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Date: 15 Jan 2020
To: "Zhihua Wei" zhihua_wei@tongji.edu.cn,zhihua.wei@hotmail.com
From: "Information Sciences" eesserver@eesmail.elsevier.com
Reply To: "Information Sciences" INS@elsevier.com
Subject: Decision on INS-D-19-4012

Re: INS-D-19-4012

Dear Dr. Wei,

We have received the decision on your paper entitled "Improved General Attribute Reduction Algorithms for Inconsistent Decision Table".

The Editor's and the reviewers' comments are as follows:
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Fully and carefully consider comments from reviewers. In particular, pay attention to the following issues:

1. Motivations of the study and the main contributions.
2. Accuracy.
3. Linguistic quality and readability.
4. The list of references is too long. Have < 50 items.

Reviewer #1: In view of the computational efficiency, the authors have introduced a concept of granularity space, and developed two quick general algorithms of searching reducts in the inconsistent decision table. The comparative experiments have demonstrated the superiority of the proposal. I think this topic is meaningful for the large-scale data-oriented attribute reduction, but the authors need to address the following:

1. In this paper, the authors term granularity as the partition, it can't be quite convincing to me. Moreover, the formula of granularity makes me confused originally, because C denotes the conditional attributes, while here Ci indicates the set of some objects.

2. I found some typos such as: in Algorithm 3.1, "TG:=TG-ec2" instead of "TG=TG-ec2"; in Definition 4, "let [x]G denotes …". I suggest the authors revise these minor mistakes and carefully check for spelling and language errors throughout the manuscript.

3. The decision table is mainly discussed, but below Definition 4, why the authors get back to attribute sets A which is the concept in IS?

4. The returned result in Algorithm 3.3 is a reduct, I can't understand why this algorithm is named granularity search? And I think granularity search is supposed to be the other granular computing topic.

5. For Tables 6-9, the values are expressed with two or three decimal digits, but "Average" values have three or four, so the numeric precision should be explained. Moreover, I think that the employed datasets are not associated, so such "Average" of values over these datasets has no semantic explanation, and it is not reasonable to support the authors' conclusion. I strongly suggest that the authors use the significance test to compare the average 10-fold cross-validation based accuracies over each dataset.

Reviewer #2: This paper defines a concept named granularity space that can unify several existing definitions of attribute reduct. Furthermore, two quick related reduction algorithms are also proposed. The theoretical analysis and experimental results demonstrate the efficiency of proposed reduction algorithms.
Several comments and questions:
(1) Why do you mention inconsistent decision table in the title of this paper? Is there any difference for

your attribute reduction algorithms when decision table is consistent or inconsistent?
(2) In your experiments, since all algorithms are based on the same reduction criterion, such as PRPR and DRPR, why did these four algorithms obtain different classification accuracies? Is that because the reduction results obtained by different algorithms are different? The authors should do more analysis on this point.
(3) The English should be improved with many typos.

Reviewer #3: I have several objections listed below:

Originality:

(i)
in abstract:
"At first, we introduce a concept named granularity space
to establish a unified representation of five typical
reducts."

What authors call granularity space in the paper is simply
a system of finer/rougher granularizations. I see no
originality in it. In fact, for the unified representation
it can be completely omitted.

(ii)
The fact, that various notions of reducts utilized in RFS
can be somewhat unified is quite well known -- it is always
a minimal set of attributes which satisfy a "consistency"
condition. Only parameter is how you define the "consistency"
condition in inconsistent information system.

(iii)
in abstract:
"Based on the unified representation, we construct two quick
general reduction algorithms by extending the positive region
approximation to the granularity space."

Yes, the algorithms are described, however relationship to known
algorithms must be explained.

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Linguistic quality:

The paper contains many mistakes in grammar and in math,
which makes it very hard to read:

Take for instance Definition 4:

Given a decision table DT = (U, C \cup D, V, f) and a granularity G of U.
(incomplete sentence)
Let [x]_G denotes a set of objects that belong to the same set in G.
(denote, missing 'as x' at the end.)
The granularity approximation of G in U/B is defined as follows.
GA(U/B,G) = \bigcup{[x]_B | [x]_B \subseteq [x]_G }
(missing any quantification of the x, 'GA' is in italics but should not be)

This is just randomly chosen part of the text.
Entire theoretical part of the text looks like this.
The text must be improved to be more rigorous.

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Correctness/Soundness:

I have also concerns about soundness of the results:

For instance, the authors define particular hash function
to improve efficiency of the algorithms.

Hash functions are supposed to assign a slot (integer) to
a key.
The hash functions in the paper assign, for instance,
a vector of fraction, or sets. Their use does not bring any

efficiency. The authors are either really bad at explaining their results or their results are incorrect.

This can be caused the above-mentioned bad quality of the text.

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Finally, I really liked introductory section of the paper and the experimental results seem promising. I recommend to rework the paper.

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In view of these comments the Editor-in-Chief, Professor Witold Pedrycz, has decided that the paper can be reconsidered for publication after major revisions.

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Kind regards,

Witold pedrycz
Editor-in-Chief
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