Abstract

The present paper introduces a new destructive algorithm for rule extraction based on a trained neural network. The degree of complexity of neural network increases exponentially as a factor of the numbers of input and hidden nodes. Therefore, the dimensionality of the trained neural network is reduced by using a proposed destructive algorithm to extract only the most effective values of the input attributes which have higher impact on the output result for each class. Thus, the searching efficiency is highly increased and the computation is dramatically reduced for extracting rules. The generated rules from the proposed model are fired through two levels for each class. As for the first level, it deals with each individual effective input value, and the second level is concerned with each possible conjunction of the effective input values. Moreover, the proposed model extracts the strongest rules which represent a large number of instances from the database by adjusting the similarity measure threshold value. Finally, the proposed model is evaluated on different public-domain datasets and compared with standard learning models from WEKA, then the results assert that the set of rules extraction from the proposed method is more accurate and concise compared with those obtained by the other models.

References

- Oscar Marbán, Javier Segovia, Ernestina Menasalvas, Covadonga Fernández-Baizán, "Toward data mining engineering: A software engineering approach", Information
Destructive Algorithm for Rule Extraction based on a Trained Neural Network

- Mouloud Boumahdi, Jean-Paul Dron, Saïd Rechak, Olivier Cousinard, "On the extraction of rules in the identification of bearing defects in rotating machinery using decision tree; Expert Systems with Applications, Volume 37, Issue 8, August 2010, Pages 5887-5894.
- Francesco Gagliardi, "Instance-based classifiers applied to medical databases: Diagnosis and knowledge extraction; Artificial Intelligence in Medicine, Volume 52, Issue 3, July 2011, Pages 123-139.
- Wouter Verbeke, David Martens, Christophe Mues, Bart Baesens, "Building comprehensible customer churn prediction models with advanced rule induction"


- Tickle, A. B., Orlowski, M., and Diederich, J., "DEDEC: A Methodology for Extracting Rules from Trained Artificial Neural Networks", Proceedings of The Rule Extraction From Trained Artificial Neural Networks Workshop, 1996.

- WEKA at http://www.cs.waikato.ac.nz/~ml/weka

Index Terms
Computer Science  Artificial Intelligence

Keywords
Rule Extraction  Supervised Learning  Neural Network  Destructive Technique  Performance Measures.