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Pest Free Groundnut using ML Techniques

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Abstract

Plants are very important to the earth and all living things. Plant diseases are a kind of destruction of the normal state of plants, which can interrupt or change their life functions. Leaf disease is the most common disease in most plants. One of the ultimate key factors in reducing production is the onset of disease. Peanut plant diseases, such as fungi, soil-borne and viruses. In this article, the software certainty to automatically classify peanut leaf diseases is used. This method will increase the yield of crops. It includes the number of steps. Various image processing techniques use K nearest neighbours (KNN). In order to improve the performance of existing algorithms, the SVM classifier is replaced with KNN classification. n order to improve the speed and accuracy of the network for identifying and classifying different disease-infected areas on peanut leaves, a classic neural network algorithm is used. In this article, the KNN classifier algorithm is used to classify 4 different diseases.

Keywords:, Image Preprocessing, Detection & Classification Of Plant Disease, KNN Classification, Neural Network, Precision Agriculture.

1. Introduction

India is famous for agriculture, which means that most people are dedicated to the agricultural industry. Agriculture plays an important role in the economic sector. Most plants are infected with mutated fungal and bacterial diseases. Due to the exponential population trend, climatic conditions also cause plant diseases. The main challenge of sustainable development is to reduce the use of pesticides, save environmental costs and improve quality. Accurate, accurate and early diagnosis may reduce the use of pesticides. In India, 70% of the population depends on agricultural production, mainly because peanut plant diseases have fallen into a dilemma, which may lead to a significant decline in the advantages and capabilities of agricultural products. Identify plant diseases.

Among the peanut yield diseases in both the chariff and summer periods are stem rot (sun rot), leaf spot (early and late), rust and bud necrosis. Among the germ and plantlet diseases, collar rot / seedling blight, stem rot / sclerotium wilt or dry root rot have been identified as economically important diseases. These diseases cause high mortality of seedlings, which results in a heterogeneous stand, mainly on sandy loam soil, and reduces the yield by 25-50%. Among the fungal diseases of leaves, early leaf spot, late leaf spot and rust are of significant economic importance. Early leaf spot is caused by genus Cercospora arachidicola Hori and late leaf spot is caused by Phaeoisariopsispersonata Berke & Curt, each ordinarily stated as "tikka disease". These diseases occur where peanuts square measure fully grown.

The user needs to select a specific diseased area in the leaf, and then send the cropped image to the processing. Specifically, we focus on predicting the diseases such as alternate streptococci, anthracnose,

staghorn spores, bacterial wilt and leaf spot. This is very useful for identifying different diseases on crops. It provides various methods of using image processing and data mining to study crop diseases/traits. In addition, the infected area and the affected percentage were also measured. The concept of backpropagation is used to adjust the weight of the training database.

2. LITERATURE SURVEY

Ghaiwat et al. A research of varied classifier techniques which will be wont to classify crop leaf diseases is planned. For the given check example, the KNN methodology appearance to be the foremost appropriate and therefore the simplest of all algorithms used for sophistication prediction. If the coaching information isn't linearly severable, it's problematic to make your mind up the best factors in SVM, that appears to be one in all its shortcomings [1].

S. Arivazhagan et al. [4] Use texture features to detect unhealthy areas of plant leaves and classify them (2013The malady recognition method includes some steps, among that the four main steps area unit as follows: 1st, use color as input in RGB image The structure is reworked, and so the inexperienced pixels area unit cloaked and removed employing a specific threshold, and so the segmentation method is performed additional, and texture statistics area unit calculated for helpful segmentation. Finally, the classifier is applied to the extracted options to classify diseases. The strength of the rule is proven by the experimental results of victimization regarding five hundred plant leaves within the info.

Harshadkumar B Prajapati, Jitsh Shah, Vipul Dabhi [5] Detection and classification of rice plant diseases (2017) during this proposal characteristic diseases from plant pictures is one attention-grabbing analysis space in agriculture wherever machine learning ideas may be applied laptop. The article presents a image system for police investigation and classifying rice diseases supported pictures of infected rice plants. This image system was developed when careful experimental analysis of assorted techniques utilized in image process operations. we have a tendency to contemplate 3 rice plant diseases, particularly microorganism blight, brown spot, and leaf crush. we have a tendency to take photos of infected rice plants with a camera from the rice field. we have a tendency to by trial and error value four background removal techniques and 3 segmentation techniques.

2.1 Limitations of existing work:

- In some cases, implementation still lacks accuracy of results. Need more optimization.
- They used a simple image processing classifier algorithm.
- For the detection of plant diseases, only experts can complete the identification and detection of plant diseases through visual observation.

3. PROPOSED SYSTEM

Use k-means clustering algorithm to predict leaf diseases to improve performance models, and plan to develop hardware to monitor and control peanut pests. This involves several steps,

- Use the estimator to automatically initialize the cluster center, so no user input is required during segmentation. • Improve the detection accuracy through the proposed algorithm.

3.1 Plant diseases-basic principles :

In the field of crop production, plant diseases are an important factor in reducing the visibility and quantity of plants. The common methods followed in plant diseases are classification and detection

models. Both classification and detection models have been extensively studied in the engineering and IT fields.

3.2 Bacterial disease:

Bacterial diseases are commonly referred to as "bacterial leaf spots." It arises from small yellow-green lesions on young leaves, and is usually found to be deformed and distorted, or appear as dark, water-soaked, or greasy, appearing on older leaves.

3.3 Viral disease:

All viral diseases will reduce the yield to some extent, and the life span of plants infected by the virus is usually very short. The most likely symptoms of virus-infected plants usually appear on the leaves, but some viruses may cause them on leaves, fruits and roots. Viral diseases are difficult to analyze. Due to the virus, the leaves are seen as wrinkled, curled and may grow too small.

3.4 Fungal disease:

Fungal diseases affect contaminated seeds, soil, yield, weeds and are blowout by breeze and water. In the preliminary tissue, it appears as a lower or more experienced removal, as a soaked gray-green spot. Afterwards, these spots become obscure and incomprehensible, at this time, the growth of white fungi is scattered below. In the pile of wool, yellow to white stripes appear on the upper surface of the older scavengers. It spreads outward on the surface of the leaf, making it yellow.

4. PROPOSED METHODOLOGY

The flowchart is shown in Figure 1. Digital cameras or similar devices area unit wont to take pictures of various varieties of leaves then wont to determine the affected areas within the leaves. Then, differing types of image process techniques area unit applied thereto to method these pictures to get totally different and helpful functions required for later analysis functions. The algorithm written below illustrates the step-by-step method for the proposed image recognition and segmentation process This article includes several steps: image acquisition, image preprocessing, image segmentation, feature extraction and classification based on neural networks. It works as follows:

4.1 Image Acquisition

The initial method is to gather knowledge from public repositories. It takes the image as input for additional process. we've adopted the foremost well-liked image domain, thus we are able to use any format like .bmp, .jpg, .gif because the input of the method.

4.2 Image preprocessing

Since the image is obtained from the sector, it's going to contain noise like dirt, spores and water spots. the aim of information preprocessing is to eliminate the noise within the image, thereby adjusting the constituent price. It will improve image quality.

4.3 Image segmentation

Image segmentation is that the third step of our projected technique. Use Otsu classifier and k-means clustering algorithm to cluster the segmented images into different sectors. Before clustering the images, the RGB color model is reborn to the research lab color model. the looks of the research lab color model is to simply cluster the metameric pictures.

4.4 Feature extraction

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Feature extraction is a very important a part of unwellness detection. It plays an important role in identifying objects. Feature extraction is employed in several applications of image process. Color, texture edge, and form square measure options and square measure used for illness detection. Monica huria et al. used color, shape, and texture because the characteristics of illness detection.The morphological result was found to provide more results than any other feature. Texture shows how colors are distributed in an image, and how hard the image is.

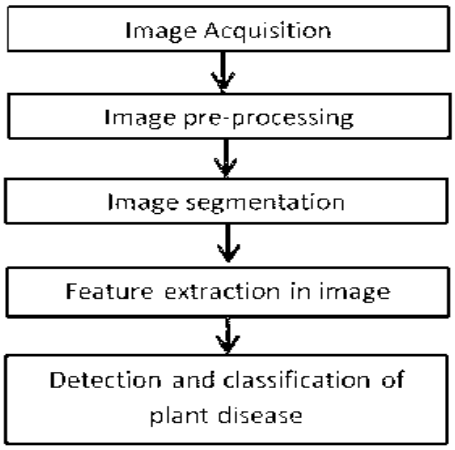

Fig 1- Flowchart

4.5 KNN algorithm

The KNN process is shown in Figure 2. The family of k-nearest neighbor (KNN) classification algorithms and regression algorithms is usually called memory-based learning or instance-based learning. typically it's additionally known as lazy learning. These terms correspond to the most ideas of KNN. The conception is to exchange model creation by memorizing coaching information sets, then use the information to create predictions. The KNN algorithmic rule uses a majority balloting mechanism. It collects information from the coaching information set and later uses this information to create predictions on new records. for every new record, confirm the kth most up-to-date record within the coaching information set. supported the worth of the foremost recently recorded target attribute, a replacement record is foreseen.

The KNN algorithmic program extends this method by employing a sure range of k≥1 of the closest coaching instances rather than mistreatment only 1 instance. Typical values vary from one to many dozen. The result depends on whether or not you're mistreatment the KNN algorithmic program for classification or regression.

Within the KNN classification, the anticipated category label is decided by ballot for the closest neighbors, that is, the bulk category label within the set of elect k instances is came back.

• In KNN regression, the mean value of the target functions of the nearest neighbors is returned as the predicted value.

• By using a certain number of k≥1, you can control the trade-off between overfitting prevention and solution. Preventing overfitting is vital for rackety information. Resolution could also be vital to induce totally different predictions for similar cases.

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KNN continues to be a much better alternative for applications wherever forecasts aren't needed ofttimes, however accuracy is vital.

4.6 Recognition and cataloguing of plant diseases

The final stage is to detect diseases and, with the help of diseases, classify plants that match the diseases with the given data set. For disease detection and classification, we are implementing deep learning algorithms. The deep learning algorithmic rule is employed to classify the desired image into the acceptable unwellness, therefore it'll be straightforward to notice the unwellness and realize the proper medication. The deep learning algorithm is the part where we find the correlation count of the pixels by comparing the image with the data set. Based on the correlation count, we will find matching diseases.

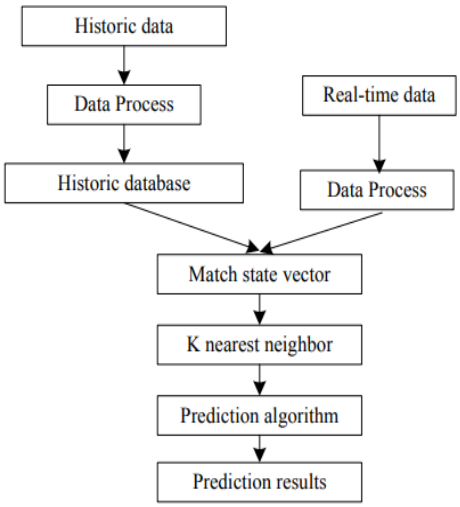

Fig 2- KNN Flow

4.6.1 Deep learning algorithm

- Upload images and read them into pix [] []
- Initialize pixels with image pixels [] [].
- For i = 0 to pix [] []. Len
- One. Match the pix [] [] attributes with the attributes of the pixels in the dataset
- B. Store matching results in db
- •

ends at

- Calculate the weight of each pixel.
- Calculate z to match the disease z = sum(w)
- Take the average of z = avg(z)
- Filter diseases with z value less than the average (z)
- Transmit the output of the first layer to the second layer
- Take the average of z = avg(z)
- Filter diseases with z value less than the average (z)

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•Transmit the output of the first layer to the third layer

• The output of the third layer will be delivered to the user.

4.7 Advantages

• Efficient and user-friendly system.

• Improved accuracy with the help of deep learning algorithms.

• Increased the number of layers of deep learning algorithms to obtain the most accurate and appropriate results.

• Compared with other systems, our system is very fast, because segmentation can reduce processing time.

5. RESULTS AND DISCUSSION

The test input is shown in Figures 3, 4, 5, and 6. The test result of the input image shows the disease detection in a successful manner. Each type of leaf was trained and tested and tested. It can be seen from the results that compared with other methods, the proposed algorithm can improve the detection accuracy of the neural network. The performance of the system can achieve accurate output within the assumed assumed time range.

Fig 3- Blight

Fig 4- Leaf spot

Fig 5- Sun Rot

Fig 6- Necrosis

5.1 Simulation Results

By using MATLAB and assigned codes, it is possible to predict the outcome of each stage until detection.

Fig 7- Masked Image

Fig 8- Gray Image

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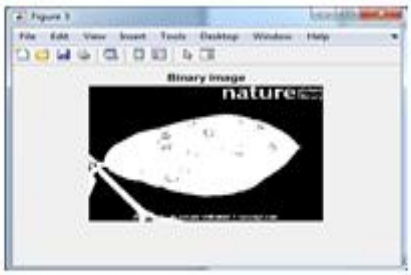

Fig 9- Binary Masked Image

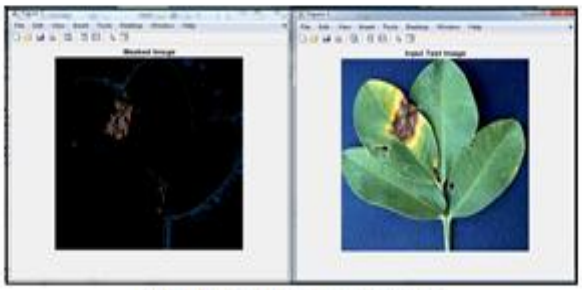

Fig 10- HSV Segmentation

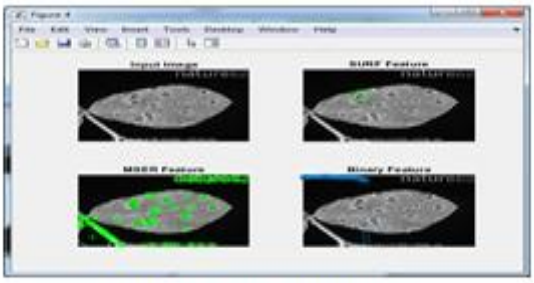

Fig 11- Feature Extraction

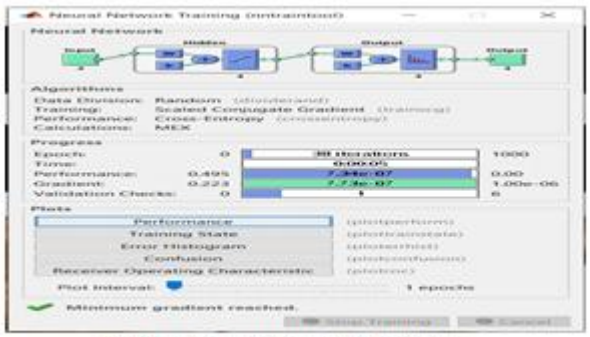

Fig 12- Neural Network Training

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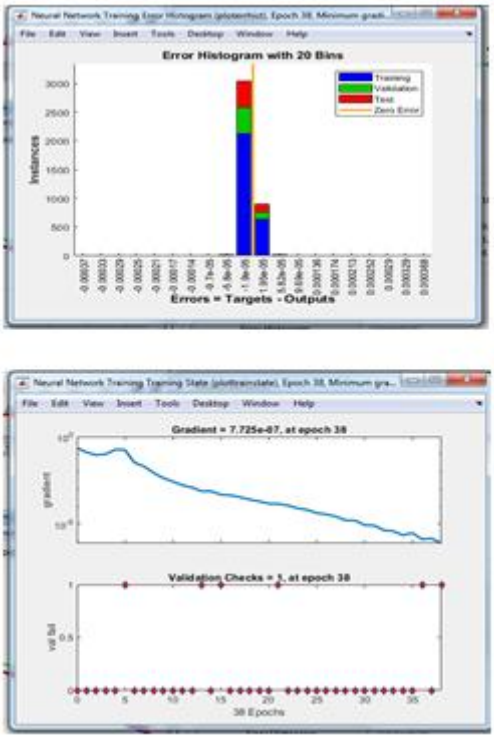
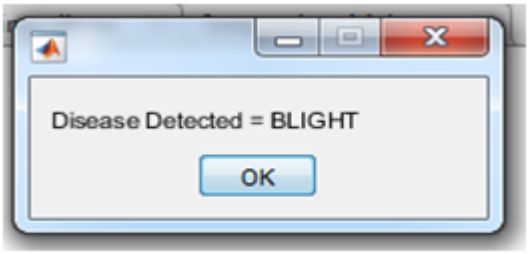


13- Performance Evaluation



14- Predicted Disease

6. CONCLUSION

An efficient and low-cost real-time disease monitoring system is proposed to classify infected and healthy peanut leaves. This project implements the innovative idea of identifying affected crops and

providing remedial measures in the agricultural sector. Using the KNN algorithmic rule, the infected leaf space is metameric and analyzed. pictures square measure uploaded to our application for illness identification. it's a decent alternative for the farming community, particularly in remote villages. It acts as Associate in Nursing economical system in reducing the bunch time and space of the infected region. The feature extraction technique helps isolate the infected leaf moreover as classify plant diseases. The inherent voice guidance device helps United States of America guide United States of America through the complete method.

Since the future improvement of the project is to automatically develop open multimedia (audio/video) related to diseases and their solutions after diseases are discovered. Use the IoT design and implementation framework in precision agriculture.

References

[1]Jaya Sil et. al "Rice Disease Identification using Pattern Recognition Techniques", Proceedings of 11th International Conference on Computer and Information Technology (ICCIT 2008), 25-27 December, 2008, Khulna, Bangladesh, pg.no420- 423, (IEEE).

[2]M. Kayamori et. Al. "Matching Based Cercospora Leaf Spot in sugar beet" The 11th International Conference on Quality Control by Artificial Vision, pp.99-106. 2013.

[3]Cordelia Schmid et. Al. "A performance evaluation of local descriptors", Pattern Analysis and Machine Intelligence", IEEE Transactions on Pattern Analysis and Machine Intelligence, Volume 27, Issue 10, 2005, pp 1615 – 1630.

[4]Dr.G.Suresh, Dr.A.Senthil Kumar, Dr.S.Lekashri, Dr.R.Manikandan. (2021). Efficient Crop Yield Recommendation System Using Machine Learning For Digital Farming. International Journal of Modern Agriculture, 10(01), 906 - 914. Retrieved from http://www.modern-journals.com/index.php/ijma/article/view/688

[5]Dr. R. Manikandan, Dr Senthilkumar A. Dr Lekashri S. Abhay Chaturvedi. "Data Traffic Trust Model for Clustered Wireless Sensor Network." INFORMATION TECHNOLOGY IN INDUSTRY 9.1 (2021): 1225–1229. Print.

[6]Dr.A.Senthil Kumar, Dr.G.Suresh, Dr.S.Lekashri, Mr.L.Ganesh Babu, Dr. R.Manikandan. (2021). Smart Agriculture System With E – Carbage Using Iot. International Journal of Modern Agriculture, 10(01), 928 - 931. Retrieved from http://www.modern-journals.com/index.php/ijma/article/view/690