

Foreword

The confluence of communication systems and computing power has enabled industry to collect and store vast amounts of data. Data mining and knowledge discovery methods and tools are the only real way to take full advantage of what those data hold. The lack of available materials and research in data mining as it is applied to the manufacturing and industrial enterprise only came to my attention in the spring of 2004.

At that time, I was Program Officer of the Manufacturing Enterprise Systems program in the Division of Design, Manufacture and Industrial Innovation at the National Science Foundation (NSF), Arlington, Virginia, USA. The two editors of this book, Drs. Liao and Triantaphyllou, proposed a Workshop on *Data Mining in Manufacturing Systems* to be held in conjunction with the Mathematics and Machine Learning (MML) Conference in Como, Italy, June 23-25, 2004 (<http://www.mold.polimi.it/MML/Location.htm>). At that point, I had funded two or three proposals in the area.

The workshop highlighted for me the need for a more focused effort in data mining research in applications of enterprise design and control, reliability, nano-manufacturing, scheduling, and technologies to reduce the environmental impacts of manufacturing. The trend in modeling and analysis of the manufacturing enterprise is becoming increasingly complex. The interaction between an enterprise and other intersecting systems significantly adds to the difficulty of this task. Mining data related to these interactions and relationships is an essential aspect of the process of understanding and modeling. This workshop also emphasized the need for expanding the community of users who are knowledgeable

and have the capability of applying the tools and techniques of data mining.

I would like to congratulate the two editors of this book for filling a critical gap. They have brought together some of the most prominent researchers in data mining from diverse backgrounds to author a book for researchers and practitioners alike. This volume covers traditional topics and algorithms as well as the latest advances. It contains a rich selection of examples ranging from the identification of credit risk to maintenance scheduling. The theoretical developments and the applications discussed in this book cover all aspects of modern enterprises which have to compete in a highly dynamic and global environment.

For those who teach graduate courses in data mining, I believe that this book will become one of the most widely adopted texts in the field, especially for engineering, business and computer science majors. It can also be very valuable for anyone who wishes to better understand some of the most critical aspects of the mining of enterprise data.

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