

ON ROUGH SETS BASED RULE GENERATION FROM TABLES

HIROSHI SAKAI

Department of Mathematics and Computer Aided Sciences
Faculty of Engineering, Kyushu Institute of Technology
Tobata, Kitakyushu 804, Japan
sakai@mns.kyutech.ac.jp

MICHINORI NAKATA

Faculty of Management and Information Science
Josai International University
Gumyo, Togane, Chiba 283, Japan
nakatam@ieee.org

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ABSTRACT. *Rough sets based methods to obtain rules from tables, which are defined by Deterministic Information Systems (DISs) and Non-deterministic Information Systems (NISs), are presented. NISs have been known as systems for handling information incompleteness, and logic for incomplete information has mainly been investigated. In this paper, previous work on rough sets based rule generation is surveyed. Then, some methods, which generate rules not only from DISs but also from NISs, are proposed. These methods are implemented on a workstation in prolog, and real executions of implemented programs are shown.*

Keywords: Rough sets, Rule generation, Non-deterministic Information systems, Soft computing, Data mining tools

1. Introduction. Rough set theory is seen as a mathematical foundation of soft computing. This theory usually handles tables with deterministic information. Many applications of this theory to rule generation, machine learning and knowledge discovery have been presented [1-10].

We follow rule generation in *DISs* [5-11] and propose rule generation in *NISs*. *NISs* were proposed by Pawlak, Orłowska and Lipski in order to handle information incompleteness in *DISs*, like null values, unknown values, missing values, etc. From the beginning of the research on incomplete information, *NISs* have been recognized to be the most important framework for handling information incompleteness [12-18]. Therefore, rule generation in *NISs* will also be an important framework for rule generation from incomplete information. Rule generation in *NISs* is also a paradigm for data mining from uncertain data.

In *NISs*, the concept of modality was introduced, and an axiomatization of logic has mainly been studied [13-18]. Most of work related to *NISs* is research on logic with modal operators, and there exists less work for handling *NISs* on computers. Rules in a *NIS* are defined by means of all *derived DISs* from a *NIS*. Namely, rules are defined in the manner of *possible world semantics* [14,15]. In every *NIS*, the number of all derived