Detecting A Diseases of Plants Using Machine Learning

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Abstract -   To reduce the risks of crop failure due to diseases outbreak, machine learning methods can be implemented. Naked eyes inspection for plant diseases usually based on the changes in color or the existence of spots or rotten area in the leaves. Various researches are going on vigorously in plant disease detection. Identification of plant diseases can not only maximize the yield production but also can be supportive for varied types of agricultural practices. This paper proposes a disease detection and classification technique with the help of machine learning mechanisms and image processing tools,

Agriculture provides food to all the human beings even in case of rapid increase in the population. It is recommended to predict the plant diseases at their early stage in the field of agriculture is essential to cater the food to the overall population. But it unfortunate to predict the diseases at the early stage of the crops. The idea behind the paper is to bring awareness amongst the farmers about the cutting edge technologies to reduces diseases in plant leaf. Since tomato is merely available vegetable, the approaches of machine learning and image processing with an accurate algorithm is identified to detect the leaf diseases in the tomato plant. In this investigation, the samples of tomato leaves having disorders are considered. With these disorder samples of tomato leaves, the farmers will easily find the diseases based on the early symptoms. The K-means clustering is introduced for partitioning of dataspace into Voronoi cells. The boundary of leaf samples is extracted using contour tracing

Key Words: Machine Learning, CNN Algorithm, python, Plant disease detection, Classification.

1.INTRODUCTION

Developed Technologies have provided the ability to produce sufficient food to meet the demand of society. But still, the safety and security of the food or crops remained unattained. Factors like change in climate, the decline in pollinators,

Plant disease, and others are challenging to the farmers. An important foundation for these factors needs to be attained on a priority basis. Making use of analysis and detection processes using present technology helps the farmers to get rid of such problems. During pandemic situations like the nation is dependent on the recent technologies to prevent address the issues to reduce the transmission of the diseases.

Farmers and other people who are not experts may find it difficult to identify the diseases based on the symptoms shown. The same diseases may show different symptoms or different diseases may show similar symptoms. Therefore, it may be difficult to take the proper precautions. Non-experts rely heavily on experts to obtain precise information about the disease of corn leaves. This may be unaffordable by smallholder farmers. Their inputs also a take on any value between 0 and 1.

The neuron has weights for each input and an overall bias. The weights are real numbers expressing importance of the respective inputs to the output. The bias is used for controlling how easy the neuron is going to output 1. For a neuron with big bias, it is easy to output 1, but when the bias is very negative then it is difficult to output 1. These automated techniques have made way to solve the problems, but the greatest challenge being faced is the accuracy and the robustness of the results obtained. In this paper we make use of image processing techniques as well as machine learning techniques for the identification of the plant diseases.

2. PROBLEM STATEMENT

To Detect "Plants disease Using Machine Learning" using python to detect A Diseases of plants is diseased or not. If that the plants leaf is classify in healthy or diseased, then that person is allowed to enter in area else that person is not wearing a mask it gives alert message like alarm will ringing.

when alarm will ring then it is very effective to detecting person is wearing mask or not.

3. LITERATURE SURVE

A literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Literature reviews use secondary sources, and do not report new or original experimental work.

1.Paper name: "Leaf Disease Detection and gradient using computer vision technology"
Author: M Aakansha Rastogi,Ritika Arora,Shanu Sharma

Satellite In Agriculture, leaf diseases have grown to be a dilemma as it can cause significant diminution in both quality and quantity of agricultural yields. Thus, automated recognition of diseases on leaves plays a crucial role in agriculture sector. This paper imparts a simple and computationally proficient method used for leaf disease identification and grading using digital image processing and machine vision technology. The proposed system is divided into two phases, in first phase the plant is recognized on the basis of the features of leaf, it includes pre-processing of leaf images, and feature extraction followed by Artificial Neural Network based training and classification for recognition of leaf. In second phase the disease present in the leaf is classified, this process includes K-Means based segmentation of defected area, feature extraction of defected portion and the ANN based classification of disease. Then the disease grading is done on the basis of the amount of disease present in the leaf.

2.Paper name: "Cotton leaf disease identification using pattern recognition technique"
Author: P.R Rothe ,R.V Kshirsagar

Leaf diseases on cotton plant must be identified early and accurately as it can prove detrimental to the yield. The proposed work presents a pattern recognition system for identification and classification of three cotton leaf diseases is Bacterial Blight, Myrothecium and Alternaria. The images required for this work are captured from the fields at Central Institute of Cotton Research Nagpur, and the cotton fields in Buldana and Wardha district. Active contour model is used for image segmentation.

3.Paper name:Automated Vision-Based Diagnosis of Banana Bacterial Wilt Disease and Black Sigatoka Disease

Author:Owomugisha Godliver, A. Quinn John, Ernest Mwebaze and James Lwasa

Machine learning has been applied in agriculture in various areas including crop disease detection and image processing systems have been developed for some crops. These crops include cotton, pomegranate plant, grapes, vegetables, tomatoes, potatoes and cassava among others. However, no machine learning techniques have been used in an attempt to detect diseases in the banana plant such as banana bacterial wilt (BBW) and banana black sigatoka (BBS) that have caused a huge loss to many banana growers.

4.Paper name:Digital image processing techniques for detecting quantifying and classifying plant diseases

Author:G. A. Barbedo

This paper presents a survey on methods that use digital image processing techniques to detect, quantify and classify plant diseases from digital images in the visible spectrum. Although disease symptoms can manifest in any part of the plant, only methods that explore visible symptoms in leaves and stems were considered. This was done for two main reasons: to limit the length of the paper and because methods dealing with roots, seeds and fruits have some peculiarities that would warrant a specific survey. The selected proposals are divided into three classes according to their objective: detection, severity quantification, and classification. Each of those classes, in turn, are subdivided according to the main technical solution used in the algorithm.

5.Paper name:A plant recognition approach using shape and color features in leaf images

Author: A. Caglayan, O. Guclu and A. B. Can

Recognizing plants is a vital problem especially for biologists, chemists, and environmentalists. Plant recognition can be performed by human experts manually but it is a time consuming and low-efficiency process. Automation of plant recognition is an important process for the fields working with plants. This paper presents an approach for plant recognition using leaf images. Shape and color features extracted from leaf images are used with k-Nearest Neighbor, Support Vector Machines, Naive Bayes, and Random Forest.

4. PROPOSED SYSTEM

To find out whether the leaf is diseased or healthy, certain steps must be followed. i.e., Preprocessing, Feature extraction, Training of classifier and Classification. Preprocessing of image, is bringing all the images size to a reduced uniform size. Then comes extracting features of a preprocessed image which is done with the help of HOG .HoG is a feature descriptor used for object detection.
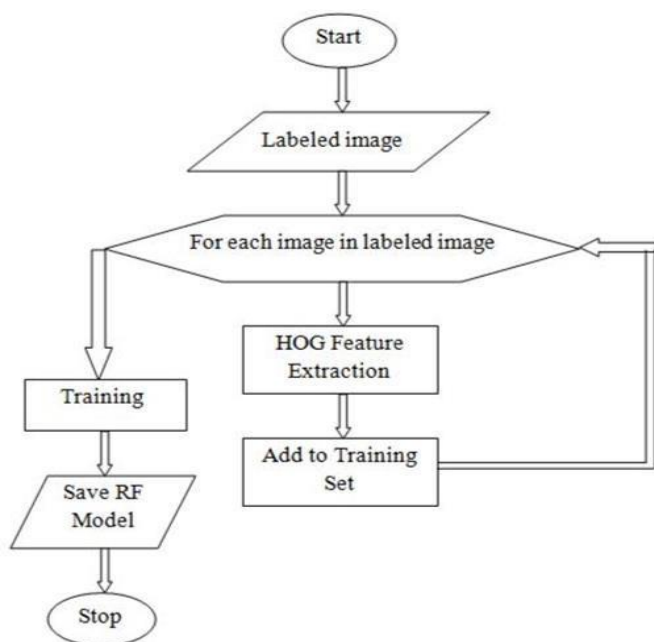
5. METHODOLOGY

The Used Leaf data set was taken and data processing has done to filter the data and to remove some unnecessary data. The model was trained with the processed data using the linear regression algorithm to predict the Leafs with higher accuracy. Fig 1 shows the structured outline for proposed Methodology.

Detect Faces in Streams after that it check weather that person is wearing a mask or not. If that person is wearing a mask that person is allow to enter in specific area else those persons are not allowed to enter in the specific area. The features used in developing the project are Anaconda-Spider tool is used and Python programming language. Anaconda-Spider tool is the platform where the complete programming of the project is done. Python libraries are used to create and compile packages. Python is the programming language which helps in system development.
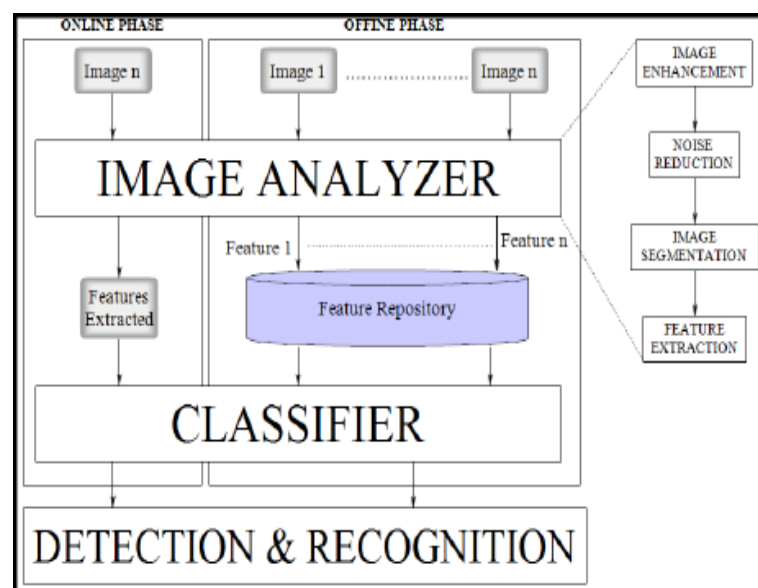
6. SYSTEM ARCHITECTURE

Fig. 1. Architecture of proposed system

7. ALGORITHM

CNN Algorithm –

CNN is a powerful algorithm for image processing. These algorithms are currently the best algorithms we have for the automated processing of images. Many companies use these algorithms to do things like identifying the objects in an image.

Three Layers of CNN

Convolutional Neural Networks specialized for

applications in image & video recognition. CNN is

mainly used in image analysis tasks like Image recognition, Object detection & Segmentation.

There are three types of layers in Convolutional Neural Networks:

1) **Convolutional Layer:** In a typical neural network each input neuron is connected to the next hidden layer. In CNN, only a small region of the input layer neurons connect to the neuron hidden layer.

2) **Pooling Layer:** The pooling layer is used to reduce the dimensionality of the feature map. There will be multiple activation & pooling layers inside the hidden layer of the CNN.

3) **Fully-Connected layer:** Fully Connected Layers form the last few layers in the network. The input to the fully connected layer is the output from the final Pooling or Convolutional Layer, which is flattened and then fed into the fully connected layer.

STEPS OF CNN

1. Image capturing.
2. Image segmentation.
3. Classification.
4. Transformation.
5. Detection.

The algorithm will categorize the items into k groups of similarity. To calculate that similarity, we will use the Euclidean distance as measurement. The algorithm works as follows: Convolutional Neural Network, also known as CNN, is a well-known method in computer vision applications. It is a class of deep neural networks

that are used to analyze visual imagery. This type of architecture is dominant to recognize objects from a picture or video. It is used in applications like image or video recognition, neural language processing, There are three components of a Convolution

The purpose of the convolution is to extract the features of the object on the image locally. It means the network will learn specific patterns within the picture and will be able to recognize it everywhere in the picture. Convolution is an element-wise multiplication. The concept is easy to understand.
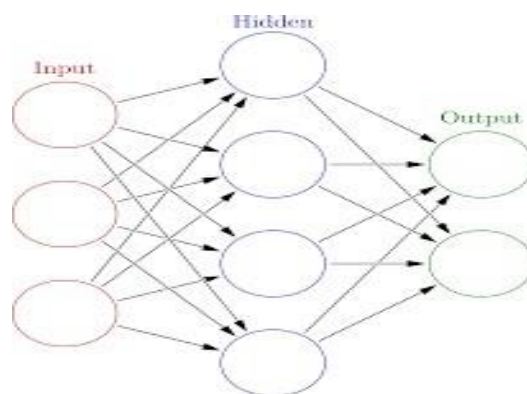

Fig: Neural Network

8.RELETED WORK

Due to the viral transmission in the air number of countries introduces Face mask. That masks is mandatory to use for protecting against viral infection.

Two main reasons to wearing a mask-

1. First one is to prevent viral infection in air.
2. protecting from small and tiny particles are present in air.

So, our project motive is related to first reason. Due to the viral infection plants suffering from number of disease so we are preventing those problems
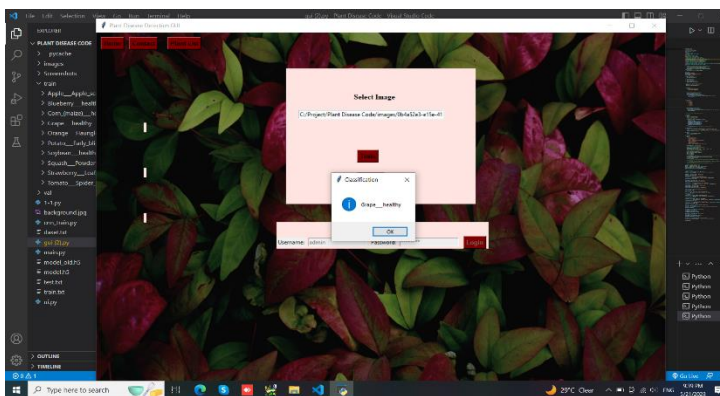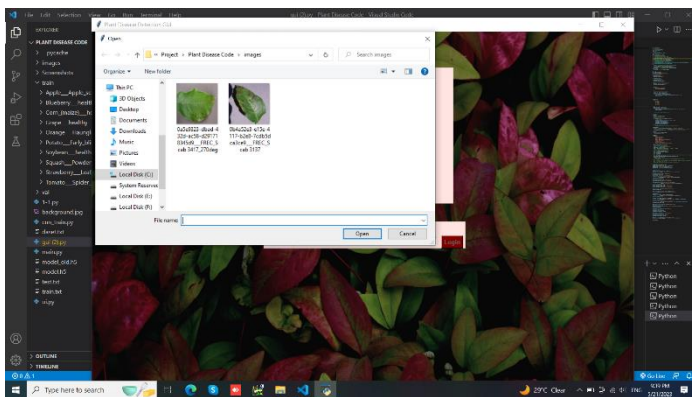
9.ADVANTAGES OF SYSTEM

1. More efficient
2. Better crime monitoring systems
3. Processing of large amount of data becomes easier.
4. Reduce the cost of storage.

10.APPLICATIONS

1. Healthcare.
2. Air-Port.
3. Railways Entry.
4. Office Entry.
5. Museums and Amusement Park.
6. Other Public Places.

11.RESULTS

12.CONCLUSIONS

The conclusion of this algorithm is to recognize abnormalities that occur on plants in their greenhouses or natural environment.
The image captured is usually taken with a plain background to eliminate occlusion.
The algorithm was contrasted with other machine learning models for accuracy.

13.FUTURE SCOPE

7. As we all know that in the last few years, the corona crisis has hit our country and during that time it was very important to wear a mask.
8. Entry was not allowed anywhere without checking people wear mask or not.
   In future Covid-19 also other viral infection disease are occurred that time this system is very useful.
9. It gives a faster result and the people does not need to check every person is wear a mask or not system will detect itself.

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