

Preface

Since its inception, data mining has been described as “the nontrivial extraction of implicit, previously unknown, and potentially useful information from data”. It was usually used by business intelligence organizations and analysts to extract useful information from databases. But increasing applications of data mining have been found in other areas to extract information from the enormous data sets generated by modern experimental and observational methods. However, due to the intractable computational complexity of many existing data mining techniques for real world problems, techniques that are tolerable to imprecision, uncertainty, and approximation are very desirable.

In contrast to conventional hard computing, the basic ideas underlying soft computing is to exploit the tolerance for imprecision, uncertainty, partial truth, and approximation to achieve tractability, robustness and low solution cost. At this juncture, the principal constituents of soft computing are Fuzzy Logic (FL), Neural Computing (NC), Evolutionary Computation (EC), Genetic Algorithms (GA), Swarm Intelligence (SI), Machine Learning (ML) and Probabilistic Reasoning (PR), with the latter subsuming belief networks, chaos theory and parts of learning theory. It has been demonstrated in many areas that the soft computing methodologies are complementary to many existing theories and technologies.

As such, the objective of this book is to present an international forum for the synergy of new developments from two different research disciplines. It is hoped that through the fusion of diverse techniques and applications, new and innovative ideas will be stimulated and shared.

This book contains nineteen chapters written by leading experts from researchers of soft computing and data mining communities as well as practitioners from medical science, space and geo-information science, innovative life science, and traffic and transportation engineering. The book is organized into three sections. The first section shows four innovative works that give a flavor of how soft computation and data mining can be integrated for various applications. The second section compiles nine new soft computation techniques for different real world applications, with a leading chapter of survey to classify current computational intelligence technologies. The third section is devoted to five real life problems that can be addressed by the proposed new data mining techniques. Since the chapters are written by many researchers with different backgrounds around the world, the topics and content covered in this book provides insights which are not easily accessible otherwise.

While integrating advanced technologies clearly falls in the emerging category because of recency, it is now beginning to reach popularity and more books on this topic becomes desirable. It is hoped that this book will provide a reference to researchers, practitioners, students in both soft computing and data mining communities and others, for the benefit of more creative ideas.

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