

Preface

Decision making in business, economics, and social sciences is omnipresent yet at the same time it becomes highly difficult to comprehend and model human mental processes. In general, in spite of their diversity the decision problems exhibit a number of highly visible features:

- the objective of the decision problem is ambiguous;
- the problem structure describing the relationship among sub-problems might be loosely specified;
- preference relations are not explicitly stated;
- knowledge of the organizational environments is uncertain;
- available information is often imprecise, uncertain or there might be an acute lack of information; and
- one-time decision models are needed when dealing with unrepeated problems with partially available information.

The classical decision theories, such as the expected utility (EU) theory of von Neumann and Morgenstern, and the subjective expected utility (SEU) theory of Savage cannot fully address the complexity of the problems and still a number of open critical questions remain that need to be thoroughly addressed.

This edited volume aims to offer effective methods to deal with different types of uncertainty inherently existing in decision problems and deliver comprehensive decision frameworks to handle different decision scenarios under various facets of uncertainty. The objective is to bring forward diverse decision-making models, which help use effectively the explicit and tacit knowledge and intuition, model perceptions and preferences in a more human-oriented style, and form decisions which become more in rapport with a human line of thinking.

The volume presents original approaches and delivers new results in fundamentals and applications related to human-centered decision making approaches to business, economics, and social systems. It includes multi-criteria (multiattribute) decision making, decision making with prospect theory, decision making with incomplete probabilistic information, granular models of decision making and decision making realized with the use of non-additive measures. New emerging decision theories being presented as along with a wide spectrum of ongoing research make the book valuable to all interested in the field of advanced decision making.

An overall concise characterization of the objectives of this edited volume is captured by highlighting several focal points:

- Systematic exposure of the concepts, design methodologies, and detailed algorithms. This is a self-explanatory feature of the volume; the systematic, well-organized flow of the presentation of the ideas is directly supported by a way in which the material is structured.
- Individual chapters with clearly delineated agenda and well-defined focus and additional reading material available via carefully structured references.
- Self-containment. The intent is to provide a material, which is self-contained and provides the reader with all necessary prerequisites and, if necessary, augments some parts of the material with a step-by-step explanation. More advanced concepts are supported by a significant amount of illustrative numeric material. Furthermore several detailed application scenarios are offered to motivate the reader and make some abstract concepts more tangible and easy to follow.

This book is aimed at a broad audience of researchers and practitioners. The areas of particular interest include industrial engineering, informatics, business, economics, social systems. The material could be also of interest to those involved in operations research, management, and various branches of engineering. A prudently struck balance between the theoretical studies and applications makes the material suitable for researchers as well as graduate students especially in courses such as information, computer sciences, psychology, cognitive science, economics, system engineering, operation research and management science, risk management, public and social policy.

We would like to take this opportunity to express our sincere thanks to the authors for reporting on their innovative research and sharing their insights into the area. The reviewers deserve our thanks for their constructive input. We highly appreciate a continuous support and encouragement from the Editor-in-Chief, Prof. Janusz Kacprzyk whose leadership and vision makes this book series a unique vehicle to disseminate the most recent, highly relevant, and far-fetching publications in the domain of Computational Intelligence and intelligent systems.

We hope that the readers will find this volume of genuine interest and the research reported here will help foster further progress in research, education, and numerous practical endeavors.

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