

# Preface

This book presents a number of applications of computational intelligence paradigms, with a focus on economic and financial decision-making. In this context, the book includes tools like self-organizing maps (SOM) and their variants, elastic maps and elements of complex network theory.

This book on computational intelligence is thought for both students at graduate level and practitioners dealing with practical application of computational intelligence, and it does not necessarily require a deeper background in artificial intelligence and mathematics. In an introductory perspective, in fact, the first part of the book is devoted to provide basic notions and mathematical foundation for the computational tools that will be used in the second part of the same book.

The intention of the book is not to provide thorough attention to all computational intelligence paradigms and algorithms, but to give an overview of the most popular and frequently used models, for these models are provided with a number of applications with discussion. In addition the book provides insights into many new developments to tempt the interested reader. In this perspective the material can be useful to graduate students and researchers who want a broader view of various paradigms of computational intelligence.

The book is organized into two parts. Part I provides a short introduction to the different paradigms of computational intelligence including: self-organizing maps (Chap. 1), complex networks (Chap. 2), and elastic maps (Chap. 3). Part II covers the application of different paradigms, and it can be read in any order. The following topics are included: Chapter 4 introduces the use of SOM variants for the simulation of market price modeling; Chapter 5 analyzes the use of elastic maps to define the risk profile of financial investments; Chapter 6 discusses how self-organizing maps and their enhancements can be helpful to identify hubs and communities in financial markets; Chapter 7 employs network paradigms to study the financial balance sheets of health care providers; Chapter 8 focuses on an application of self-organizing maps to explore the behavior of a population's mortality rate and life expectancy. Finally, Chap. 9 uses SOM to discover a firm's

clusters, analyzing data from micro-territories inside a city's boundaries, trying to exploit possible development policies.

As a final remark, it is necessary to thank a number of people who have helped to produce this book. First of all, I am deeply indebted to Professor Lakhmi Jain to whom I address very warm thanks, for trusting in me and giving this challenging opportunity. Also, many thanks to my parents, Vincenzo and Franca, my husband Stefano, and my son Antonio, without their support and love it would have not been possible to write this book.

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