Foreword

Graphical models for handling uncertainty have been around for more than two decades. Most notably *Bayesian networks* have been widely known and applied. The extensive development of the theory of Bayesian networks has created new ways of specifying models for rational decision making, and over the past two decades we have also witnessed a rapid development of the theory of graphical models for sequential decision making.

Several excellent textbooks cover Bayesian networks. Focus in these books is belief updating in Bayesian networks and learning of models. However, I have for many years been missing a graduate textbook, which systematically introduces the concepts and techniques of graphical models for sequential decision making.

This book serves this purpose. Not only does it introduce the basic theory and concepts, but it also contains sections indicating new research directions as well as examples of real world decision models.

The two main obstacles for successful application of graphical decision models are complexity and insufficient insight in the domain for establishing a model. The book presents several approaches to overcoming these obstacles.

For the domain expert wanting to exploit graphical decision models for constructing a specific decision support system, this book is a useful hand book of the theory as well as of ideas, which may help establishing appropriate models.

To the young researcher: this book will give you a firm ground for working with graphical decision models. Read the book, and you will realize that the story is not over. There are lots of challenges waiting for you, and the book provides you an excellent starting point for en exiting journey into the science of graphical decision models.

Finn V. Jensen
Aalborg University, Denmark

Finn Verner Jensen *is Professor, PhD and Dr. Techn, and Knight of Dannebrog at the Department of Computer Science, Aalborg University in Denmark. Originally from Tnder, Denmark, he has cultivated his scientific interests since 1988, including probabilistic graphical models (PGMs) for decision making and diagnosis and data mining. He has 64 scientific publications (with academic referee) over the last ten years and three monographs on Bayesian networks and decision graphs (Springer-Verlag, New York). He was the co-designer of HUGIN, the first shell for Bayesian Networks and has achieved an H-index (Googlescholar) of 32. His industrial accomplishments include contributing to four patents which form the commercial basis for Dezide A/S, as well the before mentioned HUGIN. He is currently leader of three major research programs at Aalborg University, including the Machine Intelligence group at Aalborg University. His academic distinctions include being the Chair of the Board of Directors for The Association for Uncertainty in Artificial Intelligence (2005-2008), the Area editor for The International Journal of Approximate Reasoning and General Chair and co-chair of seven international conferences.*