

An Intelligent Two Phase Fuzzy Decision Tree Based Clustering Model for Design of Computer Aided Detection/Diagnosis (CADE/CADx) System

A. Dhull^{1*} and G. Gupta²

¹CSE and IT Department, The NorthCap University, Gurgaon, India

²Applied Sciences and Humanities Department, The NorthCap University, Gurgaon, India

*Corresponding author, E-mail: anuradha@ncuindia.edu

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Abstract: Automated computer aided detection/diagnosis (CADE/CADx) system plays a key role in decision making process and work as a recommender system for researchers. Nowadays, CADe/CADx systems are getting popular due to their strong ability to extract complex relations present in unprocessed data set. In this research article, we present an intelligent two phase classification model for the design of CADe/CADx system. In order to design an intelligent CAD system, the primary challenge lies in identifying important attributes. The presence of irrelevant and redundant attributes in the data can have adverse impact over classifier accuracy. An efficient dimensionality reduction technique aims at achieving lower computational cost with reduced storage requirement by choosing problem specific relevant or significant attributes. The secondary challenge is to provide unambiguous and comprehensible rule base for accurate predictions. The contribution of work can be stated twofold: first, to attain reasonably good classification accuracy with possible speed up, linear discriminant analysis and some popular correlation coefficients (Fisher, Phi and Point bi-serial) are being used to identify significant attributes. Second, to generate comprehensible and understandable rule set a fuzzy decision tree based clustering approach is used. The performance of proposed model is verified on twelve famous UCI data sets.

Keywords: Linear discriminant analysis (LDA); Fuzzy decision trees (FDT); Decision tree based clustering; Dimensionality reduction; Computer aided detection/diagnosis (CADE/CADx) system