

Evaluation of Ensemble Classifiers for Intrusion Detection

Authors : M. Govindarajan

Abstract : One of the major developments in machine learning in the past decade is the ensemble method, which finds highly accurate classifier by combining many moderately accurate component classifiers. In this research work, new ensemble classification methods are proposed with homogeneous ensemble classifier using bagging and heterogeneous ensemble classifier using arcing and their performances are analyzed in terms of accuracy. A Classifier ensemble is designed using Radial Basis Function (RBF) and Support Vector Machine (SVM) as base classifiers. The feasibility and the benefits of the proposed approaches are demonstrated by the means of standard datasets of intrusion detection. The main originality of the proposed approach is based on three main parts: preprocessing phase, classification phase, and combining phase. A wide range of comparative experiments is conducted for standard datasets of intrusion detection. The performance of the proposed homogeneous and heterogeneous ensemble classifiers are compared to the performance of other standard homogeneous and heterogeneous ensemble methods. The standard homogeneous ensemble methods include Error correcting output codes, Dagging and heterogeneous ensemble methods include majority voting, stacking. The proposed ensemble methods provide significant improvement of accuracy compared to individual classifiers and the proposed bagged RBF and SVM performs significantly better than ECOC and Dagging and the proposed hybrid RBF-SVM performs significantly better than voting and stacking. Also heterogeneous models exhibit better results than homogeneous models for standard datasets of intrusion detection.

Keywords : data mining, ensemble, radial basis function, support vector machine, accuracy

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