Feature decision-making ant colony optimization system for an automated recognition of plant species

ABSTRACT

In the present paper, an expert system for automatic recognition of different plant species through their leaf images is investigated by employing the ant colony optimization (ACO) as a feature decision-making algorithm. The ACO algorithm is employed to investigate inside the feature search space in order to obtain the best discriminant features for the recognition of individual species. In order to establish a feature search space, a set of feasible characteristics such as shape, morphology, texture and color are extracted from the leaf images. The selected features are used by support vector machine (SVM) to classify the species. The efficiency of the system was tested on around 2050 leaf images collected from two different plant databases, FCA and Flavia. The results of the study achieved an average accuracy of 95.53% from the ACO-based approach, confirming the potentials of using the proposed system for an automatic classification of various plant species.

Keyword: Ant colony optimization; Automatic leaf classification; Feature subset selection; Leaf analysis; Plant recognition