Neural Networks: Computational Models and Applications

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Preface

Artificial neural networks, or simply called neural networks, refer to the various mathematical models of human brain functions such as perception, computation and memory. It is a fascinating scientific challenge of our time to understand how the human brain works. Modeling neural networks facilitates us in investigating the information processing occurred in brain in a mathematical or computational manner. On this manifold, the complexity and capability of modeled neural networks rely on our present understanding of biological neural systems. On the other hand, neural networks provide efficient computation methods in making intelligent machines in multidisciplinary fields, e.g., computational intelligence, robotics and computer vision.

In the past two decades, research in neural networks has witnessed a great deal of accomplishments in the areas of theoretical analysis, mathematical modeling and engineering application. This book does not intend to cover all the advances in all aspects, and for it is formidable even in attempting to do so. Significant efforts are devoted to present the recent discoveries that the authors have made mainly in feedforward neural networks, recurrent networks and bio-inspired recurrent network studies. The covered topics include learning algorithm, neuro-dynamics analysis, optimization and sensory information processing, etc. In writing, the authors especially hope the book to be helpful for the readers getting familiar with general methodologies of research in the neural network areas, and to inspire new ideas in the concerned topics.

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