AGVENTURE

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Abstract - INDIA is predominantly an agricultural country, where agriculture sector plays a vital role in accelerating the economic growth. Agriculture remains the most important sector of Indian economy, contributing 19.6 percent to the national GDP and providing employment for 63 percent of the population. A National Agricultural Census report has said India is currently home to 93 million farmer families. The report also highlighted the fact that there over four million landless farmers, with near 59.7 million farmers cultivating other people's land. To help the farmers and improve in agricultural sector, we design and develop a web based application "Smart Farming System". Farmers of India can learn and share various knowledge and problem facing during farming through this system. Farmers can acquire information around various diseases and resolver on their problems. They can get support in various agricultural activities "Smart Farming System". To develop this system, we used HTML5, CSS, Bootstrap, and JavaScript. In addition, the PHP framework is used to manage the MySQL database.

Index Terms - Disease prediction system, Crop recommendation system, Yield quality system,

I. INTRODUCTION

1.1 AGRICULTURE AND RURAL DEVELOPMENT:

Agriculture, or farming as it is commonly known, is the practice of growing crops and raising cattle. It contributes greatly to a country's economy. Many raw materials and food products are produced by agriculture. Raw materials such as cotton, jute is used by industries for manufacturing various products that is used in day-to-day life. Agriculture not only helps for food production but also produces resources needed for creating commercial products. Agriculture used traditional techniques for cultivation of crops. Conventional or traditional farming is mostly practiced all over the world. It involves techniques suggested by experienced farmers. These techniques are not precise hence results in hard labour and time consumption.

Precision agriculture additionally referred to as precision farming is a farming control system that provides a comprehensive approach to deal with the spatial and temporal crop and soil variability to maximize profitability, optimize yield, improve quality of production. Precision Agriculture is an efficient way to improvise the yield..

1.2 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING:

Machine learning makes agricultural applications incredibly efficient and simple. Data acquisition, model building, and generalization are the three stages of the machine learning process. The majority of cases, machine learning algorithms are used to deal with complex problems when human competence is insufficient. Machine learning may be used in agriculture to forecast soil parameters like organic carbon and moisture content, as well as crop yield prediction, disease and weed identification in crops, and species detection. Traditional machine learning is improved by Deep Learning by adding additional complexity to the model and changing the input with various functions that allow data representation in a hierarchical manner, through multiple faced during cultivation. It mainly focuses on recommending the crops based on weather parameters, suggesting the nutrients requirements and specifying the Growing Degree Days. It also helps in identifying the weeds and recommending herbicides for the same. Many insects ruin the crops hence pesticides are recommended based on the insects that are present in the field. And finally cost estimation is very much needed in these recent times. Crisis, uncertainties would result in great loss. Hence forecasting the cost for cultivating a crop is necessary to plan for future uncertain events. This work specifies various costs in cultivation for future years.

As we have seen that most of the farmers today face a lot of problems even though a lot of solutions and technologies helping agricultural farmers are available which always doesn't solve the problem. Farmers and agricultural technology are left un-noticed when brought under the light of technology. So here we are with an optimal solution where we deal with many problems faced by Farmers and creating a business model which helps the farmers to get a good revenue out of their crops yield.

II. LITERATURE REVIEW

Crop growth is primarily influenced by the soil's macronutrient and trace mineral content of the soil. Soil being the broad representation of several environmental factors including rainfall, humidity, sunlight, temperature and soil ph. The use of a support vector machine and decision tree algorithm to distinguish the type of crop based on micronutrients and meteorological characteristics has been presented as an efficient means of predicting the crop. Three crops where selected such as rice, wheat and sugarcane.

Linear Regression model was used to predict the production value against the climatic parameters such as rainfall, temperature and humidity. The scores of all these algorithms were below 90% . This work was just a model implementation using the dataset. Web interface needs to be implemented so that even common people can use it efficiently. All the values need to be provided manually for the model to predict the crop. The proposed work helps in extracting temperature and humidity values using Web Scraping.

Weeds grown along with soybean can be detected using K-means and CNN model. K- means were used for identifying the features of the images and convolutional neural network for was used for classifying the weeds and soybean. It also suggests that accuracy can we improved by fine tuning the CNN model. CNN model provides an efficient way to detect the weeds present among crops. When used along with K-means initially the images and its augmentations are clustered and on using CNN model helps to precisely identify the weed.

only predicting the image the proposed model also helps to provide details about the herbicides that can be used which is an additional information for the user.

2.1 CROP RECOMMENDATION SYSTEM

Data mining is the practice of examining and deriving purposeful information from the data. Data mining finds its application in various fields like finance, retail, medicine, agriculture etc. Data mining in agriculture is used for analysing the various biotic and abiotic factors. Agriculture in India plays a predominant role in economy and employment. The common problem existing among the Indian farmers are they don't choose the right crop based on their soil requirements. Due to this they face a serious setback in productivity. This problem of the farmers has been addressed through precision agriculture.

2.2 DISEASE PREDICTION SYSTEM:

The software architecture was based on the MVC design pattern (Model-View Controller), an application development model that uses layers during the programming. It was divided into three layers or functional areas: Model, View and Controller (Viet and Herrmann, 2003). The Model part represented the "business logic", the state and behaviour of components, managing and leading all transformations. The Controller determined the flow of the application, managing the user interaction/system with the Model (Figure 1). Servers were designed to process requests and ensure the execution. They were divided into five servers: weather data management server (WDMS), database server (DBS), disease forecasting model server (DFMS), web server (WS), and crop model server (CMS). The WDMS consisted in a recovery data module to retrieve weather data from remote sites, updating the data into the DBS.

2.3 AGRICULTURE SYSTEM

Agriculture is a foremost field within the world, and it's the backbone in the Republic of India. Agriculture has been in poor condition. The impact of temperature variations and its uncertainty has engendered the bulk of the agricultural crops to be overripe in terms of their manufacturing.. ML is the method of finding new models from giant information sets.. Area and production are among the meteorological information that's made by necessary data. This paper figures out the yield recommendation of the crop by the accurate comparison of numerous machine learning ML regressions where the overall percentage improvement over several existing methods is 3.6%.

Attributes	Crop_Recommendation.csv	Soil.csv	Crop_names.csv
Source	https://www.kaggle.com/atharvaingle/crop-recommendation-dataset	https://www.kaggle.com/shekharyada/crop-soilcsv	https://www.kaggle.com/aj021977/crop-names
No.of samples	2200	43	35
Attributes	8	2	2
Used for	Classification	Classification	Classification
Labels Count	22	7	35

Fig.1 Data set content

[1] This paper enlightens related to cotton plants which is mostly affected part is the leaf that damages the plant resulting in the damage of the entire crop. In order to detect the diseases of the cotton leaf, image processing and machine learning techniques are employed as Dense-121model is used.

[2] This paper presents a deep learning-based approach for rice crop disease prediction using a convolutional neural network (CNN) trained on a large dataset of leaf images.

[3] This paper presents a deep learning-based convolutional neural networks (CNNs) and transfer learning.

[4] This paper presents the various challenges and algorithms used to solve by using Unmanned Aerial Vehicles (UAV's) and AI for image classification of soil fertility which improves growth of the yield and also timely predict the soil fertility and to detect diseases, pests and weeds in the early stages which can improve the growth of yield.

[5]This paper proposes a deep learning-based approach for detecting and classifying crop diseases using a convolutional neural network (CNN) trained on a dataset of images of diseased and healthy leaves.

[6]This paper proposes a deep learning-based crop recommendation system that considers soil nutrient content and crop yield data to make recommendations to farmers on which crops to grow in specific regions.

[7]This paper presents Web service is based on QoS which decides the service functionality and energy, both which affect the attractiveness of the ongoing service, also gauge the performance characteristics of the Web services.

III. METHODOLOGY

The proposed work is a Web application developed through Django framework. The Web Interface starts with the User login page. In order to access these modules, users need to initially register with their basic details such as their name, Address, Country, State, Pin code, Phone number, Username and Password.

Datasets Used: For Crop Recommendation module the dataset used are Crop recommender.csv, soil.csv, scientific_names.csv.

The Crop recommendation was used for training model since it contains attributes such as temperature, humidity, average rainfall, soil Ph., nitrogen requirement ratio, potassium requirement ratio and phosphorous requirement ratio essential for predicting a crop.

Steps involved in Crop Recommendation module are as follows

3.1.1 : Importing Libraries and Dataset

In order to utilize Machine Learning algorithms and pre-processing tools specific libraries needs to be imported. Using these libraries, the model building and prediction would be performed efficiently. The libraries such as Numbly, pandas, pickle, matplotlib, seaborn, Label Encoder, train_test_split were imported. The models such as Naïve bayes, Logistic Regression, SVM, Decision Tree Classifier, Bagging Classifier, Random Forest Classifier, AdaBoost Classifier, Gradient Boosting Classifier, XGBoost Classifier, LGBM Classifier and KNN was imported.

	N	P	K	temperature	humidity	ph	rainfall	label
0	90	42	43	20.879744	82.002744	6.502985	202.935536	rice
1	85	58	41	21.770462	80.319644	7.038096	226.655537	rice
2	60	55	44	23.004459	82.320763	7.840207	263.964248	rice
3	74	35	40	26.491096	80.158363	6.980401	242.864034	rice
4	78	42	42	20.130175	81.604873	7.628473	262.717340	rice
...	...	...	...	...	...	...	...	...
2195	107	34	32	26.774637	66.413269	6.780064	177.774507	coffee
2196	99	15	27	27.417112	56.636362	6.086922	127.924610	coffee
2197	118	33	30	24.131797	67.225123	6.362608	173.322839	coffee
2198	117	32	34	26.272418	52.127394	6.758793	127.175293	coffee
2199	104	18	30	23.603016	60.396475	6.779833	140.937041	coffee

Fig.2 Descriptive Analysis

```
missing values
N                0
P                0
K                0
temperature      0
humidity         0
ph               0
rainfall         0
label            0
dtype: int64

dtypes
N                int64
P                int64
K                int64
temperature    float64
humidity       float64
ph             float64
rainfall       float64
label           object
dtype: object
```

Fig.3 Data Visualization

```
unique crops
['rice' 'maize' 'chickpea' 'kidneybeans' 'pigeonpeas' 'mothbeans'
 'mungbean' 'blackgram' 'lentil' 'pomegranate' 'banana' 'mango' 'grapes'
 'watermelon' 'muskmelon' 'apple' 'orange' 'papaya' 'coconut' 'cotton'
 'jute' 'coffee']
```

Fig.4 Data Implementation

The fig signifies that the dataset has all crops equally distributed in the dataset. Each attribute in the dataset is plotted against the dependent variable such as Label column. Taking into consideration Nitrogen requirement per each crop the dataset specifies that cotton requires more nitrogen for its growth compared to all other crops.

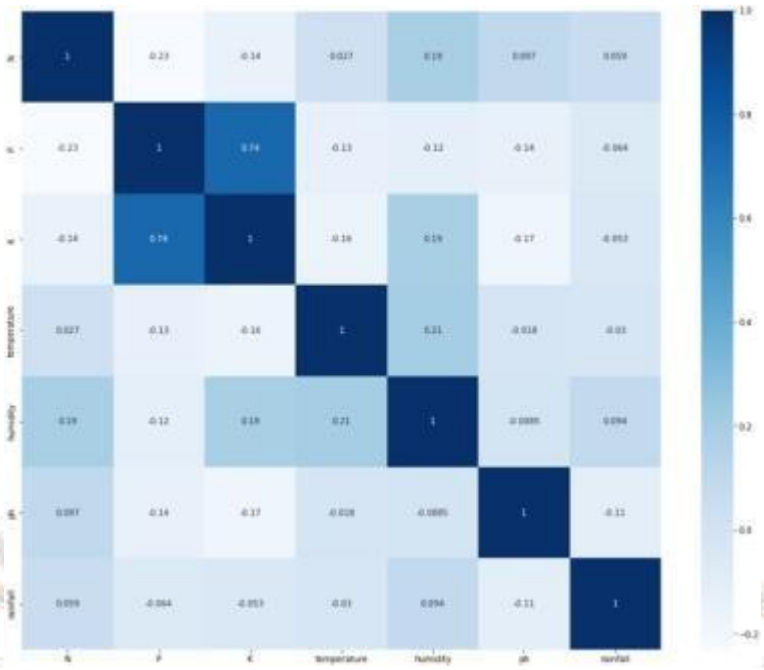

Fig.5 Data Implementation

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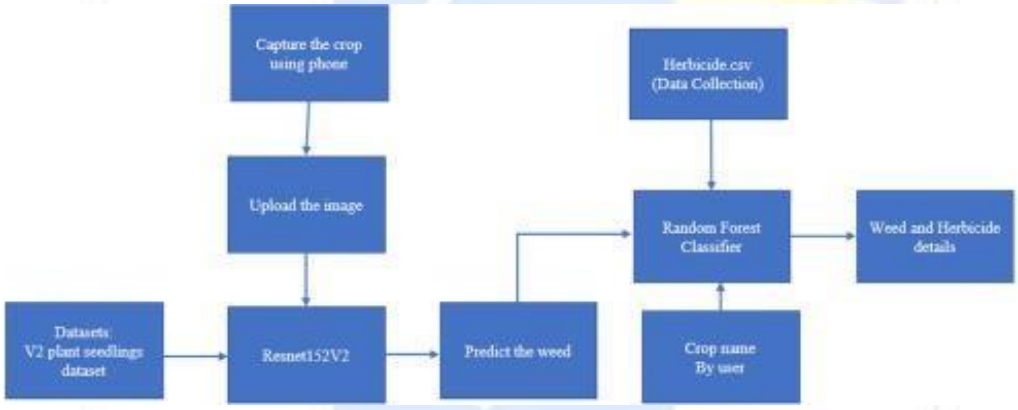

Fig.6 Data Flow Diagram

IV WEED IDENTIFICATION

Weeds were one of the most destructive constraints on crop production and posed a significant threat to agricultural productivity. The increasing development of smart agriculturepromoted the innovation and development of precise weed control techniques. With the application of deep learning in agriculture, more and more emerging technologies have beenapplied to weed identification

Obviously, due to the short development time, there were many deficiencies in neural architecture search technology, which had a perfect space for progress. Many researchers in related directions have proposed many optimization methods. summarized the current optimization methods into four types, namely reinforcement learning, evolutionary algorithm, optimization based on the proxy model, and one-time architecture search.

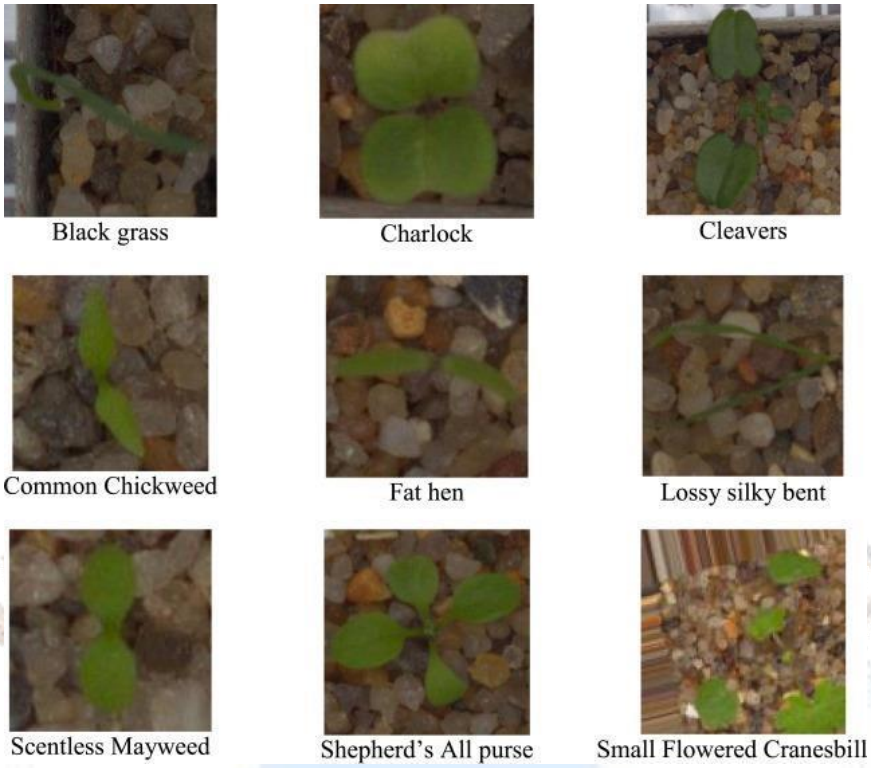

Fig.7 weed detection

V FACE RECOGNITION ATTENDANCE

The purpose of this system is to build a attendance system which is based on face recognition techniques. Here face of an individual will be considered for marking attendance.Nowadays, face recognition is gaining more popularity and has been widely used. In this paper, we proposed a system which detects the faces of students from live streaming video of classroom and attendance will be marked if the detected face is found in the database.

The users can interact with the system using a GUI. Here users will be mainly provided with three different options such as, student registration, faculty registration and mark attendance. photos until 60 samples are collected or CRTL+Q is pressed.

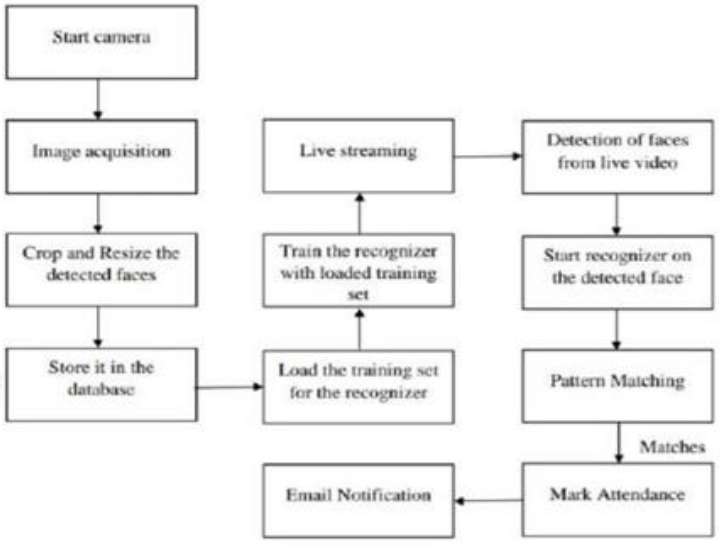

Fig.8 System Architecture

VI ONLINE MARKET

The concept of an online virtual farmers market for locally produced foods appears to be a very recent innovation. Based on our Internet research, we have seen it emerging only in the last 10 to 15 years, and mostly in more urbanlocations with larger populations. Multiple farmers, all delivering to the same centralized location, create a critical mass that allows, through fees to the market, the maintenance of refrigeration and other storage devices at the foods delivered to their doorstep already exist. In Brooklyn, New York, San Francisco, California, New Orleans, Louisiana, and Los Angeles, California, the Good Eggs virtual market has been satisfying customers for several years and continues to grow (Wortham, 2013). Wortham (2013) notes that New York also has Urban Organic and Next Door Organics, along with companies like Quinciple that specialize in artisanal food delivery.

We also believe it can capture a potentially untapped share of the local food dollar from those customers who do not have time or who do not wish to go to a farmers market physically, but who still want to purchase locally grown products and support the local economy. The Troy, Ohio, online market experiment continues today, nearly four years later. However, at the time themarket became a private business, sales had remained consistently below what we hoped for, and below the level to create a desirable part-time salary for a market manager.

VII PROPOSED SYSTEM

Data collection: The system starts by collecting data on agriculture, such as weather patterns, soil characteristics, crop growth patterns, and previous yielddata.

Data processing: The collected data is then processed and analyzed to identifypatterns and trends. This could include using machine learning algorithms to predict weather patterns, soil moisture levels, and crop yields.

Predictive modeling: Based on the processed data, the system creates predictive models that can be used to make predictions about future crop growth, weather patterns, and yield

Recommendation generation: Based on the predictions made by the predictive models, the system generates recommendations for farmers.

Decision support: The system provides decision support to farmers by analyzing the data and predictions and suggesting the best course of action.

Continuous improvement: The system is continuously improved as new data iscollected and processed.

VIII IMPLEMENTATION

SOFTWARE REQUIREMENTS:

Scikit-learn: A popular library for machine learning that includes a wide range of algorithms for classification, regression, clustering, and dimensionality reduction.

TensorFlow: A library for numerical computation and machine learning, particularlyfor deep learning.

PyTorch: A library for machine learning and deep learning that provides a simple and flexible interface for building and training models.

Surprise: A library for building and analyzing recommendation systems that provides avariety of algorithms for collaborative filtering.

LightFM: A library for building recommendation systems that supports both implicitand explicit feedback and provides algorithms

Implicit: A library for building recommendation systems using implicit feedback data,such as clicks or purchases.

Keras: A high-level library for building and training deep learning models.

Flask is a micro web framework written in Python. It is designed to be minimal, flexible, and modular, allowing developers to quickly create and deploy web applications.

Flask uses the Model-View-Template (MVT) architecture, where the Model representsthe data and business logic, the View defines the presentation logic.

PHP is a popular server-side scripting language that can be used to build an online market or e-commerce platform. With PHP, developers can create dynamic and interactive web pages, connect to databases.

Setup hardware: The first step is to set up the hardware required for the facialrecognition system.

Create a database: The next step is to create a database to store information about the employees, including their names, IDs, and facial images.

Train the system: The facial recognition software must be trained on the images of theemployees to create a reference for the system to use in recognizing faces.

Integrate with existing systems: The facial attendance system must be integrated with existing systems, such as time and attendance systems.

User setup: The next step is to set up user accounts for employees, so they can log intothe system and access their attendance data.

Attendance tracking: The facial attendance system must be set up to track attendance, either in real-time or through batch processing.

Reporting and analysis: The final step is to provide reporting and analysis features, so that attendance data can be viewed and analyzed to identify patterns.

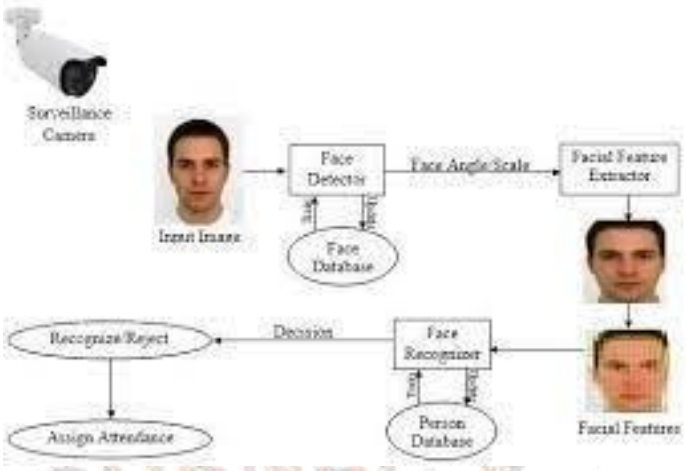

Fig.9 face detection and data sweeping

IX RESULT

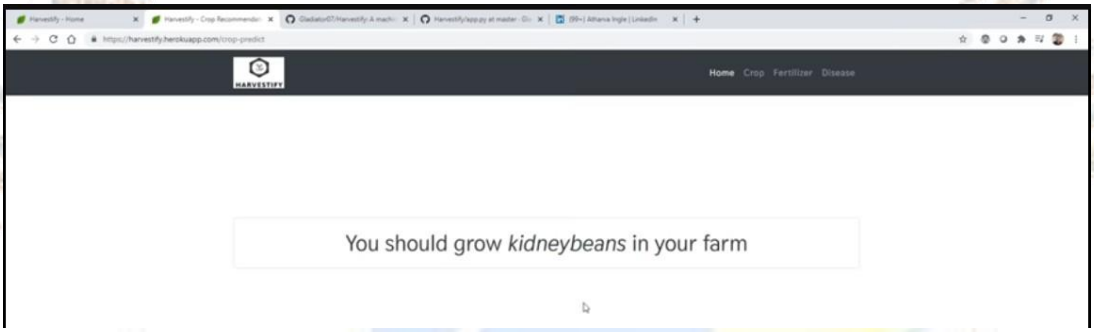

Fig. 10 crop recommendation

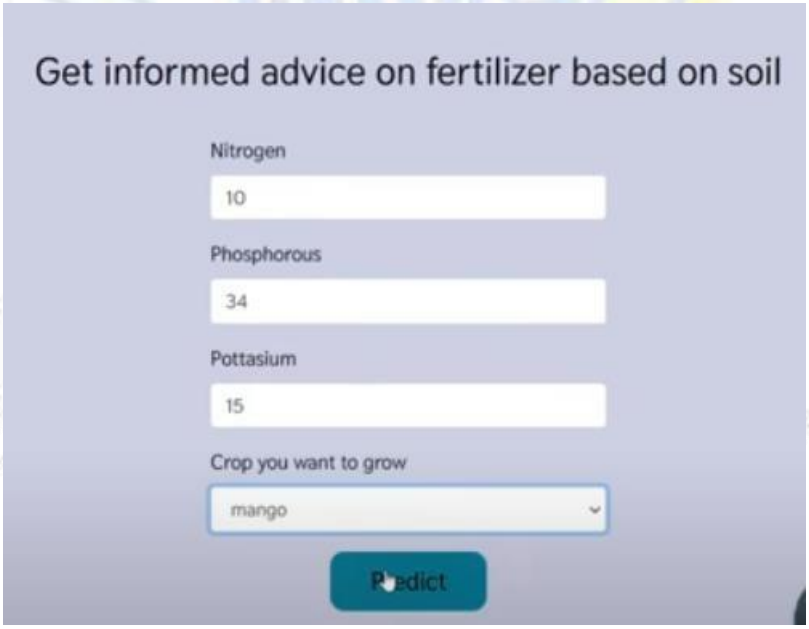

Fig. 11 Fertilizer recommendation

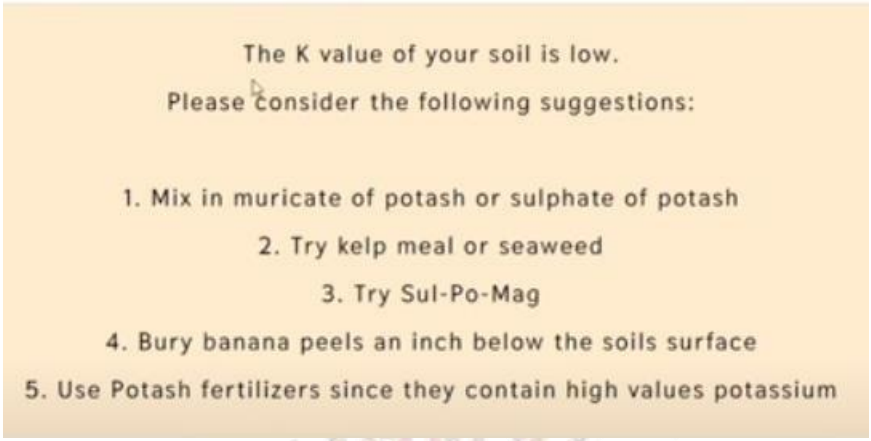

Fig. 12 Soil disease prediction

Fig. 13 Disease prediction in plants

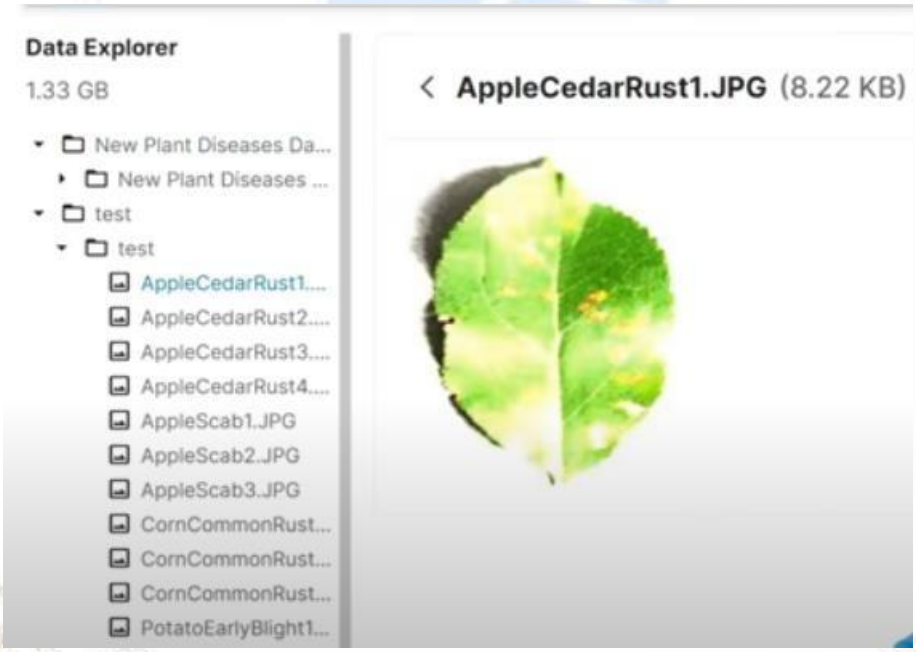

Fig. 14 View of Diseased plants Dataset

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