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## **Identifying paddy diseases with image processing techniques in Sri Lankan context**

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Agriculture is one of the main sectors in Sri Lanka for ages and rice cultivation plays a major role in Sri Lankans' economy. Currently, farmers use traditional methods and they seek the advice of regional agricultural officers to recognize any unknown paddy disease. As a result, the efforts to increase the quality and quantity of rice production are obstructed by paddy diseases especially due to the lack of resources to identify them immediately. Thus, this study attempts to identify paddy diseases using machine learning techniques in relate with Image processing. Among many rice diseases, Rice Blast, Rice Sheath Blight and Bacterial Leaf Blight are focused to analyze further in detail as they are the leading diseases for major destructions in paddy cultivation. Several existing algorithms will be analyzed to select the suitable algorithms for accurate identification of the above three diseases and to suggest better solutions to overcome them as per the recommendations of the Department of Agriculture. Thus, the main object of the study is to analyze different machine learning techniques for the classification in image processing and to get the best technique which can be used effectively for the application. Increasing the disease diagnosing rate and to decreasing the crop destruction rate from these diseases are the main objectives of the study. The outcome of this study will be used by farmers in detecting paddy diseases without depending on others. The methodology includes gathering data from Rice Research and the Development Institute in Bathalagoda (RRDI) and some more images from field visits to the farms. Then MATLAB is to use for preprocessing the datasets to get qualitative images as a data preparation step. For this purpose, we have decided to use the hybrid version of a genetic-algorithm-segmentation based selective principal component analysis method for the feature extraction and develop a featured algorithm from the literature. After the feature extraction, classification will be done by analyzing Support Vector Machine (SVM), K-Nearest Neighbor (KNN) and Probabilistic neural network (PNN) from the literature and the best technique will be selected. The proposed solutions is to provide precise and scalable visual cues to identify diseases. Conclusively, this study will provide valuable information regarding the reduction of crop destruction from paddy diseases for a better future.

**Keywords:** Disease diagnosing, genetic algorithm, image processing, machine learning, paddy diseases