Passion Fruit Disease Detection using Image Processing

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Abstract

Fruit diseases are a major problem in economic and production losses in the agricultural industry worldwide. In this paper, an image processing approach is proposed for identifying passion fruit diseases. According to the Sri Lankan context, treatment details are taken by the farmers from the field officers. However, it can take a few days. So, this proposed system can be used to identify passion fruit diseases quickly and automatically. This proposed approach is composed of the following main steps; Image Acquisition, Image Preprocessing, Image Segmentation, Feature Extraction, Dataset Preparation, Training & Testing. Healthy and two types of passion fruit diseases, namely passion fruit scab and woodiness images were used for this approach. This approach was tested according to passion fruit disease type and its' stages, such as mild, moderate and severe. K-Means clustering was used for segmentation. Images were clustered according to k values, such as 2, 4, 6 and 8. Before the segmentation, images were converted to RGB, L*a*b, HSV and Grey colour models, because of find out the most suitable colour model for this approach. Local Binary Pattern was used for feature extraction and Support Vector Machine was used for creating the model. Seventy percent (70%) of each dataset was used to train the SVM and the other thirty percent (30%) was used to test the model. According to this approach, passion fruit diseases can be identified in the average accuracy of 79% and its' stage can be identified in average accuracy 66%.

Keywords: K-Means Clustering, Local Binary Pattern, Support Vector Machine, L*a*b