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Decision and Inhibitory Trees and Rules for Decision Tables with Many-valued Decisions

Springer

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To our families

Preface

This book is devoted to the study of decision and inhibitory trees and rules for decision tables with many-valued decisions. In conventional decision tables, a single decision is associated with each row. However, situations in which a set of decisions is associated with each row are often possible. For some decision tables, inhibitory trees and rules can represent more information than decision trees and rules.

We consider various examples of problems and decision tables with many-valued decisions and discuss the difference between decision and inhibitory trees and rules for decision tables with many-valued decisions. We mention without proofs some relatively simple results obtained earlier for decision trees, tests, rules, and rule systems for binary decision tables with many-valued decisions. We generalize these results to the inhibitory trees, tests, rules, and rule systems.

We extend the multi-stage and bi-criteria optimization approaches to the case of decision trees and rules for decision tables with many-valued decisions and then generalize them to the case of inhibitory trees and rules. The applications of these techniques include the study of totally optimal (optimal relative to a number of criteria simultaneously) decision and inhibitory trees and rules, the comparison of greedy heuristics for tree and rule construction as single-criterion and bi-criteria optimization algorithms, the development of the restricted multi-pruning approach used in classification and knowledge representation, etc.

We also study the time complexity of decision and inhibitory trees and rule systems over arbitrary sets of attributes represented by information systems.

The results presented in this book can be useful for researchers in data mining, knowledge discovery, and machine learning, especially those who work in rough set theory, test theory, and logical analysis of data. The book can be used for the creation of courses for graduate students.

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Contents