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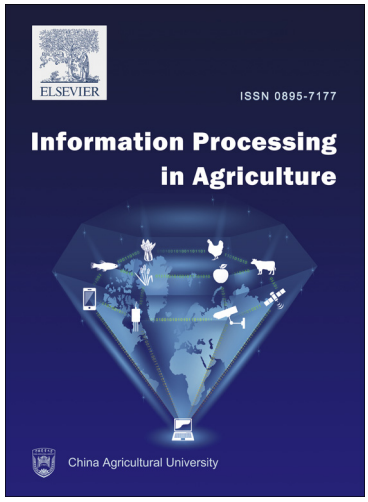

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Archana Chaudhary, Savita Kolhe, Raj Kamal

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An improved Random Forest Classifier for multi-class classification

Archana Chaudhary[a], Savita Kolhe[b], Raj Kamal[c]
[a] School of Computer Science and IT, Devi Ahilya University, Khandwa Road, Indore, India.
Email: archana_scs@yahoo.in, archana227@gmail.com.

[b] ICAR-Directorate of Soybean Research, Khandwa Road, Indore, India.

[c] Medicaps Institute of Science and Technology, Indore, India

ABSTRACT

The paper presents an improved-RFC (Random Forest Classifier) approach for multi-class disease classification problem. It consists of a combination of Random Forest machine learning algorithm, an attribute evaluator method and an instance filter method. It intends to improve the performance of Random Forest algorithm. The performance results confirm that the proposed improved-RFC approach performs better than Random Forest algorithm with increase in disease classification accuracy up to 97.80% for multi-class groundnut disease dataset. The performance of improved-RFC approach is tested for its efficiency on five benchmark datasets. It shows superior performance on all these datasets.

Keywords: Groundnut disease; Improved-RFC; Machine learning; Multi-class classification.

1. Introduction

Diseases, pests and uneven rainfalls are vital reasons for yield losses in crops. Significant crop losses by pests and diseases have been accounted from many countries [1, 24, 38]. Yield losses due to some diseases are to an extent of 70 percent [14]. The degree of economic losses due to diseases is much more than the reported global yield losses of 600 million US$ [28]. Groundnut (*Arachis hypogaea* L.) is an important oilseed crop and a vital source of protein. More than fifty five pathogens along with viruses have been reported to affect groundnut crop. Some diseases are extensively distributed and cause more financial losses while others are confined in distribution and are not considered to be reasonably significant at the present time. Proper diagnosis of disease(s) is the first step in planning a Disease Intelligent System [27]. Symptoms on plant parts along with the congenial climatic conditions can be used to identify most of the diseases [43, 44, 45].

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