

Plant Disease Identification Using SVM and ANN Algorithms

N. Kanaka Durga, G. Anuradha

ABSTRACT--- *Tomato and maize are two Indian crops for rural humans to make income. These crops are contaminated with many diseases. Our main goal is to detect the sickness that is infected by the crop and take precautions to protect the crop before it spreads over the complete crop. By doing in this way, there is less loss to the farmers and requires less pesticides and additionally viable to export which no longer have an effect on our monetary growth. In this paper, we use Histogram of Oriented Gradient (HOG) operation and predict features and provide that points to the classification model. At finally, we test the leaves and identify the sickness and shift those records to the farmer through message. Here, take the leaves of the tomato and maize crops and pick out the disease with the aid of using SVM and ANN algorithms in order to find efficient result and accuracy. To predict the illnesses in early stage and take precautions and keep the vegetation leads to extend in production and income.*

Keywords: Diseases, SVM, ANN algorithms, HOG, vegetation

I. INTRODUCTION

- I. Agriculture is the major occupation and plays a key function in India. The rural people rely upon on agriculture as their major livelihood. In the plant growing stage, there are typically contaminated with extraordinary diseases. The farmers have ability to perceive the ailment in the early stage and take precautions. But it is impossible to become aware of the ailment caused with the aid of the crop with naked eye [1]. As the technology increases, there is a want to develop some superior techniques involving agriculture. In this paper, we proposed a new method by taking the pictures of a plant and perceive the ailment and transfer those records to the farmer via message. This reduces the loss and will increase the production. It reduces the work of the farmers and agricultural officers to survey the complete field. Many farmers are fail to observe patterns at single glance, it leads to inaccurate assumptions, sometimes harmful to the farmers [9].
- II. Tomato is a day neural plant and many varieties of the tomato vegetation are grown around the world [2].The tomatoes production is feasible during all seasons of the year. The production of tomatoes is absolutely depends on the usage of the nutrients and fertilizers. The tomatoes can be of unique kinds like red, yellow, green, orange. The tomato plant is typically contaminated with ailments like early blight, late blight, septoria leaf spot,

Southern bacterial wilt etc [3]. Maize is one of the Indian crop and it requires greater area compared to normal crops because it grows larger in size. It requires full sunlight for most of the day and must be planted in blocks as a substitute than single row and it takes 30 to forty days of time after planting. Each maize stalk produces one large ear of maize. Under perfect conditions, it will produce a second one, which is barely smaller than the first. The ailments brought about with the aid of maize crop are Charcoal rot, frequent rust, Gibberella stalk, Downy Mildew, Cercospora leaf spot.

- III. Here, consider the SVM and ANN algorithms in order to pick out the efficient and accuracy. SVM is a supervised learning algorithm and it works well on classification issues. To evaluate the performance of a system, cross-validation is a common method to deal with small training sets in desktop learning is typically used [6]. Photo Courtesy (pc) is used to grading of plant diseases. In the texture leaf records are computed for the beneficial segments, and then the extracted facts are surpassed through the SVM classifier.

II. METHODOLOGY

The methodology will have the following stages including Data Collection, Preprocessing, Feature extraction, Image segmentation, classification phases. The flow chart is shown below:

i. Data Collection

In the first step, the sample snap shots are accumulated from the two datasets of tomato and maize crops, the usage of one kind digital camera with specific resolutions, which are used to educate the device the sample pictures are stored in the form of the JPG. All the pattern pictures are in RGB (Red, Green, Blue) form. The bought picture encompass the healthy pictures and also diseased photographs like Bacterial spot, Tomato Mosaic virus, Northern blight, Rust etc. Various methods of preprocessing can be applied to the photo to get better results.

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classification and regression challenges. The classifier will assign the label to the photograph and it specifies which category it belongs to, from where the classifier is predefined primarily based upon the feature. This classification is used for each analysis and the trying out phase. SVM makes use of the method referred to as the kernel. Artificial neural networks (ANN) take input as a unstructured image apply computational model that works on and converts them into corresponding classification output labels. It requires less preprocessing efforts which can be trained to learn the required features for classification purposes.

III. EXPERIMENTAL ANALYSIS & RESULTS

The dataset contains 200 tomato and maize leaf pictures . From that 50 pictures are healthy tomato and maize leaf pictures and 110 pictures are tomato and maize leaf pictures for coaching part and testing part. Similarly, 40 leaf pictures are used for the testing part. In Artificial Neural Networks (ANN), we have input hidden and output layers. There are sixty four input layers, sixty four hidden layers and three output layers. The ANN normally consists of **nodes**, and an arrow represents a connection from the output of one node to the other node. The keras, is a Python API which is belongs to the neural network..Each batch size taken as 20 and the model has been educated for 450 epochs. The initial gaining knowledge of rate has been set to 0.01 and it is decreased through a component of 0.3 on plateau the place the loss stops decreasing. Early stopping has additionally been used in order to monitor the validation loss and give up the training procedure as soon as it increases.

Here the tomato and corn both crops are checked by using SVM and ANN classifiers. The result can be for tomato crop by using SVM it gives 60-70% and by using ANN its gives 80-85%. For corn, by using SVM it gives 70-75% and by using ANN its gives 55-65%.

Classifier	Accuracy	Crop
SVM	70-75%	Corn
Artificial Neural Networks	80-85%	Tomato

IV. CONCLUSION

In this paper, to get the accurate result, we have taken SVM and ANN classifiers for identifying the disease that is infected with tomato and maize crops. The methodology has been applied correctly and performance tests on python software. These two crops are commonly infected with diseases like bacterial spot, tomato mosaic virus, northern blight and common rust which is primarily full-size for yield loss. Hence, these two plants sickness detection was found by the usage of Machine Learning and Artificial Neural Networks (ANN) and the result is send to the customers by the use of Google Cloud Messaging (GCM) through the smart phone. At finally, we conclude that which algorithm works well for which crop based on the accuracy rate.

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