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IOT BASED PLANT DISEASE DETECTION

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ABSTRACT: In India, 70% of its people are in the agriculture sector. The remaining 30% of people are an inseparable part of this field. Because from agriculture, we get various raw materials and especially crops, which serve as a staple food for people. But The crops and plantations get destroyed mainly due to two major reasons, first reason is destruction by natural calamities such as flood, earthquake, drought, famine, etc. and second reason is the destruction by the pathogens.98% of the destruction is caused by the pathogens and 2% of the destruction happens due to natural calamities. So, the need for the plant disease detection was felt. The traditional methods were inaccurate and not effective. So various researches in this field lead to inclusion of image processing for accurate detection of disease by using plant leaf. Various spots, patterns on plant leaf are useful in detecting the disease. Further advancement was use of digital image processing for more accurate result.

Keywords: Plant disease detection, Image processing.

INTRODUCTION

Technology helps human beings in increasing the production of food. However, the production of food can be affected by number of factors such as climatic change, diseases, soil fertility etc. Out of these, disease plays major role to affect the production of food. Agriculture plays an important role in Indian economy. Leaf spot diseases weaken trees and shrubs by interrupting photosynthesis, the process by which Leaf create energy that sustains growth and defense systems and influences survival. Over 58% smallholder farmer depends on agriculture as their principal means of livelihood. In the developing world, more than 80 percent of the agricultural production is generated by small holder farmers, and reports of yield loss of more than 50% due to pests and diseases are common the production is decreasing day by day with various factors and one of them is diseases on Leaf which are not detected early stage. Identifying the disease at an early stage and suggesting the solution so that maximum harm can be avoided to increase the crop yield. There is a need to design the automatic system to detect the leaf disease and recommend the proper pesticide. The plant disease detection can be done by observing the spot on the leaves of the affected plant. The method we are adopting to detect plant diseases is image processing using Convolution neural network (CNN).

Keywords: Plant disease detection, Image processing. Convolution neural network(CNN)

PROPOSED METHODOLOGY

This paper talks about the we can reduce the attack of pests by using proper pesticides and remedies. We can reduce the size of the images by proper size reduction techniques and see to it that the quality is not compromised to a great extent. We can expand the projects of the earlier mentioned authors such that the remedy to the disease is also shown by the system. The main objective is to identify the plant diseases using image processing. It also, after identification of the disease, suggest the name of pesticide to be used. It also identifies the insects and pests responsible for epidemic. Apart from these parallel objectives, this drone is very time saving. The budget of the model is quite high for low scale farming purposes but will be value for money in large scale farming. It completes each of the process sequentially and hence achieving each of the output.

STEPS:

1. input test image is acquired and preprocessed in the next stage and then it is converted into array form for comparison.
2. The selected database is properly segregated and preprocessed and then renamed into proper folders.
3. The model is properly trained using CNN and then classification takes place.
4. The comparison of the test image and the trained model take place followed by the display of the result.
5. If there is a defect or disease in the plant the software displays the disease along with the remedy.
6. The humidity, temperature, soil moisture is also monitored using sensors.
7.The pesticide and remedy are displayed in the LCD display.

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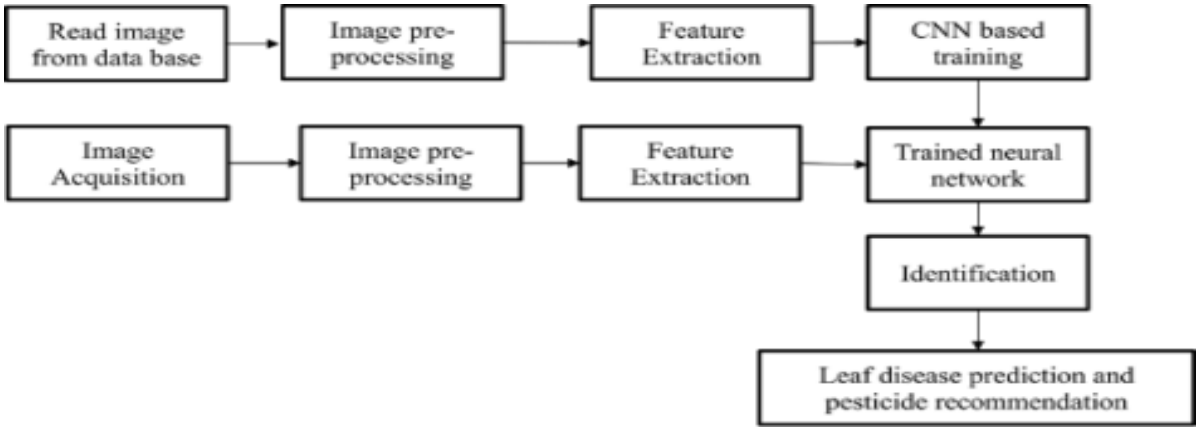

SOFTWARE DESCRIPTION:

OpenCV (Open Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then It see(which was later acquired by Intel). The library is cross platform and free for use under the open-source BSD license. OpenCV supports deep learning frameworks TensorFlow, Torch/PyTorch and Cafe.

Header files: These are located in the OPENCV_BUILD\install\include subdirectory and are used to develop new projects with OpenCV.

Library binaries: These are static or dynamic libraries (depending on the option selected with CMake) with the functionality of each of the OpenCV modules. They are located in the bin subdirectory (for example, x64\mingw\bin when the GNU compiler is used).

Sample binaries: These are executables with examples that use the libraries. The sources for these samples can be found in the source package.

HARDWARE DESCRIPTION:

HD CAMERA

Camera is used to capture the leaf images for classification purose,the camera has 12 megapixels HD resolution it captures the high-resolution leaf images which gives accuracy in result and high-resolution cameras automatically imply higher amount of details in images

RESULTS:

The proposed system helps in identification of plant disease and provides remedies that can be used as a defense mechanism against the disease. The database obtained from the Internet is properly segregated and the different plant species are identified and are renamed to form a proper database then obtain test database which consists of various plant diseases that are used for checking the accuracy and confidence level of the project. Then using training data, we will train our classifier and then output will be predicted with optimum accuracy. We use Convolution Neural Network (CNN) which comprises of different layers which are used for prediction.

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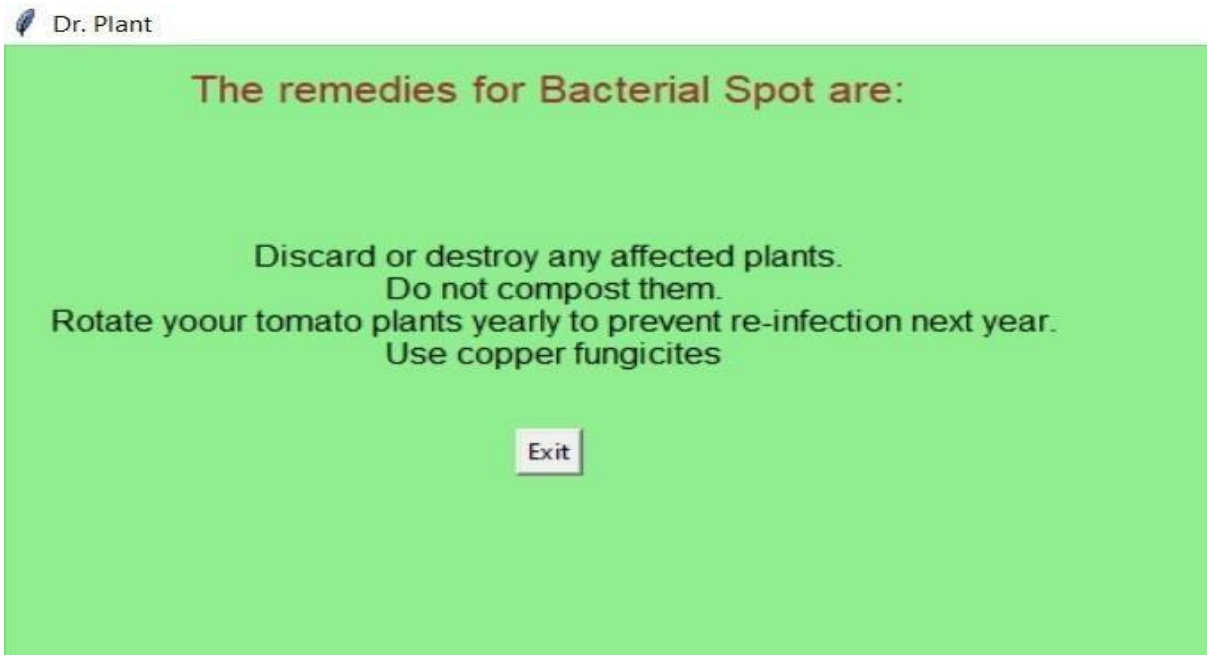
DISEASE DETECTION OUTPUT

REMEDIES FOR DISEASE DETECTION



FUTURE SCOPE :

The proposed system was developed taking in mind the benefits of the farmers and agricultural sector. The developed system can detect disease in plant and also provide the remedy that can be taken against the disease. By proper knowledge of the disease and the remedy can be taken for improving the health of the plant. The proposed system is based on python and gives an accuracy of around 78%. The accuracy and the speed can be increased by use of Googles GPU for processing. The system can be installed on Drones so that aerial surveillances of crop fields can be done.

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CONCLUSION

It focused how image from given dataset (trained dataset) in field and past data set used predict the pattern of plant diseases using CNN model. This brings some of the following insights about plant leaf disease prediction. As maximum types of plant leaves will be covered under this system, farmer may get to know about the leaf which may never have been cultivated and lists out all possible plant leaves, it helps the farmer in decision making of which crop to cultivate. Also, this system takes into consideration the past production of data which will help the farmer get insight into the demand and the cost of various plants in market.

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