FERTILIZER RECOMMENDATION SYSTEM FOR DISEASE PREDICTION

NALAIYA THIRAN PROJECT

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TIRUCHENGODE-637215

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1. INTRODUCTION

1.1 Project Overview

Agriculture is the main aspect of country development. Many people lead their life from agriculture field, which gives fully related to agricultural products. Plant disease, especially on leaves, is one of the major factors of reductions in both quality and quantity of the food crops. In agricultural aspects, if the plant is affected by leaf disease then it reduces the growth of the agricultural level. Finding the leaf disease is an important role of agriculture preservation. After pre-processing using a median filter, segmentation is done by Guided Active Contour method and finally, the leaf disease is identified by using Support Vector Machine. The disease-based similarity measure is used for fertilizer recommendation.

Agriculture Sector remained resilient even after the pandemic in India. It effectively met rising global food demands while maintaining a continuous supply chain of vital food goods across the country. India's agriculture sector employs a large number of people and is second after China in terms of producing fruits and vegetables. Traditional farming methods, on the other hand, are ineffective. It fails to make proper use of all available resources. Because the primary focus is on production, traditional methods frequently result in soil nutrient depletion and weariness. By producing only certain crops, the earth is depleted.

The proposed concept also allows people to detect ailments by simply taking a picture with their smartphones and uploading it to the website. They will be better equipped to recover their crops if they have a better understanding of the sickness that has affected their crop.

1.2 Purpose

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence, early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques.

An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant. Deep learning techniques are used to identify the diseases and suggest the precautions that can be taken for those diseases.

2.LITERATUTE SURVEY

[1] Shows a case study related to wireless sensor networks for crop monitoring, growth and measurement of meteorological factors. The paper suggests farmers for application of specific pesticides and insecticides in stressful conditions. There was no focus on soil nutrients, the level of soil fertility and monitoring the crop growth or suggest the crop for the next season in the above proposed paper. The solution to the issues in agriculture trends is proposed in this paper. The study suggests that farmers need to increase the fertility of soil and measure all parameters which are required to grow a crop in healthy condition.

[2] Data mining algorithms are used on agriculture data. The main criterion for this categorization is that if the pH value is greater than 8.5, the soil is unsuitable for crop cultivation; otherwise, it is. To overcome this problem

the proposed system will give necessary suggestion to increase or decrease the pH value of soil.

[3] The proposed system is related to increase net yield rate of the crop, based on the parameter related to the soil and atmosphere. The model gives the Crop prediction which can be carried out by using the "Bayesian algorithm". Data mining is used to extract the large amount of data from the data set and analyses those data to predict the crop yield and suggest the crop. The limitation of this includes atmospheric prediction is not accurate.

[4] In his article, the author proposes a method which helps us predict crop yield by suggesting the best crops. It also focuses on soil types in order to identify which crop should be planted in the field to increase productivity. In terms of crop yield, soil types are vital. By incorporating the weather details of the previous year into the equation, soil information can be obtained. It allows us to predict which crops would be appropriate for a given climate. Using the weather and disease related data sets, the crop quality can also be improved. Prediction algorithms help us to classify the data based on the disease, and data extracted from the classifier is used to predict soil and crop. Due to the changing climatic conditions, accurate results cannot be predicted by this system.

[5] Based on fuzzy logic and neural networks & interval-based partition, the author proposed a model which is used currently in rice to predict crop production using a fuzzy time series model. Using this model and comparing it to an existing algorithm, the result was compared to the reduction in AFER and MSE in the prediction.

2.1 Existing Problem

In most of the existing methods, the process of finding the soil type, identifying the leaf disease and preferring the fertilizer were all carried out manually. The method was prone to various disadvantages. Even when the framework was digitalized, it has certain problems as, predicting a diverse fertilizer for a soil type, certain files regarding the leaf disease or soil type or fertilizer may not be updated. In other situation the system may not provide the needed support. Hence in order to overcome some of these issues, the authors proposed a new approach.

2.2 Reference

1) Shashank Chaudhary, Upendra Kumar, Abhishek Pandey, "Crop Plant Disease Detection Using Image Processing". International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN NO: 2278-3075, 7 May 2019.

This paper discusses various plant diseases and how to improve precision agriculture (PA) using Image processing. The aspects considered are the higher yielding and result in good quality of crop production. Precision agriculture (PA) is necessary to improve agricultural productivity of specific crop. Image processing is an important tool for identification of plant diseases, whereas manual detection of crop plant disease is a difficult task as it takes serious observation (need implementation expert of automated system) and consumes much time. Another outcome from the study is that automatic detection can be very good aspect for identification of crop disease.

2) Shravani V, Uday Kiran S, Yashaswini J S, Priyanka D, "Soil Classification And Crop Suggestion Using Machine Learning". International Research Journal of Engineering and Technology (IRJET), ISSN: e-ISSN: 2395-0056, p-ISSN: 2395, 6 June 2020.

Agriculture is one of the most important components of our society. Soil is a critical factor for a successful agriculture. The composition of soil differs from soil to soil. The Growth of Crops is affected by these chemical features of soil. Choosing the right type of crops for that particular type of soil is also important. Machine Learning techniques can be used to classify the soil series data. The results of such classification can further be combined with crop dataset to predict the crops that are suitable for the soil series of a particular region and its climatic conditions. Soil dataset and crop dataset are used. The datasets comprise of chemical attributes and geographical attributes of soil and crops. Algorithms like SVM and Ensembling technique can be used to classify the soil series data and predict the suitable crops.

3) Lee, Sue Han, CheeSeng Chan, Paul Wilkin, and Paolo Remagnino. "Deep-plant: Plant identification with convolutional neural networks." In 2015 IEEE International Conference on Image Processing (ICIP), pp. 452-456.IEEE, 2015.

This paper studies convolutional neural networks (CNN) to learn unsupervised feature representations for 44 different plant species, collected at the Royal Botanic Gardens, Kew, England. To gain intuition on the chosen features from the CNN model (opposed to a 'black box' solution), a visualisation technique based on the deconvolutional networks (DN) is utilized. It is found that venations of different order have been chosen to uniquely represent each of the plant species. Experimental results using these CNN features with different classifiers show consistency and superiority compared to the state-of-the art solutions which rely on hand-crafted features.

2.3 Problem Statement Definition

Mr.Narasimma Rao is a 65 years old man. He had a own farming land and do Agriculture for past 30 Years , In this 30 Years he Faced a problem in Choosing Fertilizers and Controlling of Plant Disease.

- Narasimma Rao wants to know the better recommendation for fertilizers for plants with the disease.
- He has faced huge losses for a long time.
- This problem is usually faced by most farmers.
- Mr. Narasimma Rao needs to know the result immediately.

Who does the problemaffect?	Persons who doAgriculture
What are the boundaries of theproblem?	People who Grow Crops and facingIssues of Plant Disease
What is the issue?	In agricultural aspects, if the plantis affected by leaf disease, then itreduces the growth and productiveness.Generally, the plant diseases are caused by the abnormalphysiological functionalities of plants.
When doesthe issue occur?	During the development of thecrops as they will be affected by variousdiseases.

Where doesthe issue occur?	The issue occurs in agriculture practicing areas, particularly in rural regions.
Why is it important that we fix theproblem?	It is required for the growthofbetter qualityfood products.It is important to maximise the cropyield.
What solution to solve thisissue?	An automated system is introducedtoidentify different diseases on plantsby checking the symptoms shown onthe leaves of the plant.
What methodology used to solvethe issue?	Deep learning techniques are usedtoidentify the diseases and suggest theprecautions that can be taken forthose diseases.

3.IDEATION AND PROPOSED SOLUTION

3.1 Empathy Map Canvas

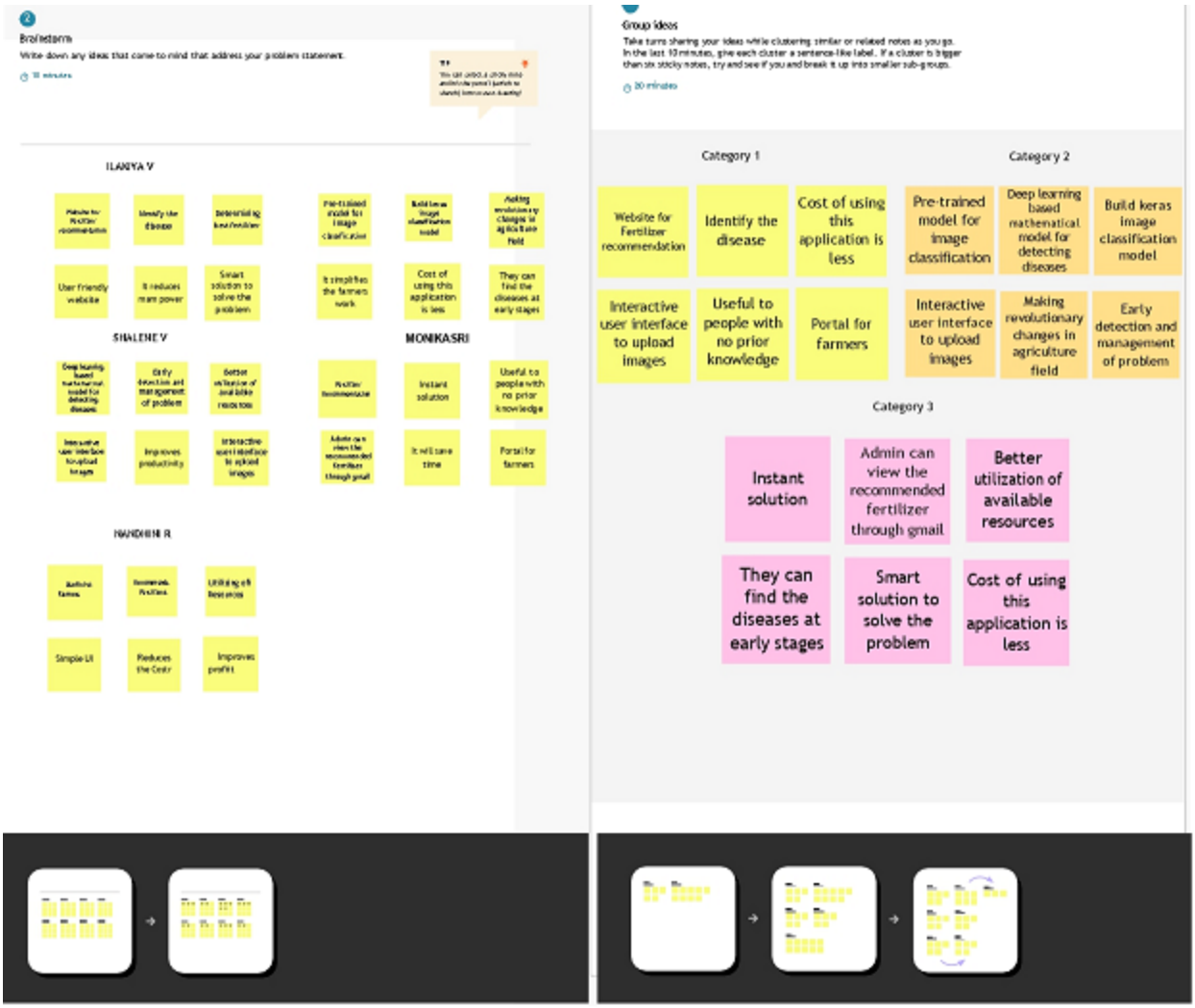
Agriculture is the main aspect of the economic development of a country. Agriculture is the heart and life of most Indians. By understanding their feelings and problems, we can create a better product and contribute to their lives. For our project, we are getting surveys from farmers to understand what they truly require and desire.

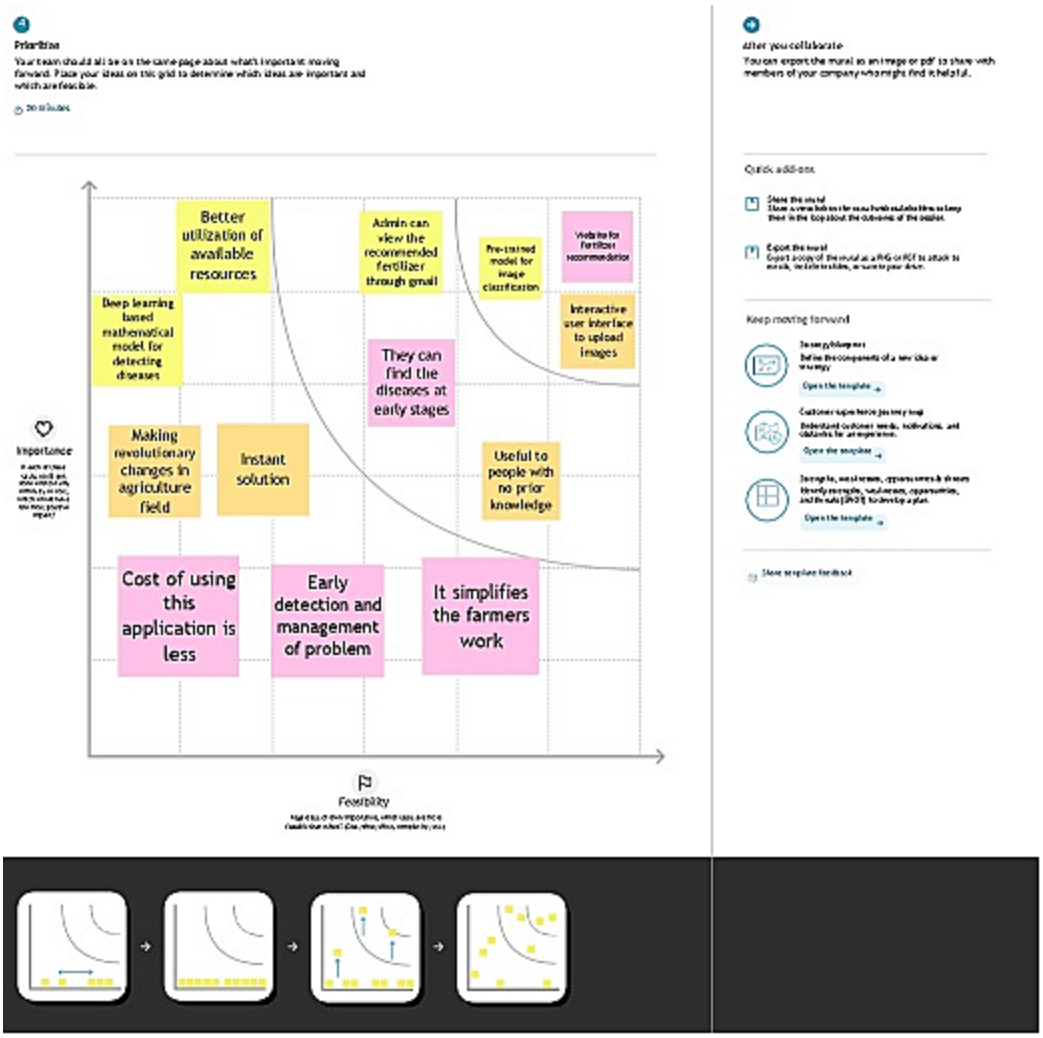
3.2 Ideation and Brainstorming

Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases.

Diseases on plants placed a major constraint on the production and a major threat to food security. Hence early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties,changes in cultivation methods, and inadequateplant protection techniques.


Template
Fertilizer Recomentation System for Disease Prediction
Agriculture is the most important sector in today's life. Most plants are affected by a wide variety of bacterial and fungal diseases. Diseases on plants placed a major constraint on the production and a major threat to food security. Hence early and accurate identification of plant diseases is essential to ensure high quantity and best quality. In recent years, the number of diseases on plants and the degree of harm caused has increased due to the variation in pathogen varieties, changes in cultivation methods, and inadequate plant protection techniques.
Before you collaborate
Define your problem statement
PROBLEM
Key rules of brainstorming
Need some inspiration?


Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
ILANYA V
SHALENE V
MONIKASRI
NANDHINI R
Group ideas
Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.
20 minutes
Category 1
Category 2
Website for Fertilizer recommendation
Identify the disease
Cost of using this application is less
Pre-trained model for image classification
Deep learning based mathematical model for detecting diseases
Build keras image classification model
Interactive user interface to upload images
Useful to people with no prior knowledge
Portal for farmers
Interactive user interface to upload images
Making revolutionary changes in agriculture field
Early detection and management of problem
Category 3
Instant solution
Admin can view the recommended fertilizer through gmail
Better utilization of available resources
They can find the diseases at early stages
Smart solution to solve the problem
Cost of using this application is less



3.3 Proposed Solution

The solution to the problem is Machine learning, which is one of the applications of Artificial Intelligence, is being used to implement the proposed system. Crop recommendation is going to recommend you the best crop you can grow in your land as per the soil nutrition value and along with as per the climate in that region. And recommending the best fertilizer for every particular crop is also a challenging task. And the other and most important issue is when a plant gets caught by heterogeneous diseases that effect on less amount of agriculture production and compromises with

quality as well. To overcome all these issues this recommendation has been proposed . Nowadays a lot of research and work is being implemented in the smart and modern agriculture domain. Crop recommendation is characterized by a soil database comprised of Nitrogen, Phosphorus, potassium. The ensembles technique is used to build a recommendation model that combines the prediction of multiple machine learning. Models to recommend the right crop based on soil value and the best fertilizer to use.

VALUE FOR SOCIETY

Consumers Farming is one of the major sectors that influences a country's economic growth. In country like India, majority of the population is dependent on agriculture for their livelihood. Many new technologies, such as Machine Learning and Deep Learning, are being implemented into agriculture so that it is easier for farmers to grow and maximize their yield.

VALUE FOR ENVIRONMENT

In the crop recommendation application, the user can provide the soil data from their side and the application will predict which crop should the user grow.

For the fertilizer recommendation application, the user can input the soil data and the type of crop they are growing, and the application will predict what the soil lacks or has excess of and will recommend improvements.

For the last application, that is the plant disease prediction application, the user can input an image of a diseased plant leaf, and the application will predict what disease it is and will also give a little background about the disease and suggestions to cure it. These all are to improve the Agriculture, that's slightly reduces the poverty, climatic condition, soil erosion etc ...

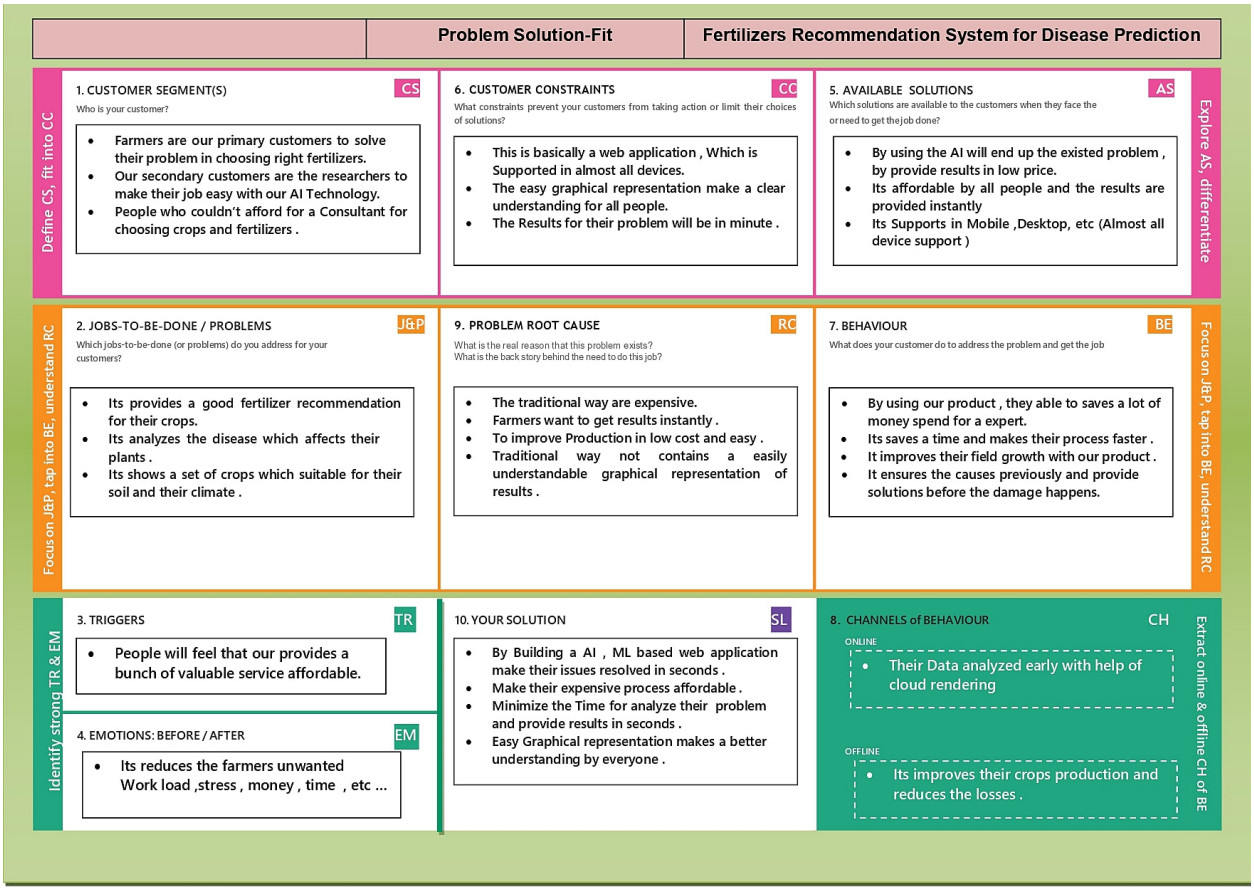
VALUE FOR BUSINESS

Predicting the fertilizers, Analyzing the disease in a tap makes the life of farmers easy with minimal subscriptions would provide an acceptable return for the organization. This action adds a lot of value to the company and the business in society.

FORM FACTORS

Our Fertilizer Recommentation system for disease Prediction is in the form of web application to provide this valuable service to the environment and society.

3.4 Problem Solution Fit



4.REQUIREMENT ANALYSIS

4.1 Functional Requirements

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	**Registration through Form**
FR-2	User Confirmation	**Confirmation via Email**
FR-3	User Profile	**Filling the profilepage after logging in**
FR-4	Uploading Dataset(Leaf)	**Images of the leaves are to beuploaded**

FR-5	Requesting solution	**Uploaded images is compared withthe pre-definedModeland solution is generated**
FR-6	**Downloading Solution**	**The Solution in pdf formatwhich contains the recommendations of fertilizers and the possiblediseases.**

4.2 Non-Functional Requirements

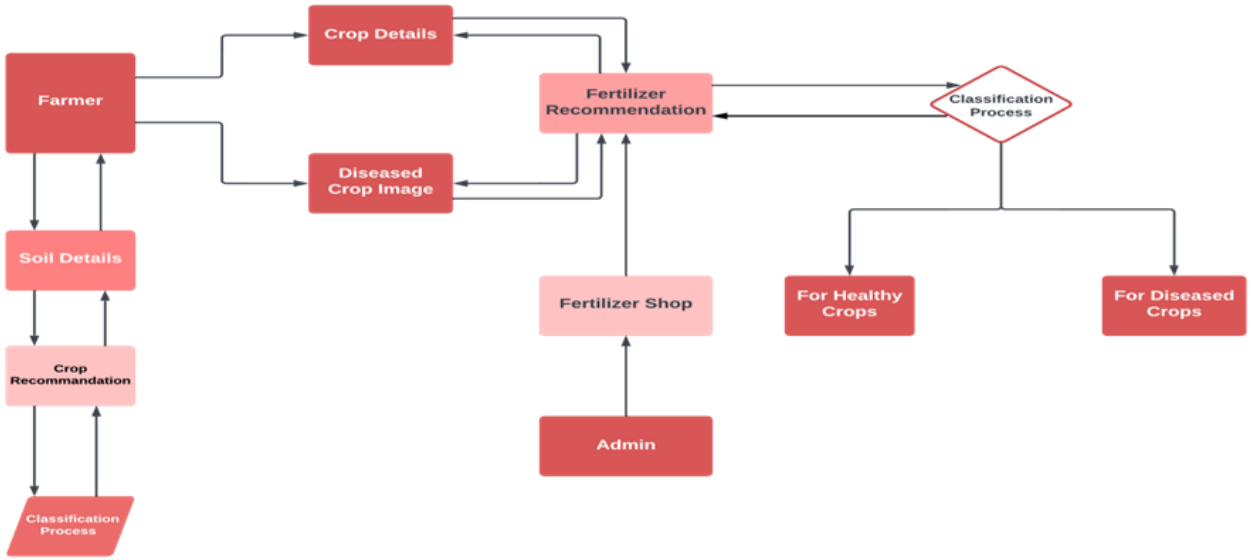
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	**The system allowsthe user to perform thetasks easily and efficiently and effectively.**
NFR-2	**Security**	**Assuring all data inside the system or its part will be protected against malware attacks or unauthorizedaccess.**
NFR-3	**Reliability**	**The website does not recoverfrom failure quickly ,it takes timeas the application is running in single server**
NFR-4	**Performance**	**Response Time and Net Processing Time is Fast**
NFR-5	**Availability**	**The systemwill be available up to 95% of the time**
NFR-6	**Scalability**	**The website is scalable**

5.PROJECT DESIGN

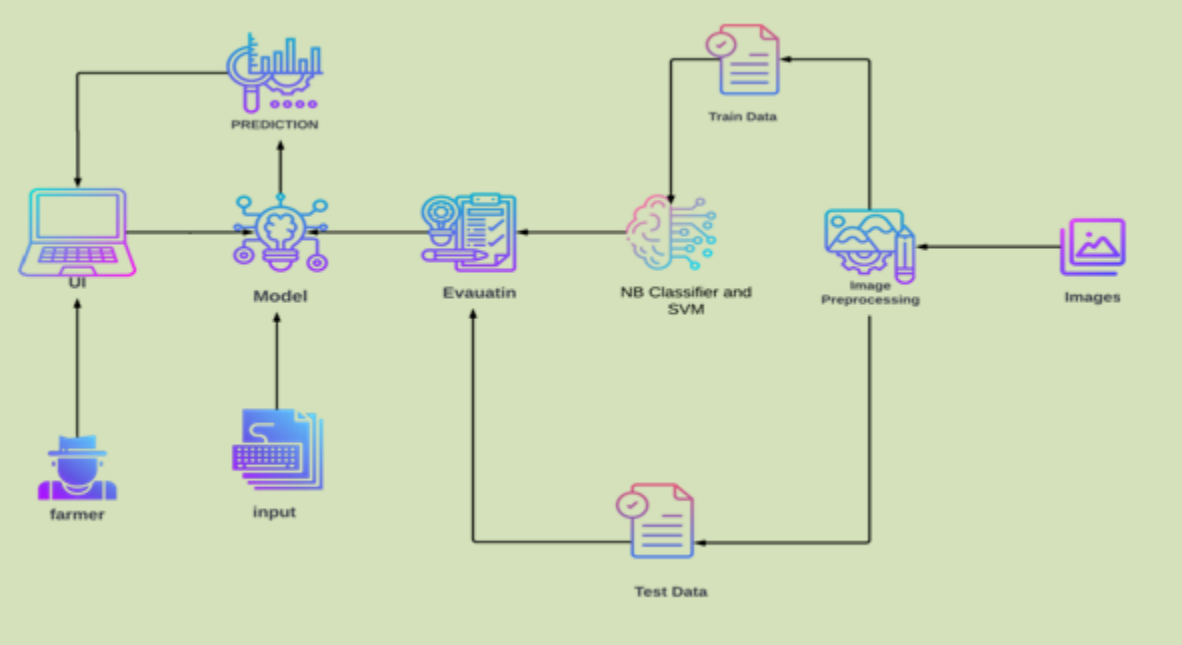
5.1 Data Flow Diagram

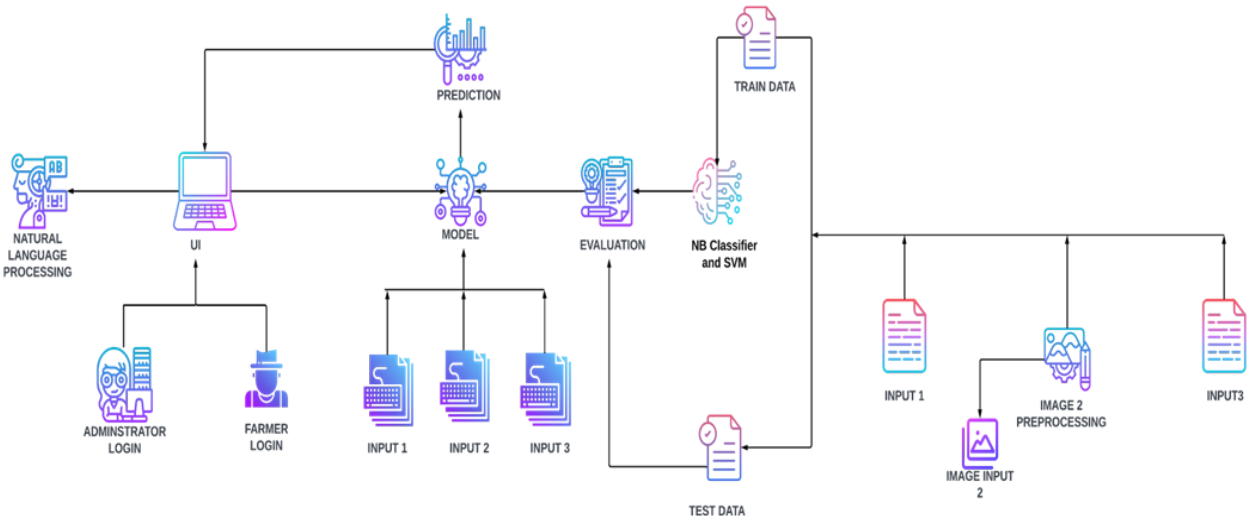
DFD LEVEL - 0

DFD LEVEL - 1



5.2 Solution and Technical Architecture





S.No	Component	Description	Technology
1.	User Interface	How the user interacts with the application .To depict the human-computer interaction andcommunication.	HTML, CSS,JSP
2.	Application Logic-1	A page to upload images as input	Python

5.3 User Stories

UserType	Functional Requirement (Epic)	User Story Number	User Story/ Task	Acceptance criteria	Priority	Release
Customer (Mobile ssuser)	Registration	USN-1	As a user,I can register for the applicationby entering my email,password, and confirming my password.	I can access my account/dashboard	High	**Sprint-1**
	Login	USN-2	As a user, I can log intothe application by entering email& password	I can login using my Email ID accounts or usercredentials	High	**Sprint-1**
	Dashboard	USN-3	As a user, I can view the page of the application where i can upload my images and the fertilizer should be recommended	I can access my account/ dashboard	High	**Sprint-2**
Customer (Webuser)	Registration	USN-4	As a user, I can loginto web dashboardjust Like websitedashboard	I can registerusing my username and password	High	**Sprint-3**
	Login	USN-5	As a user, I can login to my webdashboard withthe login credentials	I can login using my Usercredentials	High	**Sprint-3**
	Dashboard	USN-6	As a user, I can view the web application where i can upload my images and thefertilizer should be recommended	I can access my account/ dashboard	High	**Sprint-4**
		USN-7	As a user, the fertilizer recommendedto me shouldbe of higher accuracy	I can accessmy account/dashboard	High	**Sprint-4**

Administrator	Login	USN-8	As a admin, I can loginto the websiteusing my login credentials	I can loginto thewebsite using my logincredentials	High	**Sprint-5**
	Dashboard	**USN-9**	**As a admin, I can view the dashboard of the application**	**I can access my dashboard**	**High**	**Sprint-5**

6.PROJECT PLANNING AND SCHEDULING

6.1 Sprint Planning and Estimation

Sprint	**Total Story Points**	**Duration**	**Sprint StartDate**	**Sprint EndDate(Planned)**	**StoryPointsCompleted (as onPlanned End Date)**	**SprintRelease Date(Actual)**
Sprint-1	20	6Days	30Oct2022	04 Nov2022	10	05Oct2022
Sprint-2	20	6Days	01Nov222	06 Nov2022	15	07Oct2022
Sprint-3	20	6Days	30Nov222	04 Nov2022	15	05 Nov2022
Sprint-4	20	6Days	14Nov222	19 Nov2022	10	20 Nov2022

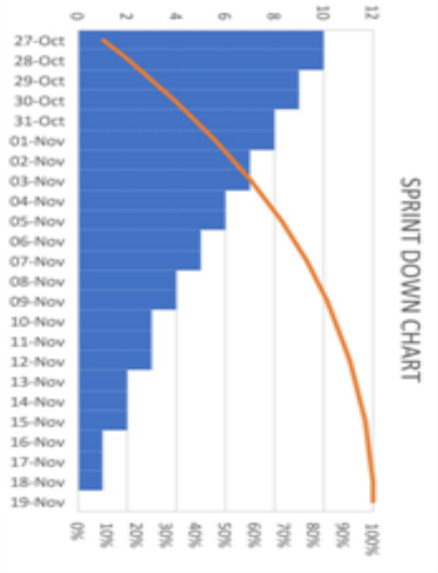
6.2 Sprint Delivery Schedule

Sprint	**Duration**	**SprintStartDate**	**SprintEndDate(Planned)**	**SprintReleaseDate(Actual)**
Sprint-1	6Days	30Oct2022	04 Nov2022	05Oct2022
Sprint-2	6Days	01Nov2022	06 Nov2022	07Oct2022
Sprint-3	6Days	30 Nov2022	04 Nov2022	05 Nov2022
Sprint-4	6Days	14 Nov2022	19 Nov2022	20 Nov2022

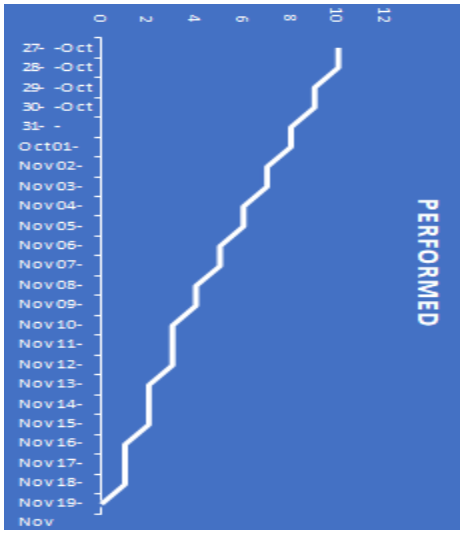
Velocity: Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (pointsper sprint). Let's calculate the team's average velocity (AV)per iteration unit (story points perday)

$$AV = \frac{sprint\ duration}{velocity} = \frac{20}{10} = 2$$

SPRINTDOWNCHART



BURNDOWNCHART



7.Coding and Solutioning

7.1 Homepage

```
#home page
@app.route('/')
def home():
    return render_template('home.html')
```

7.2 Predictionpage

```
#prediction page
@app.route('/predict')
def predict():
    return render_template('predict.html')
```

7.3 Predicting Disease & Giving Precautions

```python
@app.route('/predict1',methods=['POST'])
def predict1():
    if request.method == 'POST':
        # Get the file from post request
        f = request.files['image']

        # Save the file to ./uploads
        basepath = os.path.dirname(__file__)
        file_path = os.path.join(
            basepath, 'uploads', secure_filename(f.filename))
        f.save(file_path)
        img = image.load_img(file_path, target_size=(128, 128))

        x = image.img_to_array(img)
        x = np.expand_dims(x, axis=0)

        plant=request.form['plant']
        print(plant)
        if(plant=="vegetable"):
            preds = model.predict1(x)
            preds=np.argmax(preds)
            print(preds)
            df=pd.read_excel('precautions-veg.xlsx')
            print(df.iloc[preds[0]]['caution'])
        else:
            preds = model1.predict1(x)
            preds=np.argmax(preds)
            print(preds)
            df=pd.read_excel('precautions-fruits.xlsx')
            print(df.iloc[preds]['caution'])
```

8.TESTING

8.1 Testcases

A test case has components that describe input, action and an expected response, in order todetermineif afeature ofanapplication is workingcorrectly. A testcaseis aset of instructions on “HOW” to validate a particular test objective/target, which when followed will tell us if the expected behaviour of the system is satisfied or not.

Characteristics ofa good testcase:

- Accurate:Exacts the purpose.
- Traceable:Capable of being traced to requirements.
- Repeatable:Can be used to per form the test over and over.
- Reusable:Can be reused if necessary.

S.NO	Scenario	Input	ExpectedOutput	ActualOutput
1	HomePage	Predict	Introduction to thepredictpage	Predictpage
2	PredictPage	Selection	SelectingtheLeafimages	Leafimagesselectedsuccessfully
3	PredictPage	Predicting	Predicting leaf healthy and giving precautions	Healthy of aLeaf predictedand givenprecautionssuccessfully

8.2 User Acceptance Testing

8.2.1 Purpose Of The Document:

The purpose of this document is to briefly explain the test coverage and open issues ofthe [Fertilizer Recommendation system for plant disease prediction] project at the time of thereleaseto User AcceptanceTesting (UAT).

8.2.2 Defect Analysis:

Resolution	Severity1	Severity2	Severity3	Severity4	Subtotal
Leafspots	109	4	2	3	1
Mosaicleaf pattern	9	6	3	6	24
Misshapen leaves	2	7	0	1	10

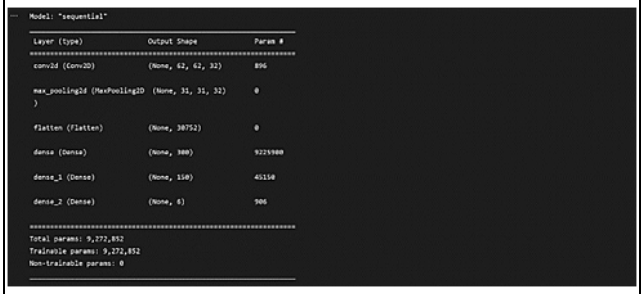
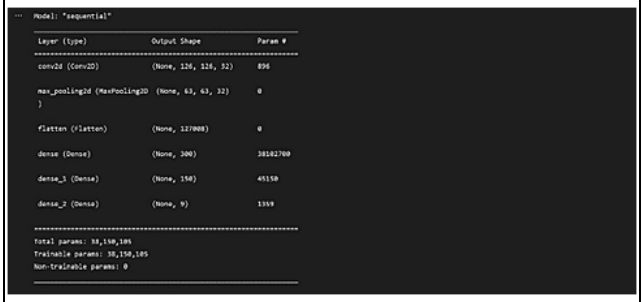
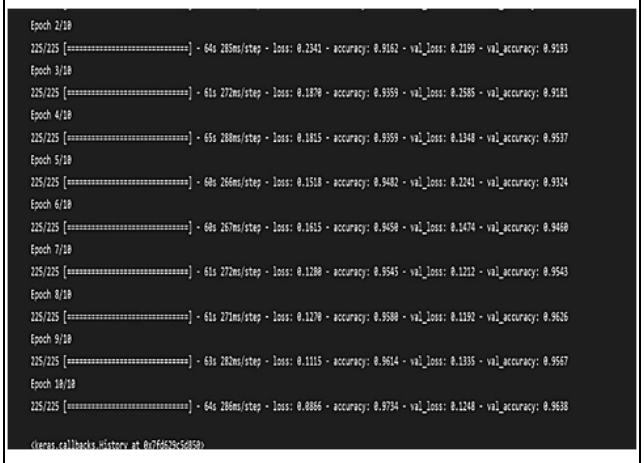
Yellowleaves	11	4	3	20	38
Fruitrots	3	2	1	0	6
Fruitspots	5	3	1	1	10
Blights	4	5	2	1	12
Totals	44	31	13	32	11

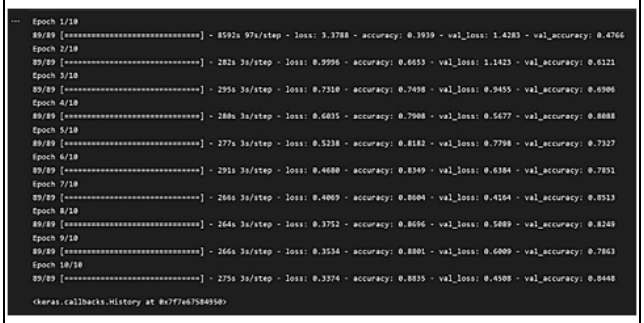
8.2.3 TestCaseAnalysis:

Selection	**TestCases**	**NotTested**	**Fail**	**Pass**
Leafspots	17	0	0	17
Mosaicleafpattern	51	0	0	51
Misshapenleaves	20	0	0	20
Yellowleaves	7	0	0	7
Fruitrots	9	0	0	9
Fruitspots	4	0	0	4
Blights	2	0	0	2

9.RESULTS

9.1 Performance Metrics

S.No.	Parameter	Values	Screenshot
1.	ModelSummary ofFruit	Training the dataset ofVegetable images by usingthe CNN models to predictthe disease of the givenleaves.	
2.	ModelSummary forVegetable	Training the dataset ofVegetableimagesbyusingt he CNN models to predictthe disease of the givenleaves.	
3.	Accuracy forFruit	TrainingAccuracy-0.9734 ValidationAccuracy-0.9638	

4.	Accuracy forVegetable	TrainingAccuracy-0.8835 ValidationAccuracy-0.8448	

10.ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

1.Prediction of disease of a plant using leaf images in early stages.
2.Giving the precautions to the plants according to the plant condition.
3.Recommends the fertilizers for the particular disease.
4.It doesn't require dany chemical to test the disease.
5.Simple way to predict the disease by taking Images.

DISADVANTAGES:

1.It predicts the disease for the plants which are given in the Dataset only.
2.It cannot predict the disease for the plants which are not present in the Dataset.
3.Sometimes it may predict the wrong fertilizers which leads to loss.

11.CONCLUSION

Different approaches and models of Deep Learning methods were explored and used in this project so that it can detect and classify plant diseases correctly through image processing of leaves of the plants. The procedure starts from collecting the images used for training, testing and

validation to image pre-processing and augmentation and finally comparison of different pre-traine models over their accuracy. Finally, attheend, our model detects and distinguishes between a healthy plant and different diseases and provides suitable remedies so as to cure the disease. This paper proposed and developed a system which uses plant leaf images to detect different types of disease into matocrops, and also provides appropriate fertilizer suggestions.

12.FUTURE SCOPE

The system successfully interprets various Diseases and is also capable of providing fertilizers suggestion for the respective disease. Furthermore, this system can be made more robust by incorporating more image dataset with wider variations like more than one leaf in a single image.An App could also be developed for the project which could make the work of the farmers easier. They could directly upload image on the app and it would tell the disease and the cure then and there. This would reduce thetime and efforts. This project is limited to just one crop for now but in the future more crops and even flowers dataset can be added so that it is helpful for every agricultural need. Newer models can also be added and tried with time which may result in better accuracy and would make the model even faster.

13.APPENDIX

SOURCE CODE:

App.py

```
importrequests
from tensorflow.keras.preprocessingimport imagefrom tensorflow.keras.modelsimport
load_modelimportnumpyasnp
import pandas as pdimporttensorflowastf
from flask import Flask, request, render_template, redirect, url_forimportos
fromwerkzeug.utilsimportsecure_filename
fromtensorflow.python.keras.backendimportset_session

app=Flask(name)

#load both the vegetable and fruit modelsmodel =
load_model("vegetable.h5")model1=load_model("fruit.h5")

#home page@app.route('/')defhome():
returnrender_template('home.html')

#prediction page@app.route('/predict')defpredict():
returnrender_template('predict.html')

@app.route('/predict1',methods=['POST'])defpredict1():
ifrequest.method=='POST':
# Get the file from post requestf=request.files['image']

#Savethefileto./uploadsbasepath = os.path.dirname(file)file_path=os.path.join(
basepath, 'uploads', secure_filename(f.filename))f.save(file_path)
img=image.load_img(file_path,target_size=(128,128))

x=image.img_to_array(img)x=np.expand_dims(x,axis=0)
plant=request.form['plant']print(plant)if(plant=="vegetable"):
preds = model.predict1(x)preds=np.argmax(preds)print(preds)
df=pd.read_excel('precautions-veg.xlsx')print(df.iloc[preds[0]]['caution'])
else:
preds = model1.predict1(x)preds=np.argmax(preds)print(preds)
df=pd.read_excel('precautions-fruits.xlsx')print(df.iloc[preds]['caution'])
```

return df.iloc[preds]['caution']ifname=="main":

home.html

```
<!DOCTYPEhtml>
<html>

<head>
<metacharset="UTF-8">
<metaname="viewport"content="width=device-width,initial-scale=1">
<title>PlantDiseasePrediction</title>
<linkhref='https://fonts.googleapis.com/css?family=Pacifico'rel='stylesheet'type='text/css'>
<linkhref='https://fonts.googleapis.com/css?family=Arimo'rel='stylesheet'type='text/css'>
<link href='https://fonts.googleapis.com/css?family=Hind:300' rel='stylesheet'type='text/css'>
<linkhref='https://fonts.googleapis.com/css?family=Open+Sans+Condensed:300'rel='stylesheet'type
='text/css'>
<linkrel="stylesheet"href="{{url_for('static',filename='css/final.css')}}">
<linkhref='https://fonts.googleapis.com/css?family=Merriweather'rel='stylesheet'>
<linkhref='https://fonts.googleapis.com/css?family=JosefinSans'rel='stylesheet'>
<linkhref='https://fonts.googleapis.com/css?family=Montserrat'
rel='stylesheet'>
<style>
.header{
top:0;margin:0px;left:0px;right: 0px;position:fixed;
background-color: #28272c;color: white;
box-shadow: 0px 8px 4px grey;overflow:hidden;
padding-left:20px;
font-family: 'Josefin Sans';font-size:2vw;
width: 100%;height:8%;
text-align:center;
}
.topnav{overflow:hidden;
background-color:#333;
}

.topnav-right a {float:left;color: #f2f2f2;text-align: center;padding:14px16px;
text-decoration: none;font-size: 18px;
}

.topnav-right a:hover {background-color: #ddd;color:black;
}
```

```
.topnav-right a.active{background-color: #565961;color:white;
}

.topnav-right {float:right;
padding-right:100px;
}
body{


background-color:#ffffff;background-repeat: no-repeat;background-size:cover;background-
position:0px0px;
}
.button{
background-color: #28272c;border:none;
color: white;padding: 15px 32px;text-align:center;
text-decoration: none;display: inline-block;font-size: 16px;border-radius:12px;
}
.button:hover{
box-shadow: 012px 16px0rgba(0,0,0,0.24),017px50px0rgba(0,0,0,0.19);
}
form{border:3pxsolid#f1f1f1;margin-left:400px;margin-right:400px;}

input[type=text], input[type=password] {width:100%;
padding: 12px 20px;display: inline-block;margin-bottom:18px;border: 1px solid #ccc;box-
sizing:border-box;
}

button{
background-color: #28272c;color:white;
padding: 14px 20px;margin-bottom:8px;border: none;cursor: pointer;width:15%;
border-radius:4px;
}

button:hover{opacity:0.8;
}

.cancelbtn{width:auto;
```

```
padding: 10px 18px;background-color:#f44336;
}

.imgcontainer{
text-align: center;margin:24px012px0;
}

img.avatar{width:30%;
border-radius:50%;
}
.container {padding:16px;
}

span.psw {float:right;
padding-top:16px;
}

/* Change styles for span and cancel button on extra small screens */@mediascreenand(max-
width:300px){
span.psw{display: block;float:none;
}
.cancelbtn{width:100%;
}
}

.home{
margin:80px;

width: 84%;height: 500px;padding-top:10px;
padding-left:30px;

}
.login{margin:80px;
box-sizing: content-box;width:84%;
height:420px;

padding:30px;
border:10pxsolid blue;
}
```

```
.left,.right{
box-sizing: content-box;height: 400px;margin:20px;
border:10px solidblue;
}

.mySlides{display:none;}img{vertical-align:middle;}
/*Slideshowcontainer*/
.slideshow-container {max-width: 1000px;position: relative;margin:auto;
}

/*Captiontext*/
.text{
color: #f2f2f2;font-size: 15px;padding: 8px 12px;position: absolute;bottom:8px;width:100%;
text-align:center;
}
/*Thedots/bullets/indicators*/
.dot{
height: 15px;width: 15px;margin:02px;
background-color: #bbb;border-radius: 50%;display:inline-block;
transition:background-color0.6sease;
}

.active{
background-color:#717171;
}
/*Fadinganimation*/
.fade{
-webkit-animation-name:fade;

-webkit-animation-duration: 1.5s;animation-name:fade;
animation-duration:1.5s;
}

@-webkit-keyframes fade {from{opacity:.4}
to{opacity:1}
}

@keyframes fade {from{opacity:.4}
```

```
to{opacity:1}
}

/* On smaller screens, decrease text size */@mediaonlyscreenand(max-width:300px){
.text{font-size:11px}
}
</style>
</head>

<body style="font-family:'Times New Roman', Times, serif;background-
color:#C2C5A8;">

<divclass="header">
<divstyle="width:50%;float:left;font-size:2vw;text-align:left;color:white;padding-
top:1%">PlantDiseasePrediction</div>
<divclass="topnav-right"style="padding-top:0.5%;">

<aclass="active"href="{{url_for('home')}}">Home</a>
<ahref="{{url_for('predict')}}">Predict</a>
</div>
</div>

<divstyle="background-color:#ffffff;">
<divstyle="width:60%;float:left;">
<divstyle="font-size:50px;font-family:Montserrat;padding-left:20px;text-
align:center;padding-top:10%;">
<b>Detectifyourplant<br>isinfected!!</b></div><br>
<div style="font-size:20px;font-family:Montserrat;padding-left:70px;padding-right:30px;text-
align:justify;">Agriculture is one of the major sectors worlswide. Over the years it has
developed and the use of new technologies andequipment replaced almost all the traditional
methods of farming. The plantdiseases effect the production. Identification of diseases and
taking necessary precautions is all done through naked eye, which requires labour and
laboratries.This application helps farmers indetecting the diseases by
```

Predict.html

```
<metaname="viewport"content="width=device-width,initial-scale=1">
<title>PlantDiseasePrediction</title>
<link
href='https://fonts.googleapis.com/css?family=Pacifico'rel='stylesheet'typ
e='text/css'>
```

```
<link href='https://fonts.googleapis.com/css?family=Arimo' rel='stylesheet'type='text/css'>
<link href='https://fonts.googleapis.com/css?family=Hind:300' rel='stylesheet'type='text/css'>
<linkhref="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css"rel="stylesheet">
<scriptsrc="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js"></script>
<scriptsrc="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>
<scriptsrc="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>
<linkhref='https://fonts.googleapis.com/css?family=Open+Sans+Condensed:300'rel='stylesheet'type
='text/css'>
<linkhref='https://fonts.googleapis.com/css?family=Merriweather'rel='stylesheet'>
<linkhref='https://fonts.googleapis.com/css?family=JosefinSans'rel='stylesheet'>
<linkhref='https://fonts.googleapis.com/css?family=Montserrat'rel='stylesheet'>
<linkhref="{{url_for('static',filename='css/final.css')}}"rel="stylesheet">
<style>
.header{
top:0;margin:0px;left:0px;right: 0px;position:fixed;
background-color: #28272c;color:white;
box-shadow: 0px 8px 4px grey;overflow: hidden;
padding-left:20px;
font-family: 'Josefin Sans';font-size:2vw;
width: 100%;height:8%;
text-align:center;
}
.topnav{overflow: hidden;background-color:#333;
}

.topnav-right a{

float:left;color: #f2f2f2;text-align: center;padding:14px16px;
text-decoration: none;font-size: 18px;
}

.topnav-right a:hover {background-color: #ddd;color:black;
}

.topnav-right a.active{background-color: #565961;color:white;
}

.topnav-right {float:right;
padding-right:100px;
}
```

```
.login{
margin-top:-70px;
}
body{

background-color:#ffffff;background-repeat: no-repeat;background-size:cover;background-
position:0px0px;
}
.login{
margin-top:100px;
}

.container {margin-top:40px;padding:16px;
}
select{
width:100%;
margin-bottom:10px;
background: rgba(255,255,255,255);border:none;
outline: none;padding:10px;

font-size: 13px;color:#000000;
text-shadow: 1px 1px1pxrgba(0,0,0,0.3);border:1pxsolidrgba(0,0,0,0.3);
border-radius:4px;
box-shadow: inset 0 -5px 45px rgba(100,100,100,0.2), 0 1px 1pxrgba(255,255,255,0.2);
-webkit-transition:box-shadow.5sease;
-moz-transition:box-shadow.5sease;
-o-transition:box-shadow.5sease;
-ms-transition: box-shadow .5s ease;transition:box-shadow.5sease;
}


</style>
</head>

<bodystyle="font-family:Montserrat;overflow:scroll;">

<divclass="header">
  <divstyle="width:50%;float:left;font-size:2vw;text-align:left;color:white;padding-
```

```
top:1%">PlantDiseasePrediction</div>
<divclass="topnav-right"style="padding-top:0.5%;">


</div>
</div>
<divclass="container">
<divid="content"style="margin-top:2em">
<divclass="container">
<divclass="row">
<divclass="col-sm-6bd">

<br>
<imgsrc="{{url_for('static', filename='images/789.jpg')}}"style="height:450px;width:550px"class="img-
rounded"alt="Gesture">
</div>
<divclass="col-sm-6">
<div>
<h4>Dropintheimage togetttheprediction</h4>
<form action = "" id="upload-file" method="post"enctype="multipart/form-data">
<selectname="plant">
 type</option>

<optionvalue="select"selected>Selectplant
<optionvalue="fruit">Fruit</option>
<optionvalue="vegetable">Vegetable</option>
</select><br>
<label for="imageUpload" class="upload-label"style="background:black;">
Choose...
</label>
<inputtype="file"name="image"id="imageUpload"accept=".png,
.jpg,.jpeg">
</form>
<divclass="image-section"style="display:none;">
<divclass="img-preview">
<divid="imagePreview">
</div>
</div>
```

```
<div>
<button type="button" class="btnbtn-info btn-lg "id="btn-
predict"style="background:#7cd0d3;">Predict!</button>
</div>
</div>

<divclass="loader"style="display:none;"></div>

<h3>
<spanid="result"style="font-size:17px;"></span>
</h3>

</div>
</div>
</div>
</div>
</div>
</div>
</body>

<footer>
    <scriptsrc="{{url_for('static',filename='js/main.js')}}"type="text/javascript"></script>
</footer>
</html>
```

Final.css

```
.img-preview {width:256px;

height: 256px;position:relative;

border:5pxsolid#F8F8F8;

box-shadow: 0px 2px 4px 0px rgba(0, 0, 0, 0.1);margin-top:1em;

margin-bottom:1em;

}

.img-preview>div {width:100%;

height:100%;
```

```
background-size: 256px 256px;background-repeat: no-repeat;background-position:center;
}

input[type="file"] {display:none;
}
.upload-label{
display: inline-block;padding: 12px 30px;background: #28272c;color:#fff;
font-size: 1em;transition: all .4s;cursor:pointer;
}

.upload-label:hover{background: #C2C5A8;color:#39D2B4;
}
.loader{
border: 8px solid #f3f3f3; /* Light grey */border-top: 8px solid #28272c; /* Blue */border-radius:50%;
width: 50px;height:50px;
animation:spin1slinearinfinite;
}
 @keyframesspin{
0% { transform: rotate(0deg); }100%{transform:rotate(360deg);}
}
```

Main.js

```
$(document).ready(function(){
//Init
$('.image-section').hide();
$('.loader').hide();
$('#result').hide();

// UploadPreviewfunctionreadURL(input){
if (input.files&&input.files[0]) {var reader = new FileReader();reader.onload=function(e){
$('#imagePreview').css('background-image', 'url(' +e.target.result+')');
```

```
$('#imagePreview').hide();
reader.readAsDataURL(input.files[0]);
}
}
$("#imageUpload").change(function(){
$('.image-section').show();
$('#btn-predict').show();
$('#result').text('');
$('#result').hide();readURL(this);
});
//Predict
$('#btn-predict').click(function(){
varform_data=newFormData($('#upload-file')[0]);

//Showloadinganimation
$(this).hide();
$('.loader').show();

//Makepredictionbycallingapi/predict
$.ajax({
type: 'POST',url: '/predict',data:form_data,
contentType: false,cache: false,processData: false,async:true,
success:function(data){
//Getanddisplaytheresult
$('.loader').hide();
$('#result').fadeIn(600);
$('#result').text('Prediction:'+data);console.log('Success!');
},
});
});
});
```

GITHUB LINK:

IBM PROJECT-10075-1659090439

https://github.com/IBM-EPBL/IBM-Project-10075-1659090439

DEMOVIDEO LINK:

https://www.youtube.com/embed/H8qsRGmMqus

https://www.youtube.com/embed/hlQR4XZF1NU