



Discovering Fuzzy Rules with Parallelized Linguistic Variable Elimination

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Abstract

Fuzzy rule discovery in collected data with linguistic variable elimination has been successfully used to create classifiers. These classifiers are composed of a group of fuzzy rules which are interpretable by humans. However, large amounts of collected data cause difficulties to obtain accurate and interpretable fuzzy rules speedily enough. In this paper, several parallelization variations of linguistic variable elimination for fuzzy rule discovery in collected data are presented with the purpose of increasing the speed of the discovery. The parallelization variations are based on parallel programming patterns tailored to the elimination so that the discovery uses several cores of the processor and the parallelization is thought in terms of tasks rather than threads. Four implemented parallel variations are compared with two sequential implementations of the original algorithm for linguistic variable elimination. Experiments show speed improvements with parallelization for various given inputs with different amounts of instances and linguistic variables.

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1. [Overview of Data Mining Classification Techniques: Traditional vs. Parallel/Distributed Programming Models](#) Times Cited: 1
 By: Besimi, Nuhi; Cico, Betim; Besimi, Adrian
 2017 6TH MEDITERRANEAN CONFERENCE ON EMBEDDED COMPUTING (MECO) Book Series: Mediterranean Conference on Embedded Computing Pages: 433-436 Published: 2017
2. [Addressing the multicore trend with automatic parallelization](#) Times Cited: 4
 By: Bliss, N.
 Lincoln Laboratory Journal Volume: 17 Issue: 1 Pages: 187-98 Published: 2007
3. [Dissimilarity Measure for Comparison of Fuzzified Instances and its Application in a Fuzzy Rule-Based System for Heart Failure Domain](#) Times Cited: 2
 By: Bohacik, Jan; Zabovsky, Michal
 2016 IEEE 14TH INTERNATIONAL SYMPOSIUM ON APPLIED MACHINE INTELLIGENCE AND INFORMATICS (SAMI) Pages: 339-344 Published: 2016
4. [Fuzzy Rule-Based System Applied to Risk Estimation of Cardiovascular Patients](#) Times Cited: 4
 By: Bohacik, Jan; Davis, Darryl N.
 JOURNAL OF MULTIPLE-VALUED LOGIC AND SOFT COMPUTING Volume: 20 Issue: 5-6 Pages: 445-466 Published: 2013
5. Title: [not available] Times Cited: 14
 By: Campbell, C.; Johnson, R.; Miller, A.; et al.
 Parallel Programming with Microsoft . NET: Design Patterns for Decomposition and Coordination on Multicore Architectures Published: 2010
 Publisher: Microsoft, USA
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6. [On the combination of evolutionary algorithms and stratified strategies for training set selection in data mining](#) Times Cited: 55
 By: Cano, JR; Herrera, F; Lozano, M
 APPLIED SOFT COMPUTING Volume: 6 Issue: 3 Pages: 323-332 Published: MAR 2006
7. [Parallelization, Modeling, and Performance Prediction in the Multi-/Many Core Area: A Systematic Literature Review](#) Times Cited: 1
 By: Frank, Markus; Hilbrich, Marcus; Lehrig, Sebastian; et al.
 2017 IEEE 7TH INTERNATIONAL SYMPOSIUM ON CLOUD AND SERVICE COMPUTING (SC2 2017) Pages: 48-55 Published: 2017
8. [Amdahl's law in the multicore era](#) Times Cited: 422
 By: Hill, Mark D.; Marty, Michael R.
 COMPUTER Volume: 41 Issue: 7 Pages: 33-+ Published: JUL 2008
9. [Towards software performance engineering for multicore and manycore systems](#) Times Cited: 5

By: Koziolok, H.; Becker, S.; Happe, J.; et al.

ACM SIGMET-RICS Perform. Eval. Rev. Volume: 41 Issue: 3 Pages: 2-11 Published: 2014

[\[Show additional data\]](#)

10. Title: [not available] Times Cited: **2,175**
By: Lichman, M.
UCI machine learning repository Published: 2013
URL: <http://archive.ics.uci.edu/ml>

11. **Fuzzy Rule-Based Systems** Times Cited: **9**
By: Magdalena, Luis
SPRINGER HANDBOOK OF COMPUTATIONAL INTELLIGENCE Pages: 203-218 Published: 2015

12. **Variants of Heuristic Rule Generation from Multiple Patterns in Michigan-style Fuzzy Genetics-based Machine Learning** Times Cited: **1**
By: Nojima, Yusuke; Watanabe, Kazuhiro; Ishibuchi, Hisao
2015 CONFERENCE ON TECHNOLOGIES AND APPLICATIONS OF ARTIFICIAL INTELLIGENCE (TAAI) Pages: 427-432 Published: 2015

13. **Effects of Parallel Distributed Implementation on the Search Performance of Pittsburgh-style Genetics-based Machine Learning Algorithms** Times Cited: **1**
By: Nojima, Yusuke; Ishibuchi, Hisao
2016 IEEE CONGRESS ON EVOLUTIONARY COMPUTATION (CEC) Book Series: IEEE Congress on Evolutionary Computation Pages: 2193-2200 Published: 2016

14. **Ordered Fuzzy Decision Trees induction based on Cumulative Information Estimates and its application** Times Cited: **1**
By: Rabcan, J.
2016 International Conference on Emerging eLearning Technologies and Applications (ICETA). Proceedings Pages: 295-301 Published: 2016

15. **On Distributed Fuzzy Decision Trees for Big Data** Times Cited: **17**
By: Segatori, Armando; Marcelloni, Francesco; Pedrycz, Witold
IEEE TRANSACTIONS ON FUZZY SYSTEMS Volume: 26 Issue: 1 Pages: 174-192 Published: FEB 2018

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