AN EFFICIENT MODEL SELECTION FOR SVM IN REAL–WORLD DATASETS USING BGA AND RGA

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Abstract: Support vector machine (SVM) has become one of the most popular machine-learning methods during the last years. The design of an efficient model and the proper adjustment of the SVMs parameters are integral to reducing the testing time and enhancing performance. In this paper, a new bipartite objective function consisted of the sparseness property and generalization performance is proposed. Since the proposed objective function is based on selecting fewer numbers of the support vectors, the model complexity is reduced while the performance accuracy remains at an acceptable level. Due to the model complexity reduction, the testing time is decreased and the ability of SVM in practical applications is increased Moreover, to prove the performance of the proposed objective function, a comparative study was carried out on the proposed objective function and the conventional objective function, which is only based on the generalization performance, using the Binary Genetic Algorithm (BGA) and Real-valued vectors GA (RGA). The effectiveness of the proposed cost function is demonstrated based on the results of the comparative study on four real-world datasets of UCI database.

Key words: *Model selection, model complexity, support vector machines, genetic algorithms, classification, real-world datasets*

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1. Introduction

Support Vector Machine (SVM) introduced based on statistical learning theory by Vapnik [31]. It is one of the supervised learning methods that have been used for classification, regression and more recently for one-class classifications. The main

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