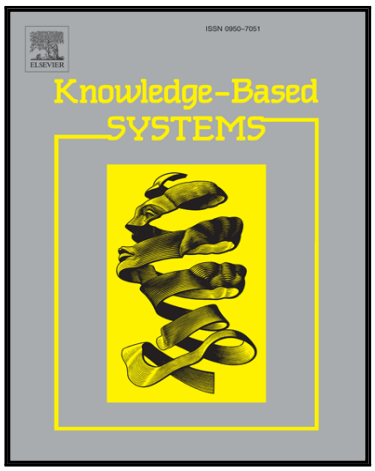

A variable precision grey-based multi-granulation rough set model and attribute reduction

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Abstract

Exploring rough set theory in the viewpoint of multi-granulation gradually attracts scholars attention in recent years. To handle uncertainty problems with grey information, in this paper, we devise a variable precision grey multi-granulation rough set (VPG-MGRS) by combining with grey system theory and multi-granulation rough set. We utilize the grey relational relation for further establishing multiple granular structures and then adopt a threshold to control the number of condition satisfied. After discussing several important properties of VPG-MGRS, we discover that the proposed VPG-MGRS model is a generalized classical MGRS. Meanwhile, we redefine the significance measures of attribute based on VPG-MGRS for attribute reduction. Last but not least, theoretical studies and numerical experiments have demonstrated that the VPG-MRGS-based attribute reduction algorithm is of feasibility and effectivity in handling uncertainty problems with grey information and provides a new technique for knowledge discovery, and the VPG-MGRS model enlarges the application fields of MGRS.

Keywords: Variable precision; Grey system theory; Grey relational class; Multi-granulation rough set; Attribute reduction

1. Introduction

As an effective technique for coping with vagueness and uncertainty in data analysis, rough set theory[1, 2] has been widely applied in numerous fields, including knowledge discovery, feature selection, decision analysis, conflict anal-

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