**ABSTRACT**

In agriculture disease detection is important for a productive crop yield. So many diseases will effect crop quality of tomatoes, potatoes and pepper some of them are bacterial spot, septoria leaf spot and yellow curved leaf diseases. To classify diseases of plant by detecting symptoms of leaf disease through automatic methods. This paper presents a Mask-R Convolution Neural Network (Mask-R CNN) algorithm for tomato leaf, pepper leaf and potato leaf. In this we are using plant village dataset which contains more than 1000 images of potato, tomato and pepper leaves of each plant along with disease symptoms. With the help of Mask-R CNN classification and extraction done automatically. Mostly information of color for the research of plant leaf disease detection. Based on RGB components filters are used in our model for the three channels. The results of proposed method for the experiment will be recognized efficiently for different types of potato, tomato and pepper leaves. This technique of detecting plant leaf disease detection using Mask-R CNN will help small holder farmers for detecting diseases of plants in very efficient manner. Smartphone usage gradually increasing every year globally. Worldwide around 5 billion smartphone users are there a part of that in India itself 1 billion users are there and 1 billion users in Africa as well. Nowadays Artificial Intelligence apps plays major role in society. In recent years usage of plant leaf disease detection using CNN technique gradually increased and also achieved excellent results. These techniques are very useful to reduce time and as well as error rate. Due to these features it is favorable to researchers. For grape plant leaf disease detection in 2015 Res Net was introduced. This architecture is a ground – breaking function. This technique has higher learning rate. So we will get more accurate results i.e.., achieved a 99% accuracy rate. For models performance data preprocessing is very difficult to differentiate fungal infections and viral bacteria often sharing an overlap of symptoms. Due to pathogens difference in shape, color or function symptoms are measurable. RGB data is preferable for this complexity. This results good, clarity and noise free images for better results and they take more amount of data to train than grayscale. Augmentation technique and transfer learning technique uses smaller data sets or unvaried data that can act on models accuracy. This technique training images not only improving model’s overall performance but also reduce over fitting. And can perform actions such as rotate, adding color, zoom and contrast changes. With these smaller datasets it is proved that it is very successful in the method of transfer learning. The quality of the dataset is also very important for getting accurate results. The photography of leaf will be unreliable when tested. So many plant leaf disease datasets are available the most accurate and very popular dataset which we took is ‘plant village’ dataset. The type of disease and in which stage of disease effected by the leaf of the plant, can be detected. To recognize this early disease detection, that particular image must be used. So many plant leaf diseases are not visible to naked eye but it can be identified using this Mask-R CNN techniques.