Feature subset selection using differential evolution and a wheel based search strategy

Abstract

Differential evolution has started to attract a lot of attention as a powerful search method and has been successfully applied to a variety of applications including pattern recognition. One of the most important tasks in many pattern recognition systems is to find an informative subset of features that can effectively represent the underlying problem. Specifically, a large number of features can affect the system's classification accuracy and learning time. In order to overcome such problems, we propose a new feature selection method that utilizes differential evolution in a novel manner to identify relevant feature subsets. The proposed method aims to reduce the search space using a simple, yet powerful, procedure that involves distributing the features among a set of wheels. Two versions of the method are presented. In the first one, the desired feature subset size is predefined by the user, while in the second the user only needs to set an upper limit to the feature subset size. Experiments on a number of datasets with different sizes proved that the proposed method can achieve remarkably good results when compared with some of the well-known feature selection methods.