

Rough Sets as a Knowledge Discovery and Classification Tool for the Diagnosis
of Students with Learning Disabilities

Lin, Yu-Chi; Wu, Tung-Kuang; Huang, Shian-Chang; Meng, Ying-Ru; Liang,
Wen-Yau

Abstract

Due to the implicit characteristics of learning disabilities (LDs), the diagnosis of students with learning disabilities has long been a difficult issue. Artificial intelligence techniques like artificial neural network (ANN) and support vector machine (SVM) have been applied to the LD diagnosis problem with satisfactory outcomes. However, special education teachers or professionals tend to be skeptical to these kinds of black-box predictors. In this study, we adopt the rough set theory (RST), which can not only perform as a classifier, but may also produce meaningful explanations or rules, to the LD diagnosis application. Our experiments indicate that the RST approach is competitive as a tool for feature selection, and it performs better in term of prediction accuracy than other rulebased algorithms such as decision tree and ripper algorithms. We also propose to mix samples collected from sources with different LD diagnosis procedure and criteria. By pre-processing these mixed samples with simple and readily available clustering algorithms, we are able to improve the quality and support of rules generated by the RST. Overall, our study shows that the rough set approach, as a classification and knowledge discovery tool, may have great potential in playing an essential role in LD diagnosis.

Key words : Rough Set; Knowledge Discovery; Learning Disabilities; LD
Diagnosis