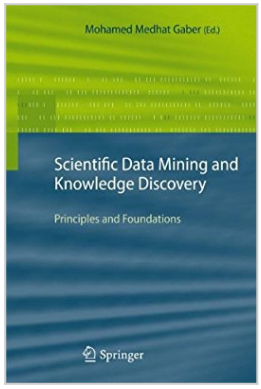

Scientific Data Mining and Knowledge Discovery: Principles and Foundations

From Springer

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Mohamed Medhat Gaber “It is not my aim to surprise or shock you – but the simplest way I can summarise is to say that there are now in the world machines that think, that learn and that create. Moreover, their ability to do these things is going to increase rapidly until – in a visible future – the range of problems they can handle will be coextensive with the range to which the human mind has been applied” by Herbert A. Simon (1916-2001) 1Overview This book suits both graduate students and researchers with a focus on discovering knowledge from scienti c data. The use of computational power for data analysis and knowledge discovery in scienti c disciplines has found its roots with the re- lution of high-performance computing systems. Computational science in physics, chemistry, and biology represents the rst step towards automation of data analysis tasks. The rational behind the developmentof computationalscience in different - eas was automating mathematical operations performed in those areas. There was no attention paid to the scienti c discovery process. Automated Scienti c Disc- ery (ASD) [1–3] represents the second natural step. ASD attempted to automate the process of theory discovery supported by studies in philosophy of science and cognitive sciences. Although early research articles have shown great successes, the area has not evolved due to many reasons. The most important reason was the lack of interaction between scientists and the automating systems.

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Editorial Review

From the Back Cover

With the evolution in data storage, large databases have stimulated researchers from many areas, especially machine learning and statistics, to adopt and develop new techniques for data analysis in different fields of science. In particular, there have been notable successes in the use of statistical, computational, and machine learning techniques to discover scientific knowledge in the fields of biology, chemistry, physics, and astronomy. With the recent advances in ontologies and knowledge representation, automated scientific discovery (ASD) has further, great prospects in the future.

The contributions in this book provide the reader with a complete view of the different tools used in the analysis of data for scientific discovery. Gaber has organized the presentation into four parts: Part I provides the reader with the necessary background in the disciplines on which scientific data mining and knowledge discovery are based. Part II details applications of computational methods used in geospatial, chemical, and bioinformatics applications. Part III is about data mining applications in geosciences, chemistry, and physics. Finally, in Part IV, future trends and directions for research are explained.

The book serves as a starting point for students and researchers interested in this multidisciplinary field. It offers both an overview of the state of the art and lists areas and open issues for future research and development.

Users Review

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Sherman Etheridge:

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