intelligent scheduling; 5.9 Conclusion; Chapter 6. Reasoning; 6.1 introduction; 6.2 Reasoning with certainty; 6.3 Reasoning with uncertainty; 6.4 Conclusion; Chapter 7. Rule-based systems
7.1 Knowledge-based, rule-based and expert systems 7.2 Implementation; 7.3 Confidence levels and fuzzy rules; 7.4 Programming language and rule-based system shells; 7.5 Conclusion; Chapter 8. Learning; 8.1 Introduction; 8.2 Learning by memory; 8.3 Learning by updating parameters; 8.4 learning during execution using Bayesian updating; 8.5 learning from examples; 8.6 learning by analogy; 8.7 Learning by discovery; 8.8 Conclusion; Chapter 9. Intelligent control; 9.1 Introduction; 9.2 The broom-balancer; 9.3 Classical solution; 9.4 Neural network solution; 9.5 Genetic algorithms; 9.6 Fuzzy rules
9.7 Hierarchical control of complex systems 9.8 Conclusion: principles for intelligent control design; Chapter 10. Computer vision; 10.1 Introduction; 10.2 Abstracting information from digital images; 10.3 The nature of digital images; 10.4 Computer vision versus computer graphics; 10.5 Object recognition and measurement; 10.6 A summary of the basic techniques in computer vision; 10.7 A hierarchical architecture for computer vision; 10.8 Conclusion: computer vision in intelligent machines; Chapter 11. Integration; 11.1 An introduction to blackboard systems
11.2 The blackboard system as a development environment

Sommario/riassunto

Mechatronics is the fusion of mechanics and electronics in the design of intelligent machines. This textbook is concerned with the concepts and techniques of artificial intelligence needed for the design of machines with advanced intelligent behaviour. It explores the topics of pattern recognition, neural networks, scheduling, reasoning, fuzzy logic, rule-based systems, machine learning, control and computer vision. This student guide shows how fifty years of research into artificial intelligence (AI) have borne fruit in the design of better and more intelligent machines. The twin o
