

Mohamed Medhat Gaber (Ed.)

Scientific Data Mining and Knowledge Discovery

Principles and Foundations



Springer

Contents

| | |
|---|-----|
| Introduction | 1 |
| Mohamed Medhat Gaber | |
| | |
| Part I Background | |
| | |
| Machine Learning | 7 |
| Achim Hoffmann and Ashesh Mahidadia | |
| | |
| Statistical Inference | 53 |
| Shahjahan Khan | |
| | |
| The Philosophy of Science and its relation to Machine Learning | 77 |
| Jon Williamson | |
| | |
| Concept Formation in Scientific Knowledge Discovery from a Constructivist View | 91 |
| Wei Peng and John S. Gero | |
| | |
| Knowledge Representation and Ontologies | 111 |
| Stephan Grimm | |
| | |
| Part II Computational Science | |
| | |
| Spatial Techniques | 141 |
| Nafaa Jabeur and Nabil Sahli | |
| | |
| Computational Chemistry | 173 |
| Hassan Safouhi and Ahmed Bouferguene | |
| | |
| String Mining in Bioinformatics | 207 |
| Mohamed Abouelhoda and Moustafa Ghanem | |

Part III Data Mining and Knowledge Discovery

Knowledge Discovery and Reasoning in Geospatial

Applications251

Nabil Sahli and Nafaa Jabeur

Data Mining and Discovery of Chemical Knowledge269

Lu Wencong

Data Mining and Discovery of Astronomical Knowledge319

Ghazi Al-Naymat

Part IV Future Trends

On-board Data Mining345

Steve Tanner, Cara Stein, and Sara J. Graves

Data Streams: An Overview and Scientific Applications377

Charu C. Aggarwal

Index399