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Mint Struma Spying Monster

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ABSTRACT: In India, Agriculture plays an important role because of the rapid growth of population and increased in demand for food. One major drawback on low crop yield is disease caused by bacteria, virus and fungus. It can be prevented by using plant diseases detection technique. The objective of this work is to identify diseases that occur on plants in tomato fields. For this objective, deep learning was used to detect the various diseases on the leaves of tomato plants. In the study, it was aimed that the Regression should be run in real time on the drone. So the drone will be able to disclose the diseases of the plants while winding manually or autonomously on the field. Likewise, diseases can also be detected from close-up photographs taken from plants by Raspberry pi camera. The inspected diseases in this study cause physical changes in the leaves of the tomato plant. These changes on the leaves are captured from the camera and compared with the database. In this study, supervised machine learning methods were used to implement plant disease detection. Supervised Machine Learning architecture selection was the key issue for the implementation. Tomato leaves are trained and it is stored in the dataset. Trained networks are also tested on the images from the internet and image is processed using supervised machine learning approach algorithm named REGRESSION.

KEYWORDS: SVM, Regression, Trained Dataset, Train Dataset

I.INTRODUCTION

IN India, agriculture has become essential source of the economic development. Farmer selects the appropriate crop based on type of soil, weather condition of the location and economic value. The agriculture industries started searching new methods to expanded production of food because of increasing population, difference in weather and instability in politics. This makes researchers to search new efficient and precise technologies for more productivity. Disease identification in plant is most essential in successful farming system. In general, a farmer perceive the symptoms of disease in plants by using naked eye observations and this requires continuous monitoring. However, this process is more costly in large plantations and sometimes this may be less accurate. In some countries like India, farmers may have to show the specimen to experts, this makes time consuming and more expensive.The plant diseases can be noticed by observing leaf, stem and root part of the plant. The digital image processing can be used to detect diseased leaf, stem, fruit and flower, shape and colour of infected area. Tomato is one of the most productive crop all around the world. According to the statistics obtained from the Food and Agriculture Organization of the United Nations, relatively 170.750 kilotons of tomato produced in the year 2018 in all around the world.Deep learning is the state of the art, that utilizes convolution neural networks (CNNs) with hidden layers. Before the deep learning trend, classification tasks were done by using sematic features. These features can be corners, edges, shapes or etc. The image is been captured by the Raspberry pi camera and then compared the image with the trained database. Then the image is processed with the Regression and sent to the user through Bluetooth module.

II. RELATED WORKS

The Existing system was based on the disease detection on the leaves of the tomato plant. Diseases that are to be detected, harms the leaves of the plants. These harmful effects change the physical appearance of the leaf so, that the cause of the harm can be detected from the images taken from the cameras. In this case, there is a need for a mobile

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computer and a standard RGB camera for disease detection using a robot. Since the disease detection is done on the robot, mobile computer must be powerful enough to do computational task.

A. Deep Learning

Deep learning is artificial neural network with hidden layers. A fully linked neural network with two hidden layers.Perceptron's are inspired from the living neuron cells. Each perceptron has multiple inputs and activation function. Activation function makes the answer of the neuron non-linear. Without activation part, network is the only linear combinations of the inputs. There are a lot of activation functions in the literature such as sigmoid, tanh,ReLU.ReLU is one of the most used activation function and it is found quicker to train.

B. Convolutional Neural Network

For the image like high dimensional and relatively big data there is specialized network architecture called convolutional neural networks (CNNs). CNNs are used for the first time to detect handwritten digits from the documents. CNNs are consisting of convolutional layers, pooling layer, activation function layers, dropout layers, and fully-connected layers. Convolutional layers hold the results of the convolution of filters or kernels with previous layer.

*C.*Support Vector Machine

It is classifier of neural network approach which can be used in hyper plane also. It is machine learning algorithm which is supervised in nature. It has good generalization. And it uses the training and train set of data to detect the disease part.

*D.*Mica-Sense Atlas data processing system.

Data acquisition system is created by integrating a Mica-Sense Red-Edge multi-spectral camera into a DJI phantom 3-quadcopter. We develop pipeline to process aerial multi-spectral images and to correlate image features to manual assessments. The acquired images is been uploaded to the MicaScene ATLAS data processing system. The cloud server align the images together and download the images as a five-layered GEOTIFF. The GIOTIFF is cropped, rotated and split into component channels within MatLab and the RBC color image is generated and explored. Then the color image is been used for plot segmentation mask in Adobe-Photo shop.

*E.*Open Source Computer Vision

Robotic disease detection in green houses is to advance disease conduct develop yield and reduce pesticide application. There are two major threats of green-house bell peppers: Powdery mildew and Tomato spotted wilt virus , the algorithm are developed based on the principle component analysis and co-efficient and variation . Disease disclosure system for green-house peppers includes three main factors: robotic manipulator, a custom-made end-effector and a sensory apparatus. The sensors are aligned in parallel and mounted on the end-effector which is connected to a 6 degrees-of-freedom . The robotic manipulator is situator near a belt carrying pots with plants. The green-house asile will be driven later by mounting on a mobile platform. The leaves were pre-calculated based on the upper and lower bounds of the RGB values. The color image is transformed to binary image using threshold. Once the diseased plant is identified enabling the high sample resolution and large area coverage of the robot manipulator while it is in motion and the TSWV is done and the plant is marked for eradication and thus it does not require PM reduction.

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TABLE I

CHARACTERISTICS OF DISEASES

S.NO	DISEASES	COLOUR	SHAPE	OCCURING PERIOD
1	Septoria leaf spot	Black Spots	Round	Wet, Humid Weather
2	Early Blight leaf	Dark Spots	Concentric Rings	Wetness
3	Leaf Mold	Palegreen to yellow	Lop-sided shape	High Humidity
4	Bacterial Spot Leaf	Black and yellow spots	Rod Shaped	Warm and Humid

III. PROPOSED METHODOLOGY

In this paper, proposed work is implemented based on supervised machine learning approach algorithm named REGRESSION with enhanced accuracy in detection of diseased part in image. There is a problem of accuracy in the previous algorithm and to overcome the problem this enhancement is made and accuracy was improved. In this paper we are mainly concentrating on TOMATO PLANT.

The proposed system is the combination of a drone that is attached with the module that could detect the disease of the TOMATO plant in the field. For the module part, the system uses pi-camera for a clear view of target for more detailing. The drone consists of battery and battery eliminating circuit. The battery eliminating circuit comprised of flight controller board and raspberry pi.

The flight controller board is the circuit board with sensors that detects orientation changes of the drone. The flight controller board which is supported by electronic speed controller (ESC) and motor. The electronic speed controller which controls and regulates the speed of an electric motor.

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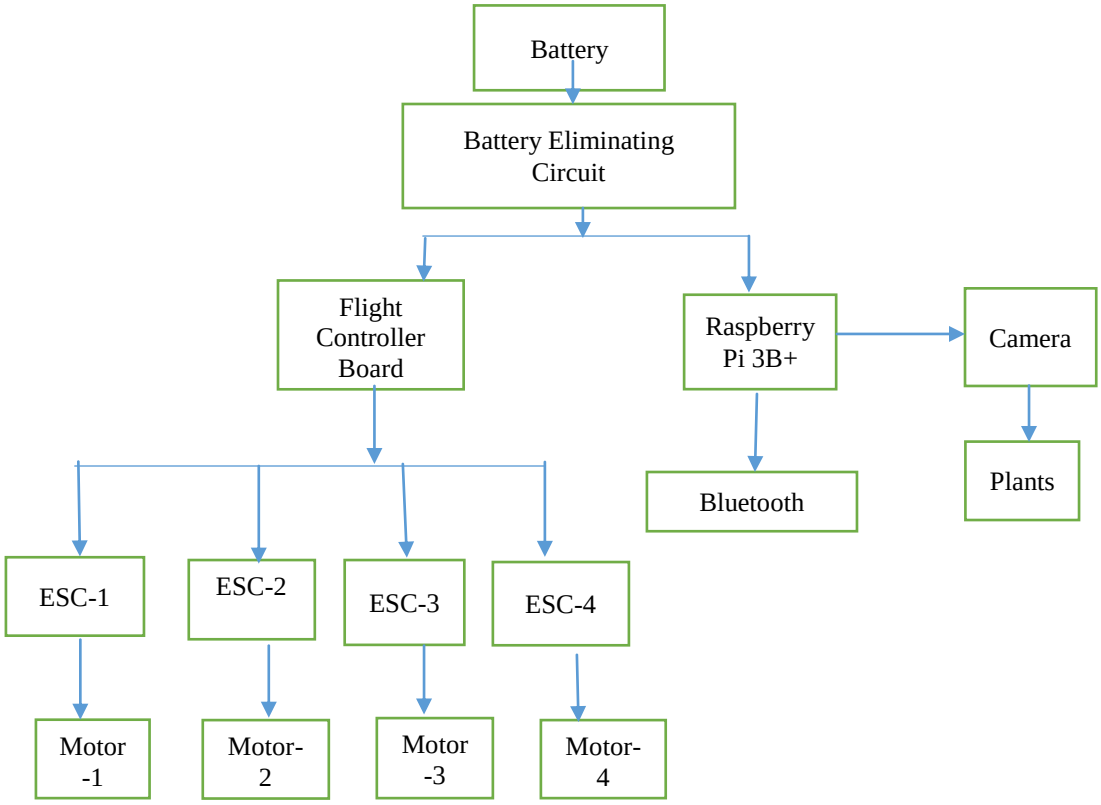

Fig: Block Diagram

In Tomato plant there are four major diseases are present such as Septoria leaf spot, Early blight leaf, Leaf mold, Bacterial spot leaf.The drone which consists of raspberry pi with pi camera and Bluetooth module.The Drone which is used to detect the disease in the tomato plant.The detected diseased is processed in the image processing. Here we trained the dataset as diseased leaves and the non-diseased leaves.The leaves are trained using pi camera and it stored as dataset. The supervised machine learning approach algorithm named REGRESSION is used to process the image in a simple way. The Regression algorithm which separates the diseased and non-diseased leaves in the linear way. The algorithm calculate the leaves diseases as percentage.The Regression algorithm uses the $y=mx+c$ linear equation to show the difference of the diseased and non-diseased leaves.

The processed image which stored in the dataset will be transferred to the bluetooth, from bluetooth it sends the obtained data to the user as a diseased name.

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IV. EXPERIMENTAL RESULTS

The Experimental results shows the sample image of good leaves and the infected leaves.

Fig A. Sample Image of Non-Diseased Leaf

Fig B: Septoria Leaf Spot

Fig C:Leaf Mold

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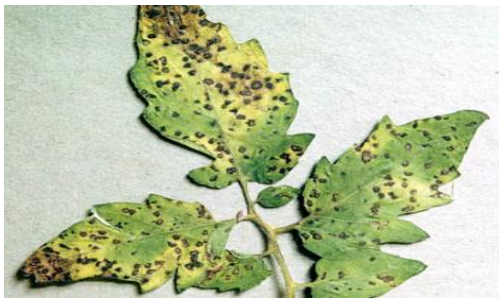

Fig D: Bacterial Spot Leaf

Fig E: Early Blight Leaf

Fig: Sample Images of Infected Leaves

The above images which are trained in the camera. These images are stored in the dataset. The Regression algorithm is used to process the image. It uses the equation y=mx+c which it shows the linear difference between the good and infected leaves.

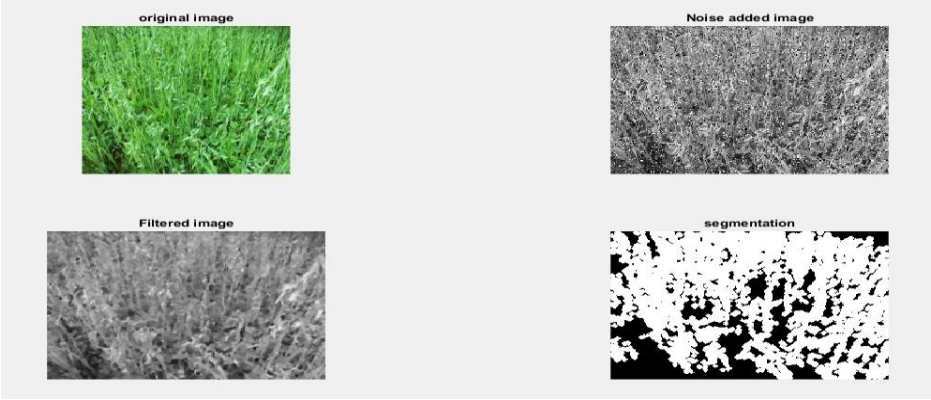

Fig: Image Processing Result

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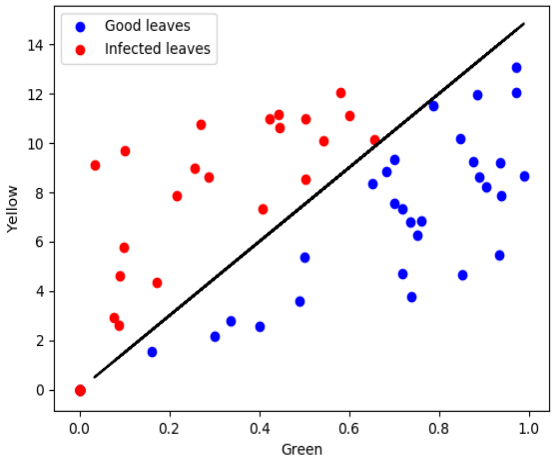

Fig C: Graphical Representation

The line in the graph splits the good and infected leaves. The X-axis shows the Green which is good leaves and the Y-axis shows the Yellow which is infected leaves. The graph is obtained from the regression algorithm.

V. CONCLUSION

This study reviews and summarizes image processing techniques for tomato plants that have been used for recognizing plant diseases. The proposed approach which can significantly support an accurate detection of leaf diseases in a little computational effort. In this study we used Unmanned Aerial Vehicle (UAV). Further future work can be extended by developing better segmentation technique , selecting better feature extraction to increase the classification process.

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