**ABSTRACT**

Plant recognition has become an active area of research as most of the plant species are at the risk of extinction. This paper uses an efficient machine learning approach for the classification purpose. This proposed approach consists of three phases such as preprocessing, feature extraction and classification. The preprocessing phase involves a typical image processing steps such as transforming to gray scale and boundary enhancement. The feature extraction phase derives the common DMF from five fundamental features. The values of the optimized σ are then used as a gauge for variable selection. In this study Kernelized (K-SVM) model is applied to several benchmark data sets in order to estimate the effectiveness of the second-order sigma tuning procedure for an RBF kernel.12 leaf features which are extracted and orthogonalized into 5 principal variables are given as input vector to the K-SVM. Classifier tested with flavia dataset and a real dataset and compared with k-NN approach, the proposed approach produces very high accuracy and takes very less execution time.