**ABSTRACT**

Due to more and more tea varieties in the current tea market, rapid and accurate identification of tea varieties is crucial for tea quality control. Tea quality mainly depends on the variety of leaf, growing environment, manufacturing conditions, size of ground tea leaves and infusion preparation. In the past few years, tea cultivar has been assessed by morphological assessment coupled with pattern recognition. This paper uses an efficient machine learning approach called Extreme Learning Machine (ELM) for the classification purpose. The proposed approach consists of four phases which are as preprocessing, feature extraction, feature clustering and classification. Additionally, this work proposes an iterative algorithm for feature clustering and applies it to leaf recognition. Feature clustering is a powerful tool to reduce the dimensionality of the selected feature. For improving the accuracy and performance of tea leaf recognition, ELM is implemented. The classifier is tested with 20 leaves from each variety and compared with k-NN and RBF approach. The proposed ELM classification produces effective results.