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BACTERIAL FORAGING OPTIMIZATION BASED ON DISEASE RECOGNITION

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Abstract

In this paper the most aim is to grow the plants healthy and safely while not touching any diseases or flora. Here existing system is, affected crops ar known by human and medication is additionally given manually. Chemical foods ar used for plant growth. therefore on reach this, the planned system here is affected crops is known through image process. reckoning on severity, the drugs quantity is given to the crops victimisation pump motor.India may be a cultivated country and concerning seventieth of the population depends on agriculture.Farmers have massive vary of diversity for choosing varied appropriate crops and findingthe appropriate pesticides for plant.Disease on plant ends up in the many reduction in each thestandard and amount of agricultural merchandise. The studies of disease check with the studiesof visually discernible patterns on the plants. watching of health and malady on plant plays a vital role in in cultivation of crops within the farm. In period, the watching and analysis of plantdiseases were done manually by the experience person therein field. needs|this needs} tremendous quantity of labor and conjointly requires excessive time interval. The image process techniques are often utilized in the disease detection. In most of the cases malady symptoms ar seen on the leaves, stem and fruit. The plant leaf for the detection of malady is taken into account that shows the malady symptoms. Then relying upon the diseases, the individual medication are often given to the crops through a machine-driven model.

Keywords: CNN Algorithm ,UART Protocol, Preprocessing Technique ,MATLAB Software

1) Introduction

In beholding, a worldwide descriptor is simpler to use as a result of it processes the complete image. and every one the pixels of the image appreciate area unita|the world|the realm} of interest are taken under consideration within the description.If plant diseases aren't discovered in time, food insecurity can increase. Early detection is that the basis for effective bar and management of plant diseases, and that they play a significant role within the management and deciding of agricultural production. In recent years, disease identification has been a vital issue.

Disease-infected plants sometimes show obvious marks or lesions on leaves, stems, flowers, or fruits. Generally, every sickness or pesterer condition presents a novel visible pattern that may be accustomed unambiguously diagnose abnormalities.[1-5]

Usually, the leaves of plants area unit the first supply for characteristic plant diseases, and most of the symptoms of diseases could begin to seem on the leaves. In most cases, agricultural and biology consultants area unit accustomed establish on-site or farmers establish flowering tree diseases and pests supported expertise[6,11-14]. This technique isn't solely subjective, however additionally long, laborious, and unskillfulness.Farmers with less expertise could err and use medication blindly throughout the identification method. Quality and output also will bring environmental pollution, which can cause gratuitous economic losses. To counter these challenges, analysis into the employment of image process techniques for disease recognition has become a analysis topic.

The overall method of victimisation ancient image recognition process technology to spot plant diseases is that the K-means cluster technique to phase the lesions regions, and combined the worldwide color bar chart (GCH) color coherence vector (CCV) native binary pattern (LBP), and completed native binary pattern (CLBP) was accustomed extract the colour and texture options of apple spots, and 3 types of apple diseases were detected and known supported improved support vector machine (SVM), and also the classification accuracy reached ninety three. Principal part analysis and fisher discriminant ways were accustomed extract the characteristic parameters and construct the discriminant model[18-21].

Recently, the convolutional neural networks (CNN), a special of deep learning techniques, area unit quickly turning into the well-liked ways. CNN is that the hottest classifier for image recognition, and it's shown outstanding ability in image process and classification.Deep learning approaches were 1st introduced in plant image recognition supported leaf vein patterns They used 3-6 layers CNN classified 3 herb species: navy bean, red bean, and soybean.Though excellent results are according within the literature, however, the variety of the used datasets is restricted. massive datasets (comprised of thousands of images) area unit needed for the coaching of CNNs[7-8,10].

Sadly, for plant plant disease recognition, such massive and numerous datasets haven't nevertheless been collected to be used by researchers. At present, transfer learning is that the simplest thanks to train the lustiness of CNN classifiers for plant plant disease recognition. Transfer learning permits the variation of pre-trained CNNs by training them with smaller datasets whose distribution is totally different from the larger datasets antecedently accustomed train the network from scratch. Indeed, it's effective that victimisation CNN models pre-trained on the ImageNet dataset then training them for plant disease recognition. Therefore, the mix of deep learning and transfer learning provides a brand new thanks to solve the matter of restricted datasets of plant diseases.[9,15-17].

2) Related work

In this paper [1] Diseases in plants are one of the main threats to food safety. Some of the diseases in plants are infectious diseases that can spread throughout the entire field, thus affecting most of the yields. Therefore, early diagnosis of diseases in plants is necessary.plant diseases are a major thread to farmers, consumers ,environment and global economy.in india alone 35% of field crop are lost to pathogens and pesits causing losses to farmers.In this paper [2] Farmers have limited access to experts. But these days getting proper yield of crops is a tough task as they are affected with some diseases during their growth and sometimes it remains unnoticed by the farmer and this in turn results in the un-proper yield ofcrops. This paper focuses upon detection of such diseases which occur on a paddy crop usingthe concept of artificial intelligence and CNN. The diseases encountered by a paddy crop isstored in the database.In this paper [3] raspberry pi analyzes that picture and compares with the database picturesusing the concepts of convolutional neural network and artificial intelligence and thus

depictsthe output whether the crop is affected with a particular or not and thus finally alerts the farmerabout the disease.

3) Proposed method

The convolution and pooling layers square measure then had in many steps to get world options from the input file. Finally, the extracted characteristics square measure passed to the totally connected layer wherever classification is performed during this layer. Affected crops is known through image process. relying upon the severity, the drugs quantity is given to the crops. Everything here is machine-controlled through a microcontroller. In machine learning victimisation the shop the info set of plant diseases pictures. we tend to victimisation 2 motors prefer to manufacture the flow of wastage water and traditional water. In MATLAB to grant correct values. during this paper, we tend to square measure victimization 2 domains like embedded and machine learning. Here we tend to square measure utilized in reduced instruction set computing MECHANISMS (AVR small controller).To store on the iot webpage.

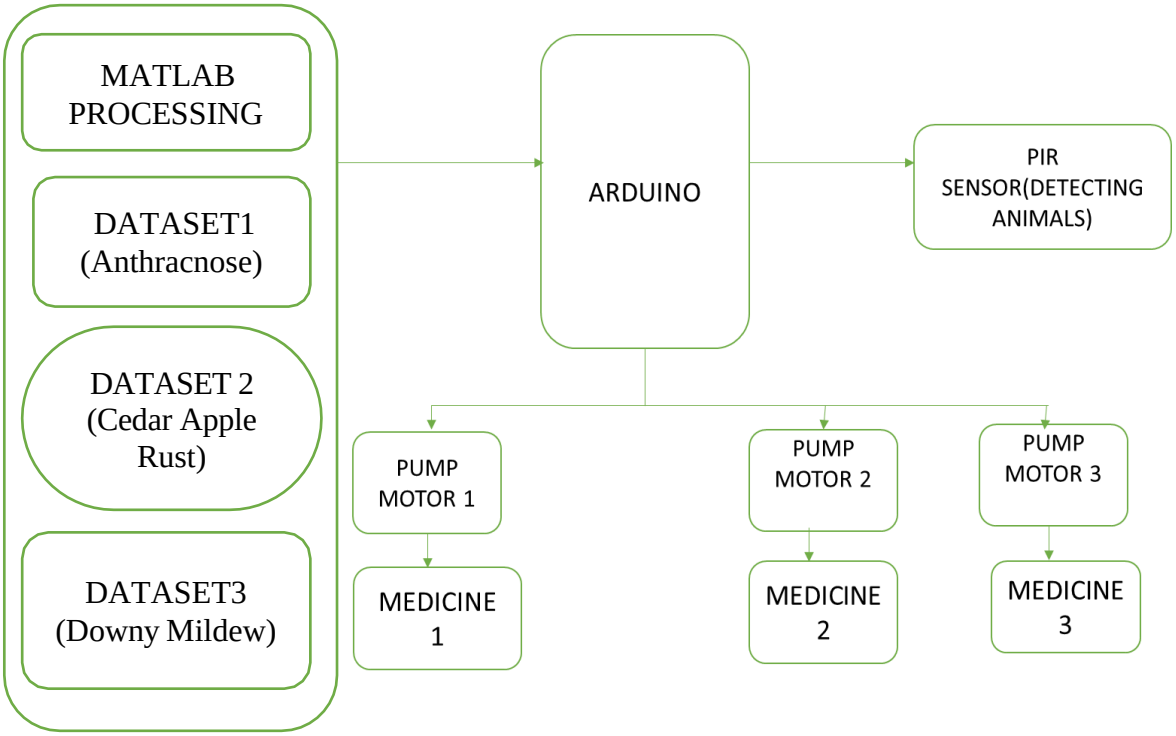

Figure 1 Block diagram for Crop disease identification

4) Result and analysis

The image data set which has been used to train the system has been obtained from plant village social media site. Then random pictures of leaves affected by diseases and that of healthy ones forms the training set for this model.The outlook of the hardware prototype is represented in figure 2

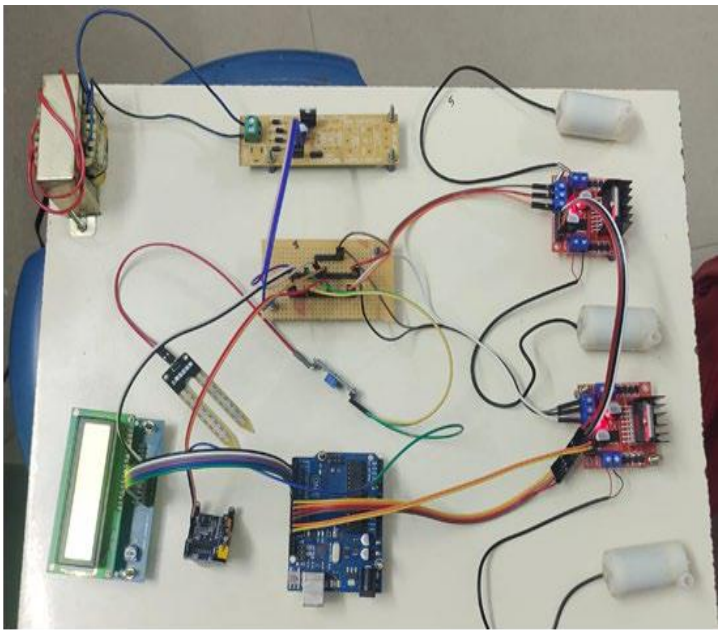

Figure 2 The Final Outlook Of The Prototype

The first step is to connect the soil moisture sensor with the Arduino board, in which the code is dumped. By, trial and error method the analog value which has to be maintained can be set; this value will be based on crop requirements and other environmental factors which are takeninto consideration. The code in the Arduino Software (IDE) is written in C language. The output displayed on the screen, is as shown in Table 1

Table 1 Basic output of the system

S.NO	Soil Condition	Sensor Output	GSM Output	Motor State
1	Dry	High	Low soil Moisture Detected Motor turned ON	On
2	Wet	Low	Soil Moisture is Normal Motor turned OFF	Off

This information has to be transmitted again to the farmer or the concerned parties, so that they are always aware above the condition of the soil and the status of the pump. So, that their activities related to the farm can be planned accordingly, to achieve this objectivecondition of soil (the input data received) the pump is turned on or switched off by the micro-controller. The system worked well without any problems. For the disease detection, the MATLAB software with CNN (Convolutional Neural Network) has been used. The system hasbeen trained for plant diseases related to grape and strawberry.

The following table shows the output for few of the leaves (healthy and unhealthy) which have been tested by using the disease detection algorithm. The classification results, along with the other parameters have been compiled and are as follows for the leaves shown in table 2

Table 2 Classification results

Figure	Classification Result	Accuracy of Kernel	Affected Region
	Grape healthy	95.1613	NA
	Grape Leaf blight (Isariopsis Leaf Spot)	96.7742	42.3764
	Strawberry healthy	96.7742	NA
	Strawberry Leaf scorch	96.7742	53.8165

5) Conclusion

The process of making a possible, low price sensible irrigation system which may lower power, labour and water consumption has been mentioned. By the employment of this technique, the frequent visits to the farm can come back down greatly, facultative the farmer to specialise in different activities. this technique also will, update the farmer from time-to-time regarding the standing of the pump and therefore the water content level of soil, by causation a message to the mobile with the assistance of GSM Module. This model also will facilitate to spot the sort of diseases occurring within the plant, by mistreatment the pictures of the leaves. The system are ready to confirm the particular variety of sickness supported the symptoms shown within the leaves. This system has been created in mind keeping the scattered and fewer land holdings possessed by Indian farmers, therefore the stress is additional on price effectiveness and ease. If enforced this technique may also increase the fertility level of the soil, and can aid in maintaining the best growth of plant.

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