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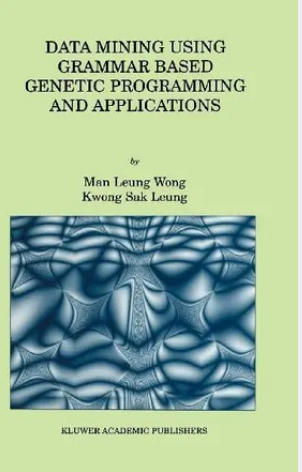
Data Mining Using Grammar Based Genetic Programming and Applications



Data mining involves the non-trivial extraction of implicit, previously unknown, and potentially useful information from databases. Genetic Programming (GP) and Inductive Logic Programming (ILP) are two of the approaches for data mining. This book first sets the necessary backgrounds for the reader, including an overview of data mining, evolutionary algorithms and inductive logic programming. It then describes a framework, called GGP (Generic Genetic Programming), that integrates GP and ILP based on a formalism of logic grammars. The formalism is powerful enough to represent context-sensitive information and domain-dependent knowledge. This knowledge can be used to accelerate the learning speed and/or improve the quality of the knowledge induced.
A grammar-based genetic programming system called LOGENPRO (The LOGic grammar based GENetic PROgramming system) is detailed and tested on many problems in data mining. It is found that LOGENPRO outperforms some ILP systems. We have also illustrated how to apply LOGENPRO to emulate Automatically Defined Functions (ADFs) to discover problem representation primitives automatically. By employing various knowledge about the problem being solved, LOGENPRO can find a solution much faster than ADFs and the computation required by LOGENPRO is much smaller than that of ADFs. Moreover, LOGENPRO can emulate the effects of Strongly Type Genetic Programming and ADFs simultaneously and effortlessly.
is appropriate for researchers, practitioners and clinicians interested in genetic programming, data mining, and the extraction of data from databases.

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