PLANT DISEASE PREDICTION USING THE INTERNET OF THINGS (IOT) AND MACHINE LEARNING – BLISTER BLIGHT IN THE TEA PLANT.

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ABSTRACT

Crop plant diseases seriously jeopardize agricultural productivity and long-term expansion. By taking preventative actions against their attacks, disease control benefits from early anticipation of illness assaults. Modern information and communication technologies (ICTs) are used in precision agriculture (PA) applications to improve sustainable development. Solutions for early disease prediction and proactive disease control against plant disease attacks are in high demand. The sickness can only be detected using the existing computer vision-based illness detection technology after it has already manifested. Using Internet data, these works aim to propose a machine learning technique for estimating the likelihood of a disease attack. The life cycles of plant diseases are closely correlated with environmental conditions. Utilizing environmental aspects of agricultural fields, plant disease incidence can be anticipated. The Multiple Linear Regression (MLR) model is utilized as the ML model since disease attack and environmental factors have a linear relationship. Using the ML approach, environmental parameters in the agricultural field based on the leaves.

With the help of the Internet of Things (IoT), plant diseases can be efficiently predicted. Agriculture is currently a major issue in the era in which we live. Protecting the wellbeing of the plants and crops is the key challenge with agricultural growth. One industry that significantly affects people's lives and the state of the economy is agriculture.

Keyword: - *machine learning, GCR-MN, CNN, Kaggle*

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1. INTRODUCTION

The first symptoms of illness are found on the leaves, which are the most delicate part of plants. From the start of their life cycles until they are ready to be harvested, crops must be inspected for disease. Initially, the traditional naked eye monitoring method—a time-consuming process that required experts to physically inspect the crop fields—was used to monitor the plants for infections. In recent years, a number of techniques have been employed to create automated and semi-automatic plant disease detection systems, and automatic disease detection by merely examining the symptoms on the plant leaves makes it simpler and more affordable. These methods have so far shown to be more effective, rapid, and economical.

Farmers frequently lack a thorough understanding of the crops they are working with and the diseases that could affect them. Farmers can use this document effectively to boost productivity instead of visiting a specialist and asking for their advice. The main objective is not just to use image processing techniques to find the illness. Additionally, it links the user to an e-commerce website where they may compare pricing for the prescription prescribed for the identified condition and properly utilize it in accordance with the guidelines given. The study's main focus is on offering high precision and portability while also overcoming the limitations of past work in terms of accuracy and portability.

2. LITERATURE SURVEY:

For the purpose of predicting plant disease, machine learning algorithms are used. It makes use of a dataset with 310 rows and 11 attributes. Several methods are utilized to analyze the data, including decision trees, Naive Bays, neural networks, and visualizations including box plots and bar plots. As a conclusion,

Applying the methods that Here are some statistical tests that were conducted in order to determine workable output predictions using a specific built-in dataset and compare them to the methods using the data set. Other strategies can be better or worse than the ones being compared. The accuracy, however, varies according to the dataset sample that is chosen. IoT-Based Plant Disease Detection and Climate Monitoring We have created a system that demonstrates how the Internet of Things can be used to monitor general meteorological parameter conditions using a simple, accessible detection framework. Simple language is used to describe the integrated system building design and the connecting elements for precise parameter estimate by smart sensors and information transmission through the web. We learned from reading earlier writing that there is a need to advise ranchers on the condition of their fields, especially online, so all results are sent immediately to agriculturalists via mail letters charged in. Nonlinear estimation and classification, "The boosting technique to machine learning: An overview." Boosting is a general method for improving any learning system's precision. This chapter, which mostly discusses the AdaBoost algorithm, summarizes some recent boosting research, including analyses of the training and generalization mistakes of AdaBoost. The relationship between boosting and AdaBoost's logistic regression expansions for problems with multiclass classification; strategies for boosting that use human knowledge; and experimental and practical boosting work. The title of this article is supporting vector clustering. Data points are transferred using a Gaussian kernel to a high-dimensional feature space, where the smallest enclosing sphere is sought after. This sphere may be split up into multiple halves, each enclosing a separate group of points, when mapped back to data space. We outline a simple method for identifying these clusters. The soft margin constant aids in handling outliers and overlapping clusters, while the width of the Gaussian kernel controls the scale at which the data is probed. By changing the two parameters and minimizing the number of support vectors to achieve smooth cluster borders, the structure of a dataset is evaluated. One of the most popular uses of remote sensing data is to analyze land cover change using decision trees, vector machines, and maximum likelihood classification techniques. Various pixel-based classification algorithms have been developed throughout the years for the interpretation of remotely sensible data. The maximum likelihood classifier (MLC), support vector machines (SVMs), and decision trees (DTs) are the most notable. Particularly the DTs provide benefits that other treatments do not. They don't make any statistical assumptions and are quickly computed.

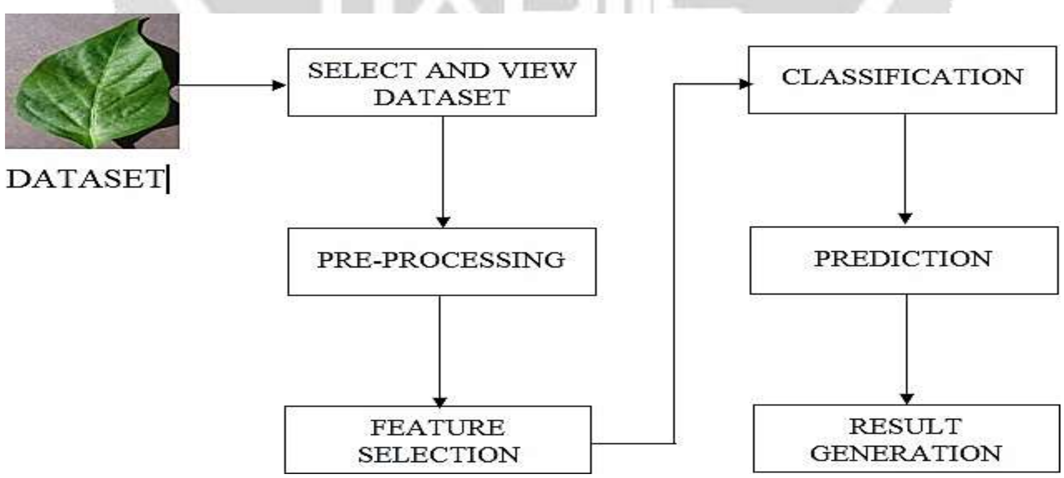

Fig-1 System Architecture

3. EXISITING SYSTEM:

The current system suggests using a Long-Term Memory neural network technique to finish the process of classifying leaf diseases. Although the detection of plant diseases is an interesting and practical topic, there hasn't been much research on it because there hasn't been any systematic investigation or use of massive datasets. Giving the dataset an acceptable structure from the perspectives of agriculture and image processing is the stage of creation that presents the greatest challenge.

Disadvantages It uses a data mining method to predict after converting the images into a data frame. It is challenging to apply the dropout approach to reduce the overfitting issue with LSTMs. A regularization technique called dropout eliminates input and recurrent connections to LSTM units from weight updates and activation during network training.

4. PROPOSED SYSTEM:

The suggested model is presented to overcome all of the flaws in the existing system. This system will increase the accuracy of the neural network discoveries by using the Deep Learning algorithm to identify the leaf disease digital picture dataset. It enhances the performance of the classification results overall. To increase accuracy, leaf disease predictions are made using an image of the disease.

Digital images are used in DENSENET121 to improve screening precision. Less time is spent identifying disease from images of leaves.

5. IMPLEMENTATION

MODULES:

1. Dataset selection and loading
2. Data preprocessing
3. Data splitting
4. Classification
5. Prediction

5.1 Dataset Selection and Loading

The process of choosing data for the dataset for PLANT VILLAGE is known as data selection. In this attempt, the condition is classified using LEAF digital photographs.
Digital images of plant leaf diseases are included in the dataset.

5.2 Data Pre-processing

Image data pre-processing is the process of extracting rescaled data from a dataset. Resizing an image collection to get data resize the image dataset The leaf digital pictures should be 64*64 in size. Getting information Variables in categorical data have a limited number of rescaled values. A variety of input and output variables are required by the majority of deep learning algorithms.

5.3 Data splitting

Data splitting is the process of dividing the given data into two sections, typically for cross-validation. One subset is used to create a predictive model, and the other is used to assess the model's performance. Creating training and testing sets of image data is a step in the evaluation of image processing models. The majority of the picture data from a data set is used for training, and a smaller portion of the data is utilized for testing when it is split into a training set and a testing set.

5.4 Classification

By using the shorter connections between layers, DenseNet121 (Dense Convolution Network) is an architecture that focuses on deepening deep learning networks while also making them more affordable to train. Each layer in the convolution neural network known as DenseNet121 is linked to all levels below it. For example, the first layer is connected to the second, third, fourth, and so on, while the second layer is linked to the third, fourth, fifth, and so on. In order to maximize information flow between network levels, this is done. Each layer gets input from all earlier layers and transmits its own feature maps to all succeeding layers to retain the feed-forward nature.

5.5 Prediction

It is a technique for predicting leaf disease using a dataset. With the help of this project, data from a dataset will be forecast efficiently by enhancing the overall accuracy of predictions.

6. CONCLUSION

In this study, images of plant leaf disease are examined using a deep learning classifier. The pre-processing method inputs the data from PLANT VILLAGE. In pre-processing, images are resized and converted into arrays. The feature selection method is then used to divide the dataset into training and testing datasets. All of the pictures are then scaled and turned into an array. Finally, the remote sensing scene from photographs is analyzed using the classification approach. Based on accuracy, predictions are made using the DENSENET121 deep learning algorithm. Additionally, graphical user interface models or internet programs have better task implementation. This technology also makes it easy to spot ill leaf images and provides a quick and accurate

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