Disease Recognition System for Sri Lankan Potato (*Solanum tuberosum*) Plants

T.H. Bathigama, R.M. Batapola, R.L.D. Rajapaksha, S.M.K. Vidubhashana, M.K.S. Madushika*
and W.A. Indika

Department of Computer Science, Faculty of Science, University of Ruhuna, Matara, Sri Lanka

Abstract

Potato is a major crop in the upcountry areas in Sri Lanka such as Nuwara Eliya and Badulla Districts. The demand for local potatoes has increased oppose to the total demand for potatoes, but the production has not been increased that much over the years, because of diseases and pests that tend to infect potato plants. Agricultural instructors (AI) are responsible for determining new diseases and existing ones and also providing ways of treating the plants and preventing further infections. As AIs are assigned to a large area where there may be large number of farms and farmers, it is very difficult for the AI to keep track of every farm, and then the communication between the AI and the farmer can be hindered. Then farmers may try remedies that are not well tested and damage the whole field. As a solution, we develop a system to identify plant diseases from an image of the plant leaf, or any infected part of the plant and a set of symptoms that can be seen in the plant. The image and the set of symptoms are then fed into a deep neural network and the probability of the disease that the plant has is given as the output. With the advancement of deep neural network, very difficult problems such as pattern identification has been tackled, so applying that strategy for this problem also seemed like a good solution. Since deep models have influential ability to capture patterns and features, our prediction model achieves a validation accuracy of 99.3%. The management part was also developed in our proposed system for gathering all the submitted images, updating the set of diseases and also plants. Finally, the mobile-based application was developed to submit images to our prediction model, to get information about how to treat the infected plants and also to provide preventive measures. We evaluated our mobile-based application with selected potato farmers in Keppetipola and Nuwara Eliya areas. Evaluation results and positive feedback achieved through it clearly indicate that our system achieves effective performance over the current techniques of recognizing plant diseases.

Keywords: Image Classification, Mobile-based Application, Neural Network, Web-based Applications (Management Dashboard)

Corresponding Author: madushika@dcs.ruh.ac.lk