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An Extended Bayesian Belief Function Approach to Handle Noise in Inductive Learning

Yong Ma
Department of Computer Science, University of Illinois
405 North Mathews Avenue, Urbana, IL 61801, USA
yongma@cs.uiuc.edu, (217) 244-1620

David C. Wilkins
Department of Computer Science, University of Illinois
405 North Mathews Avenue, Urbana, IL 61801, USA
wilkins@cs.uiuc.edu, (217) 333-2822

John S. Chandler
Office for Information Management, University of Illinois
1407 W. Gregory Drive, Urbana, IL 61801, USA
chandlej@vmd.uiuc.edu, (217) 244-0812

Abstract

Machine learning is a very important step towards artificial intelligence. Supervised inductive learning is one way to achieve the automation of knowledge acquisition. However, learning in the presence of noise or missing values has been a very difficult problem for machine learning and statistical inference. In this paper, we present a new system IUR that learns classification rules from training examples under tremendous noise in both training and testing data. IUR is based upon a well-known uncertain reasoning calculus: Dempster-Shafer theory. Thus, the inductive learning is viewed as reasoning under uncertainty. The main contributions of our approach are (1) the explicit representation and quantification of noise and (2) handling both noisy data and noiseless data in the exact same way. In addition, it also produces the relative importance of attributes and handles dependencies among them. Preliminary empirical results are given to show its applicability.