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PLANT DISEASE DETECTION USING MACHINE LEARNING

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Abstract- Plant flake conditions are a significant trouble to food security. still, their quick relating substantiation stays worrisome in numerous corridor of the world because of the non- attendance of the necessary foundation. The emergence of accurate ways in the flake- predicated image type has shown emotional results. In this design, we used the Random Forest algorithm to identify the healthy and diseased leaves from the data sets created. Random timber is a Supervised Machine Learning Algorithm that is used considerably in Bracket and Retrogression problems. Our proposed paper includes various phases of the prosecutions datasets creation, point birth, training, and type. The created datasets of diseased and healthy leaves are collectively trained under Random Forest to classify the diseased and healthy images. Overall, using machine knowledge, the trained large data sets available privately gives us the swish way to descry the complaint present in shops on a colossal scale. This design uses a camera and raspberry pi, which arrange on a robot for on- field operation.

I. INTRODUCTION

Presently, every human being directly or indirectly depends on nature. Nature is the swish gift given to every human being from god in that nature plants is one part of it.

Agricultural plays a critical part in the entire life of a given economy. Every farmer can't be an expert to confirm the exact complaint of the leaf disease at first sight only. However, it can lead to affect the farther leaves of the field, and if we have taken a lot of time to identify the disease. However, it can subsequently affect the field a lot, and at the same time, If the farmer has made a mistake in detecting the exact complaint of the plant can lead to the use of the wrong precaution to reduce the flake conditions. plant disease is the state of original or systemic abnormal physiological functioning of a plant performing from the continuous, prolonged 'vexation' caused by photogenic organisms (contagious or biotic complaint agents). According to Indian Council Agricultural Research(ICAR) analysis in the year 2019, roughly 30- 35% of crops has reduced due to conditions of crops and not taking the correct precaution at the right time in the field and in the year 2022, roughly 20- 22% of crops are get diseased. And due to not relating a complaint or taking the wrong precaution led to a lot of time loss for a farmer, and it also damaged the agricultural field area. The main ideal of our design is to reduce the losses of the crop in the agricultural field. In our design, we developed a device robot by placing a raspberry pi 3, camera, and L293D driver on it. The robot developed is used in the field to detect the disease by capturing image with the help of a camera.

II. LITERATURE

In 2015, S. Sannakki and V.S.Rajpurohit published their design Bracket of Pomegranate plant conditions in the International Research Journal of Egineering and Technology. They used the system of segmenting the amiss area and the color and texture used as the features. They used a neural

network classifier to classify the complaint. The disadvantage of this design, it's used for only limited crops.

In 2015, Aakanksha Rastogi, Ritika Arora, and Shanu Sharma worked on the design Leaf Disease Detection and Grading using Computer Vision Technology & Fuzzy sense and published in IEEE 2nd International Conference on Signal Processing and integrated networks(SPIN) 2015. They used K-mean clustering to member the amiss area, GLCM was used to prize the texture features of the flake, and they used fuzzy sense to grade the complaint. They used an artificial neural network(ANN) as a classifier which mainly helps to check the strictness of the diseased flake.

In 2015,P.R. RothandR.V. Kshirsagar published their paper Cotton Leaf Disease Identification using Pattern Recognition ways at International Conference on Pervasive Computing(ICPC). They used the BPNN classifier to classify conditions of the leaves and snake segmentation to segment the defected area.

Prasanna Mohanty proposed an approach to descry conditions by training a complication neural network. The CNN model trained to identify healthy and diseased shops of 14 species. The model achieved an delicacy of 99.35 on test set data. When using the model on images carried from trusted online sources, the model achieves an delicacy of 31.4, better than a simple model of a arbitrary selection more different set of training data can prop in adding the delicacy. Also, other variations in the model or neural network training may yield advanced delicacy, thus paving the path for making plant complaint discovery available to everyone.

Serawork Wallelign, Mihai Polceanu, and Cedric Buche did a design on Soybean plant Disease Identification Using Convolution Neutral Network in 2018 united countries. They used a complication neural network classifier for the type. CNN can prize the necessary features and classify plant conditions from images taken in the natural terrain

In 2018, Nitin R Gavai and Jyotsna Bankar published A deep-knowledge approach for on- point plant flake discovery in IEEE 14th International Colloquium on signal processing. They used a complication neural network classifier for the type. They analyzed 14 kinds of shops from datasets with CNN.

III. METHODOLOGY

A. THE EXECUTION PROCESS OF OUR PROJECT:

To find out whether plant leaves are diseased or not, we need to follow certain steps i.e, giving commands to move the robot in the field, capturing the image, classifying the leaf image using a random forest, and displaying the output result on the laptop screen. With the help of a robot, we capture images of leaves in the field. We operate the robot with help of an application leaf detection we created a code to move the robot in different directions like forward, backward, left, right, stop, and take a pic.

Fig: Instructions of robot to move in the field.

We connect the raspberry pi and laptop with the same network to execute the program. Using the command keys we control the movement of the robot. When the robot starts camera starts working, what is going to capture by the camera lens will stream on the laptop screen. If we want to capture the image, we need to stop the robot and click on the command to take a pic to capture the image. The captured image will automatically store in a folder we created. We can capture images of leaves as the number we want.

Now we run the code to detect the disease previously we have captured the images in a field that captured images will be given as input images to the source code. While running the source code first we need to select the plant leaf name like tomato, potato, or corn. In our project, we created the data set of three different plants they are tomato, corn, and potato. After selecting the plant name now we have to give the input

image captured by the camera from the file where we have stored that image. After giving the input background program will run and it will detect whether the leaf is healthy or diseased. This is the process of our project how we are capturing the images and detecting the disease.

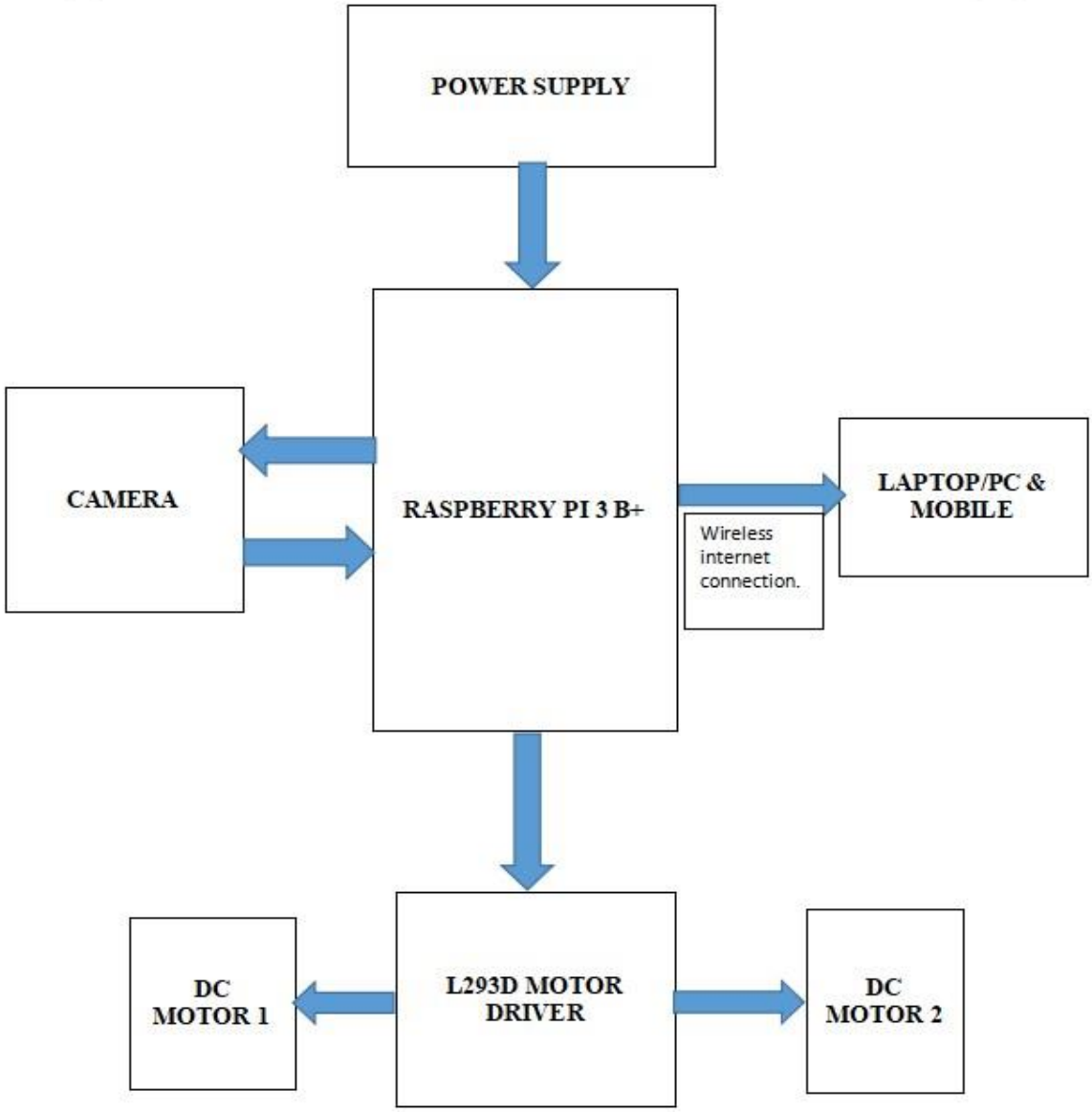

Fig: BLOCK DIAGRAM.

B. ALGORITHM FOR ROBOT CONTROL:

Step 1: Provide the power supply to a raspberry Pi.

Step 2: Connect the raspberry pi, laptop, and mobile to the same internet WiFi connection.

Step 3: Run the source code of the camera to display the video streaming on the laptop screen.

Step 4: Give the directions to the robot to move in the field with the help of an application we downloaded on our mobile.

Step 5: Give a stop command to the robot before taking the image of a leaf.

Step 6: Now capture the image of the leaf with help of the command and take a pic.

Step 7: The image will be stored automatically in our laptop folder.

Step 8: Repeat the same process to capture the images again.

C. ALGORITHM OF DETECTING THE DISEASES:

Step 1: Run the source code.

Step 2: Select the plant which plant leaf we are giving as input to detect the disease.

Step 3: Give the captured images as input.

Step 4: In the background process feature extraction takes place.

Step5: Now the input is classified by random-forest algorithm with given dateset and detect the disease.

Step6: Display the output result on the screen.

IV. RESULTS

The output result will display on screen with the name of disease. The input image will classify with the given datasets and compare whether the input leaf image is matching with any of disease or not. If image of leaf is matched with an image then it display the output on screen.

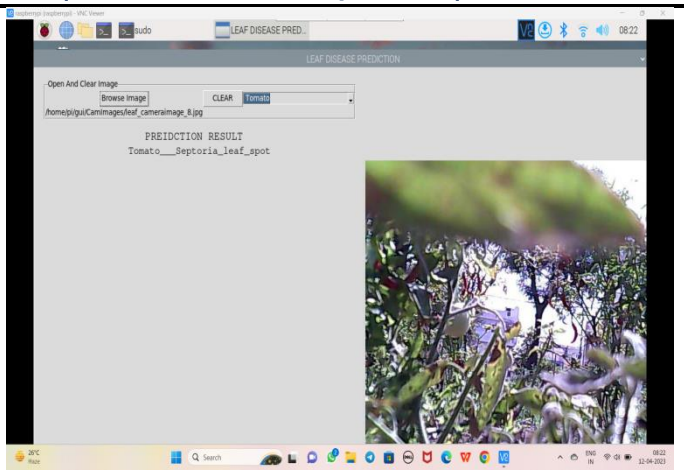

Fig: The output result.

V. CONCLUSION

The main motive of our project is to detect the plant leaf disease using random-forest algorithm. Because every farmer is not expert to detect the disease of leaf at first sight, not identifying the disease at right time will lead affect the field and at the same time it will waste the time and production of field.

VI. REFERENCES

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