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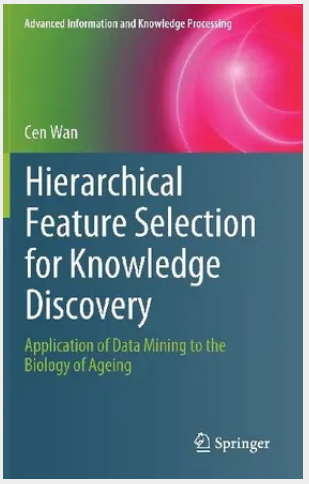
Hierarchical Feature Selection for Knowledge Discovery

Application of Data Mining to the Biology of Ageing



This book is the first work that systematically describes the procedure of data mining and knowledge discovery on Bioinformatics databases by using the state-of-the-art hierarchical feature selection algorithms. The novelties of this book are three-fold. To begin with, this book discusses the hierarchical feature selection in depth, which is generally a novel research area in Data Mining/Machine Learning. Seven different state-of-the-art hierarchical feature selection algorithms are discussed and evaluated by working with four types of interpretable classification algorithms (i.e. three types of Bayesian network classification algorithms and the k-nearest neighbours classification algorithm). Moreover, this book discusses the application of those hierarchical feature selection algorithms on the well-known Gene Ontology database, where the entries (terms) are hierarchically structured. Gene Ontology database that unifies the representations of gene and gene products annotation providesthe resource for mining valuable knowledge about certain biological research topics, such as the Biology of Ageing. Furthermore, this book discusses the mined biological patterns by the hierarchical feature selection algorithms relevant to the ageing-associated genes. Those patterns reveal the potential ageing-associated factors that inspire future research directions for the Biology of Ageing research.

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