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AI BASED CROP IDENTIFICATION WEBAPP

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ABSTRACT - *In general, agriculture is the backbone of India and also plays an important role in the Indian economy by providing a certain percentage of domestic products to ensure food security. But nowadays, food production and prediction are getting depleted due to unnatural climatic changes, which will adversely affect the economy of farmers by getting a poor yield and also help the farmers to remain less familiar in forecasting the future crops. This research work facilitates newbie farmers in this type of manner as to manual in sowing affordable crop through deploying machine learning, one of the superior technology in crop prediction. Convolutional Neural Network is a supervised learning algorithm that puts forth the way to achieve it . The picture records of the plants are gathered here, with an appropriate parameters like size, shape, color, and moisture content, which enables the plants to acquire a a success identity. In addition to the software, a cellular internet utility for Android is being developed. The users are encouraged to just click an image of a farm yield once it is uploaded will be taken automatically in this application to start the prediction process.*

Key Words: **Agriculture, Crop, Prediction Algorithm, Machine Learning, Convolutional Neural Network, Mobile.**

1. INTRODUCTION

Machine learning is a valuable decision-making tool for predicting the type of crops and agricultural yields. To aid crop prediction studies, several machine learning methods have been used. Machine learning strategies are applied in numerous sectors, from comparing client behavior. For some years, agriculture has been using machine learning techniques. Crop prediction is certainly considered one among agriculture's complicated challenges, and numerous fashions were evolved and verified so far. Because crop manufacturing is suffering from many elements together with atmospheric conditions, kind of fertilizer, soil, and seed, this undertaking necessitates the usage of numerous datasets. This means that predicting agricultural productiveness isn't a easy process; rather, it includes a chain of complex procedures. Crop yield prediction strategies can now moderately approximate the real yield, despite the fact that greater exquisite yield prediction overall performance continues to be desired. The challenge targets to apply supervised gaining knowledge of algorithms like CNN the usage of the dataset containing five forms of crops. The outcomes monitor that the advised system gaining knowledge of technique's effectiveness is as compared to the great accuracy with precision.

2. LITERATURE REVIEW

Jing Wei Tan and Siow-Wee Chang [1] suggest research on CNN is applied to extract the features from leaf images of selected tree species. Three different CNN models were used, namely, the pre-trained AlexNet CNN model, fine-tuned pre-trained AlexNet CNN model, and the proposed D-Leaf CNN model. The extracted features were then fed into a few classification approaches for learning and training purposes. Five classifiers were employed in this research which are CNN, Support Vector Machine (SVM), Artificial Neural Network (ANN), nearest Neighbour (k-NN), and Naïve Bayes (NB). A conventional method, which segmented the leaf veins by using the Sobel edge detection technique and performed vein morphological measurements, was used for benchmarking. Based on the literature review, this is one of the first few studies, which have applied CNN in tropical tree species classification, by using both leaves morphometric and venation pattern approaches.

Pankaja K and Dr. Thippeswamy G[2] suggest that endless plant species are accessible and all-inclusive. To oversee gigantic substance, the improvement of quick and successful classification techniques has transformed into a domain of dynamic exploration. As trees and plants are critical to the environment, precise Identification and grouping get important. Order strategy is helped out through several sub techniques. A recognizable proof or Classification issue is overseen by planning info information with one of the one-of-a-kind classes. In this technique, from the start, a database of leaf pictures is made, that involves pictures of test leaves with their equal plant data. Fundamental highlights are removed utilizing picture preparing methods. The highlights must be steady to make the recognizable proof framework powerful. Consequently, the plant/leaf is perceived utilizing AI procedures. In this paper, a review is introduced on the different kinds of leaf distinguishing proof procedure

Thi Thanh-Nhan Nguyen Et Al [3] is a mix of profound learning and hand-planned element for plant

distinguishing proof dependent on leaf and blossom pictures. The commitments of this paper are two-overlay. In the first place, for every organ picture, we have played out a near assessment of profound learning and hand-structured element for plant distinguishing proof. Two methodologies for profound learning and hand-structured component that are convolutional neuron arrange (CNN) and bit descriptor (KDES) are picked in our trials. Second, given the consequences of the main commitment, we propose a technique for plant ID by late combining the distinguishing proof aftereffects of leaf and blossom. Trial results on ImageClef 2015 dataset show that hand-planned element beats profound learning for all-around compelled cases (leaf caught on basic foundation). Notwithstanding, profound learning shows its power in characteristic circumstances. Additionally, the mix of leaf and bloom pictures improves essentially the distinguishing proof when looking at leaf-based plant recognizable proof.

Hulya Yalcin and Salar Razavi [4] take the benefits of present-day enlisting advancement to improve the capability of plant fields is inevitable with creating stresses overextending world masses and limited food resources. Preparing advancement is imperative not solely to endeavors related to food creation yet moreover to hearty individuals and other related authorities. It isn't unexpected to extend the gainfulness, add to an unrivaled appreciation of the association between common segments and strong harvests, reduce the work costs for farmers, and add the movement speed and accuracy. Realizing AI methodologies, for instance, significant neural frameworks on cultivating data have expanded monster thought starting late. One of the most huge issues is the customized course of action of plant species considering their sorts. Customized plant type ID procedure could offer an extraordinary help for utilization of pesticides, arrangement, what's more, gathering of different species on schedule to improve the creative strategies of food and medicine organizations. In this paper, we propose a Convolutional Neural Network (CNN) structure to arrange the sort of plants from the image groupings accumulated from splendid agro-stations. The first challenges introduced by lighting up changes and deblurring are cleared out with some preprocessing steps. Following the preprocessing step, Convolutional Neural Network building is used to isolate the features of pictures. The improvement of the CNN design and the significance of CNN are vital core interests that should be underscored since they impact the affirmation capacity of the structure of neural frameworks. To survey the introduction of the system proposed in this paper, the results traversed CNN model is differentiated and those got by using an SVM classifier with different pieces, similarly to feature descriptors, for instance, LBP and GIST. The introduction of the philosophy is taking a stab at a dataset assembled through an organization-maintained endeavor, TARBIL, for which more than 1200 agro-stations are gotten all through Turkey. The exploratory results on the TARBIL dataset allow that the proposed system is truly suitable.

Surbhi Gupta Et Al [5] Plant species recognizable proof spotlights on the modified ID of plants. But a lot of points like leaves, owers, natural items, and seeds could add to the decision, anyway leaf features are the most huge. As a plant leaf is for each situation continuously accessible when stood out from various bits of the plants, it is clear to peruse it for plant recognizable proof. The current paper introduced a novel plant creature bunches classifier considering the extraction of morphological features using a Multilayer Perceptron with Ad boosting. The proposed framework includes pre-getting ready, feature extraction, incorporate decision, and characterization. From the start, some pre-getting ready methodologies are used to set up a leaf picture for the segment extraction process. Distinctive morphological features, i.e., centroid, noteworthy turn length, minor center length, strength, outskirt, and heading are isolated from the propelled pictures of various orders of leaves. Unmistakable classifiers, i.e., k- NN, Decision Tree, and Multilayer perceptron are used to test the precision of the count. Ada Boost's approach is examined for improving the precision pace of the proposed structure. Test outcomes are procured on an open dataset (FLAVIA) downloaded from http://avia.sourceforge.net/. A precision pace of 95.42% has been cultivated using the proposed AI classifier, which beat the state-of-the craftsmanship counts.

Sigit Adinugroho, Yuita Arum Sari [6] Plant species identification focuses on the programmed identification of plants. Albeit a lot of angles like leaf, owers, organic products, and seeds could add to the choice, however, leaf highlights are the most significant. As a plant leaf is in every case progressively available when contrasted with different pieces of the plants, it is clear to read it for plant identification. The current paper presented a novel plant animal groups classifier in light of the extraction of morphological highlights utilizing a Multilayer Perceptron with Adaboosting. The proposed system involves prepreparing, highlight extraction, including choice, and classification. At first, some pre-preparing strategies are utilized to set up a leaf picture for the component extraction process. Different morphological highlights, i.e., centroid, significant pivot length, minor hub length, robustness, border, and direction are separated from the advanced pictures of different classifications of leaves. Distinctive classifiers, i.e., k-NN, Decision Tree, and Multilayer perceptron are utilized to test the exactness.

Sigit Adinugroho, Yuita Arum Sari [7] Plant species identification focuses on the programmed identification of plants. Albeit a lot of angles like leaf, owers, organic products, and seeds could add to the choice, however, leaf highlights are the most significant. As a plant leaf is in every case progressively available when contrasted with different pieces of the plants, it is clear to read it for plant identification. The current paper presented a novel plant animal groups classifier in light of the extraction of morphological highlights utilizing a Multilayer Perceptron

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Esraa Elhariri & Et Al [8] An arrangement approach based on Random Forests (RF) and Linear Discriminant Analysis (LDA) calculations for arranging the various kinds of plants. The proposed approach comprises three stages that are pre-preparing, including extraction, and order stages. Since most kinds of plants have novel leaves, so the order approach introduced in this examination relies upon the plant's leave. Leaves are not the same as each other by quality, for example, the shape, shading, surface, and edge. The utilized dataset for this investigation is a database of various plant species with all out of just 340 leaf pictures, which was downloaded from the UCI-Machine Learning Repository. It was utilized for both preparing and testing datasets with lO-crease cross-approval. Exploratory outcomes indicated that LDA accomplished an order precision of (92.65 %) against the RF that accomplished a precision of (88.82 %) with a mix of shape, first request surface, and Gray Level Co-event Matrix (GLCM), HSV shading minutes, and vein highlights.

3. PROPOSED WORK

In the Proposed system, we are proposing an experiment on 5 different crop species. The current work depends on the accuracy factor. In a proposed system, we are going to overcome the existing drawbacks of low accuracy with the help of the TensorFlow framework. Our work is based on machine learning techniques for image processing with better accuracy than previous work and image detection with advantages of huge accuracy.

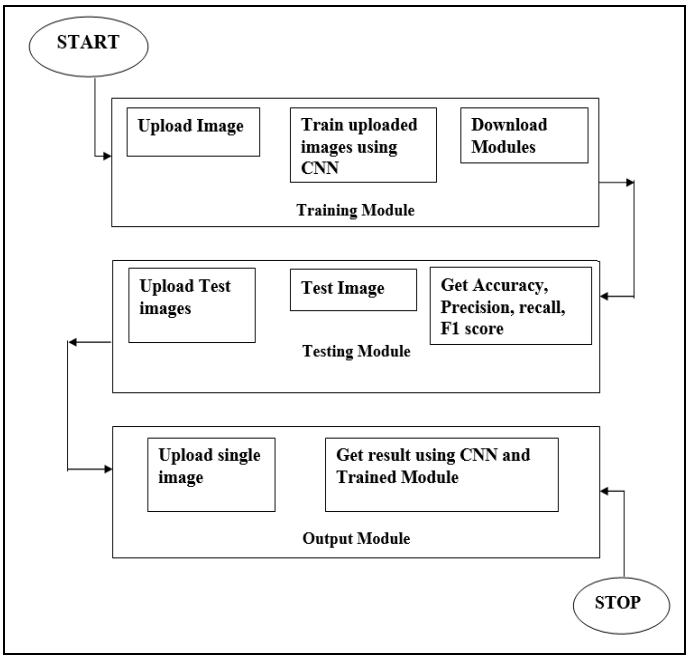
We develop the following modules:

1) Testing
2) Training

The development of image processing solutions has become one of the most popular use cases for Convolution neural networks. A CNN can recognize shape, size, color, and texture, detect and classify objects, and detect and recognize them. In our project, we defined modified CNN architecture with the TensorFlow framework and use CNN classifier for detection as classifying images based on a series of regions of interest (ROIs) for an image. However, there are many challenges in using CNNs for recognizing and detecting images. Recently, While working on this project, we are facing a few major challenges:

1. Finding a balance between accuracy and performance
2. Working with real-time image sequences.

4. DATA FLOW DIAGRAM



5. WORKING

There are broadly two modules: Training and Testing Module.

Training and testing steps:

step 1: Upload images with labels with 5 classes

step 2: resize images with 64x64 pixels

step 3: train images using CNN with the following CNN algorithm steps. After finishing training, a loss graph and a model summary will be generated.

1. set your neural network options
2. initialize your neural network
3. normalize data and train the model
4. train the model
5. use the trained model
6. make a classification

step 4: For testing, upload testing images and resize them with 64x64 pixel images each.

step 5: Test the pre-train model using testing images testing will return the confusion matrix, accuracy, precision, and recall of the pre-train model. Following CNN algorithm steps will be done in the testing model.

1. Load the pre-trained model, the weights, and the metadata.

2. Define a function to handle the results of your classification

Step 6: In the output model single image prediction will be done. Following CNN algorithm steps will be done in the output model.

1. Load the pre-trained model, the weights, and the metadata.

2. Define a function to handle the results of your classification

6. RESULTS

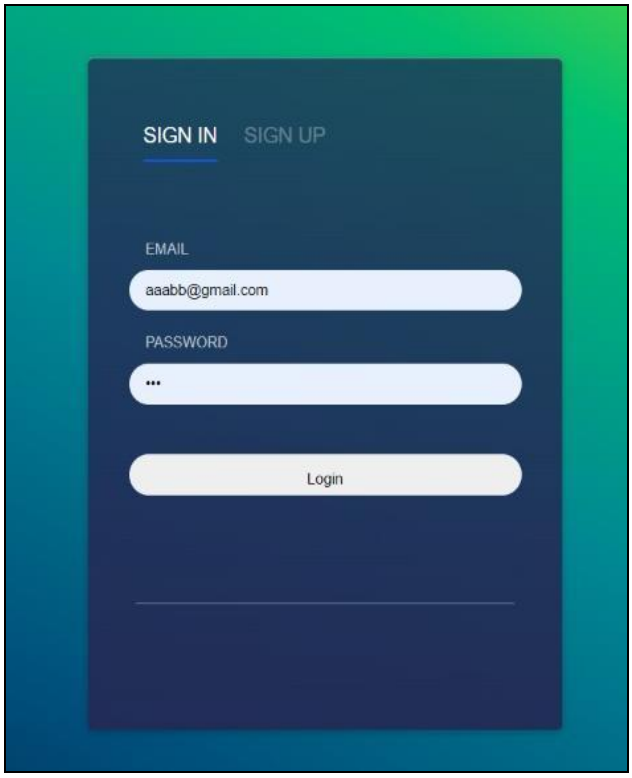


Fig -1: Main Homepage of web application in which User login/signup

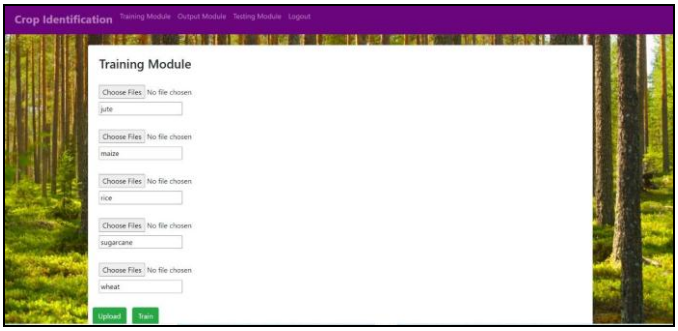


Fig: -2: Training Module

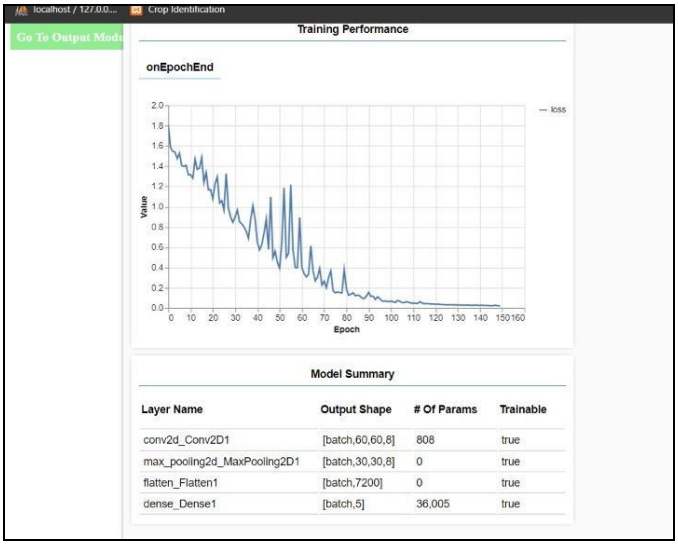


Fig: -3: Training Performance

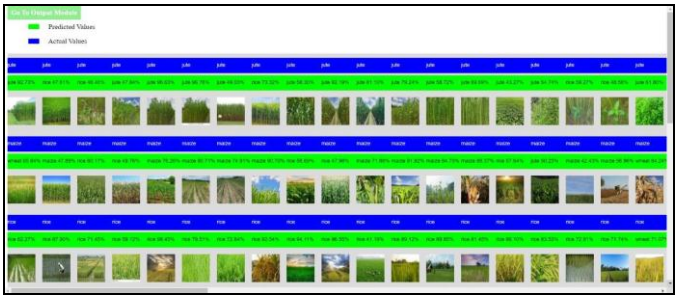


Fig: -4: Trained Dataset

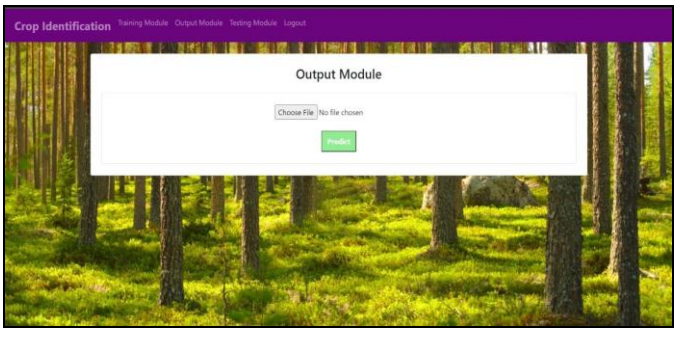


Fig: -5: Output Module

7. CONCLUSIONS

A Crop species identification approach is employed using computer vision and machine learning techniques to classify plant images. The study has been conducted in phases like image preprocessing, image segmentation, feature extraction, and finally classification of the image. A combination of texture and color features was extracted and then the CNN classifier was used for classification. The system was tested on the dataset and attained an accuracy of more than 70% with the help of the tensor flow framework. The model could automatically classify 5 different crop species. The proposed method is very easy to implement and efficient. Although the model achieved an accuracy of more than 70%, it still lags in comparison to methods implementing neural networks or deep learning techniques. Finally, the objective is to make the idea of automatic plant species identification more realistic by working on a live dataset.

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10. BIOGRAPHIES

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