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Preface

The phenomenal growth in the raw computing power and the proliferation of computer devices along with the advent of the Internet has led to a new age of easy accessibility to different types of information. The simultaneous explosion of information and integration of technology into everyday life has brought on new demands for how to get the best out of the large and ever increasing amount of stored data generated by their operating activities. Anything from simple query and reporting products to the most advanced pattern discovery products has been put forward as data mining tools. There are several data mining paradigms for automatic knowledge discovery. This special issue focused on "Optimal Knowledge Mining" is an attempt to investigate some of the recent data mining paradigms using fuzzy optimization techniques.

In the first paper Ishibuchi and Yamamoto compare heuristic criteria used for extracting a pre-specified number of fuzzy classification rules on well-known test problems. Experimental results show that better results are obtained from composite criteria of confidence and support measures than from their individual use. It is also shown that genetic algorithm based rule selection can improve the classification ability of extracted fuzzy rules by searching for good rule combinations. This observation suggests the importance of taking into account the combinatorial effect of fuzzy rules.

Deformed fuzzy automata are complex structures that can be used for solving approximate string matching problems when input strings are composed of fuzzy symbols. Different string similarity definitions are obtained by the appropriate selection of fuzzy operators and parameters involved in the calculus of the automaton transitions. Astrain et al, in the second paper, use a genetic algorithm to adjust the automaton parameters to adapt to a particular application. The genetic algorithm approach overcomes the difficulty of using common optimizing techniques like gradient descent, due to the presence of nonderivable functions in the calculus of the automaton transitions. The authors validate the proposed framework for a text recognition problem.

In the data mining literature "interestingness measures" are used to rank rules according to the "interest" a particular rule is expected to evoke. In this paper Shekar and Natarajan introduce an aspect of subjective interestingness called "item-relatedness". Relatedness is a consequence of relationships that exist between different items in a domain. Association rules containing unrelated or weakly related items are interesting since the co-occurrence of such items is unexpected. "Item-relatedness" helps in ranking association rules on the basis of one kind of subjective unexpectedness. Authors identify three types of item-relatedness – captured in the structure of a fuzzy taxonomy. An "item-relatedness" measure for describing relatedness between two items is developed by combining these three types. Further

three mechanisms for extending this measure from a two-item set to an association rule consisting of a set of more than two items are also presented.

We are very much grateful to the authors and reviewers. We hope that the reader will share our excitement to present this special issue and will find it useful.

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