# FERTILIZERS RECOMMENDATION SYSTEM FOR DISEASE PREDICTION

*Submitted by*

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# CHAPTER-1

## Introduction

Agriculture is the main aspect of country development. 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.

### 1.1Project Overview

Detection and recognition of plant diseases using machine learning are very efficient in providing symptoms of identifying diseases at its earliest. Generally, the plant diseases are caused by the abnormal physiological functionalities of plants. Therefore, the characteristic symptoms are generated based on the differentiation between normal physiological functionalities and abnormal physiological functionalities of the plants.

### 1.2Purpose

To Detect and recognize the plant diseases and to recommend fertilizer, it is necessary to identify the diseases and to recommend to get different and useful features needed for the purpose of analyzinglater. To provide symptoms in identifying the disease at its earliest. Hence the authors proposed and implemented new fertilizers Recommendation System for Crop Disease Prediction

# CHAPTER-2

## LITERATURE SURVEY

### 2.1Existing problem

Adequate mineral nutrition is central to crop production. However, it can also exert considerable Influence on disease development. Fertilizer application can increase or decrease development of diseases caused by different pathogens, and the mechanisms responsible are complex, including effects of nutrients plant growth,plant resistance mechanisms and direct effects on the pathogen. The effects of mineral nutrient plant disease and the mechanisms responsible for those effects have been deals with comprehensively elsewhere. Irrigationdecreases reliance on the monsoon, increases food security, and boosts agricultural production.

### 2.2References


1. Hamrouni. L Aiadi. O “Plants Species Identification using computer vision Techniques”, Revue des Bioresources7, in 2018.
2. Chaulagain, Basanta,Bhuwan Bhatt, BipinKhatwada “Plant Leaf Recognition” 2013.
3. pujari, Devashish, Rajesh yakkundimath and its use “SVM and ANN based Classification of plant disease using feature reduction technique (2016)


### 2.3Problem Statement Definition

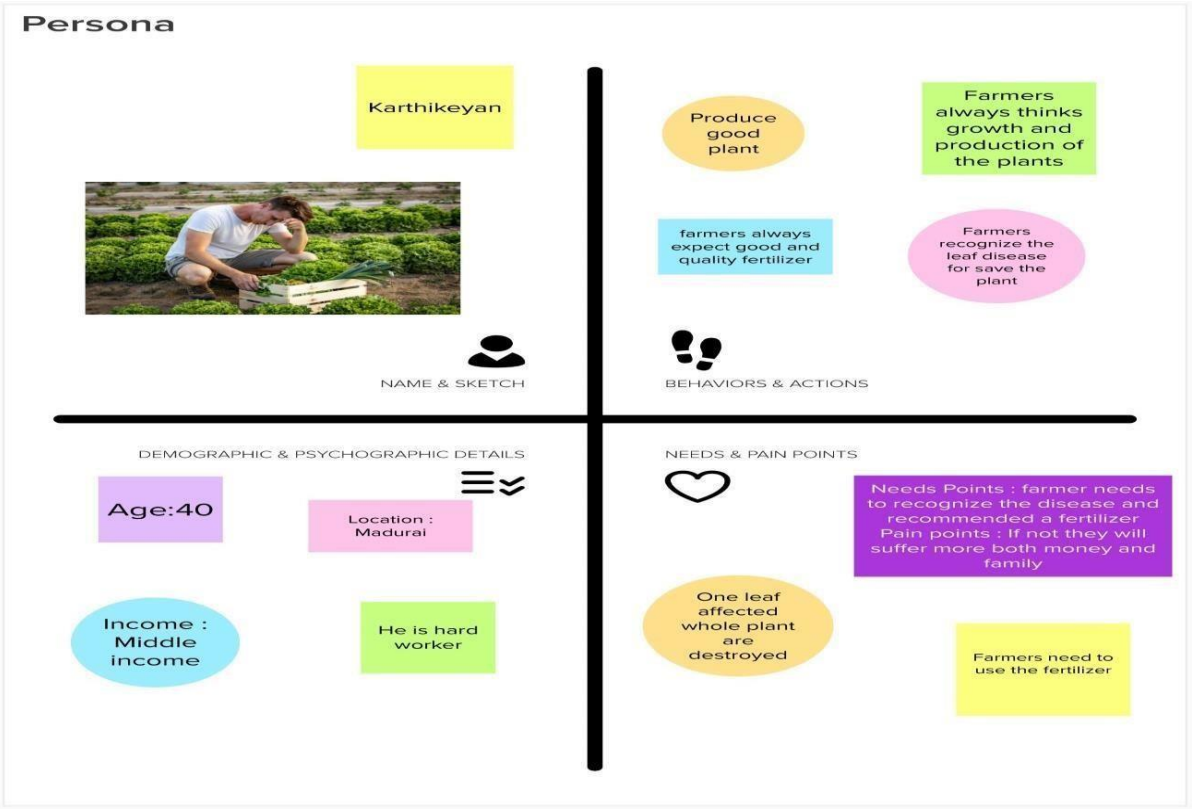
People who Grow Crops and facing Issues of Plant Disease In agricultural aspects, if the plant is affected by leaf disease, then it reduces the growth and productiveness. Generally, the plant diseases are caused by the abnormal physiological functionalities of plants During the development of the crops as they will be affected by various diseases. It is required for the growth of better qualityfood products. It is important to maximise the crop yield.An automated system is introduced to identify different diseases on plants by checking the symptoms shown on the leaves of the plant.

# CHAPTER-3

# IDEATION AND PROPOSED SOLUTION

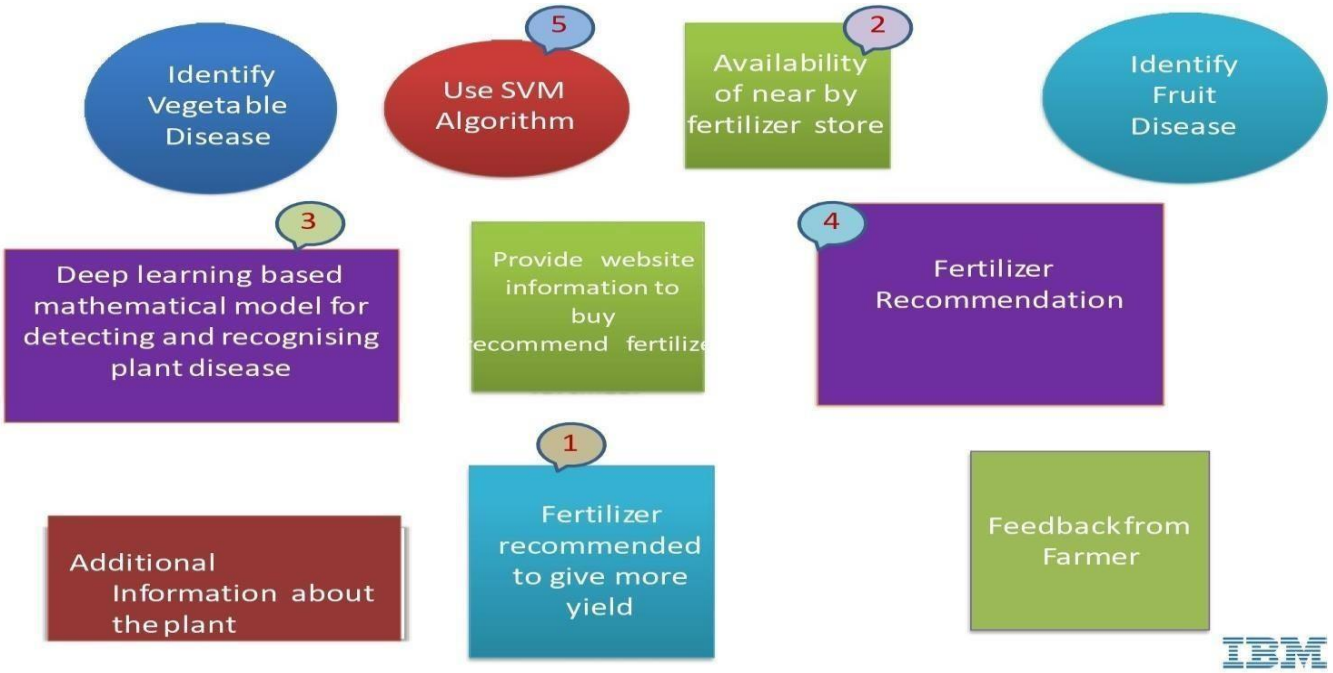
## 3.1Empathy Map Canvas

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment.



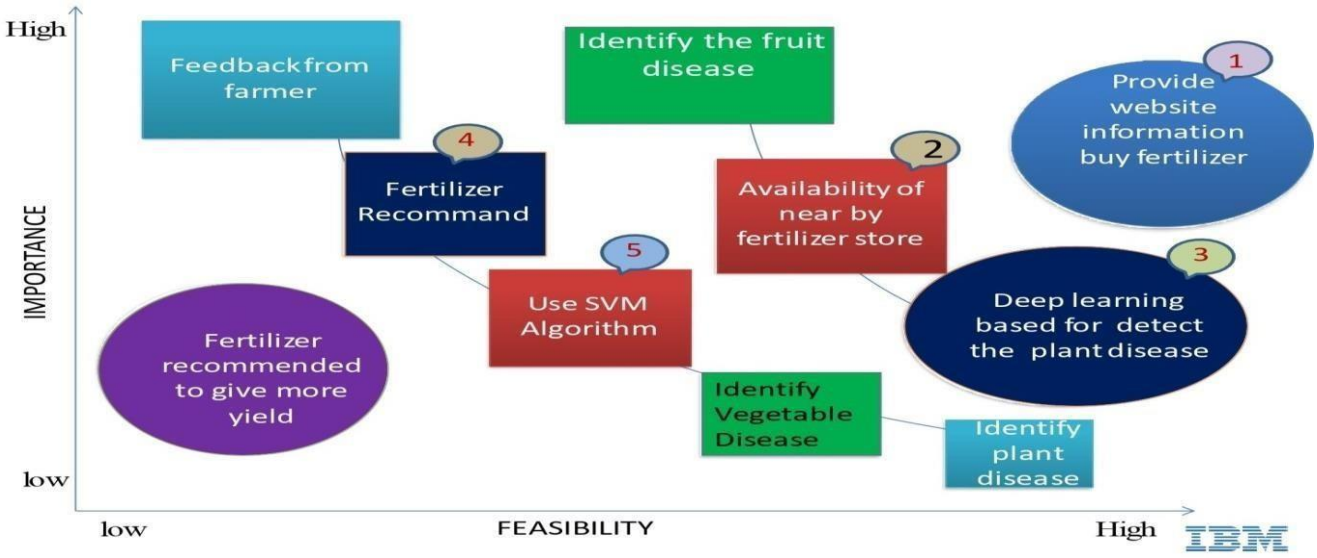
### 3.2Big Ideas

It consists of all the ideas of instruments and equipments that we are going to implement in this project.

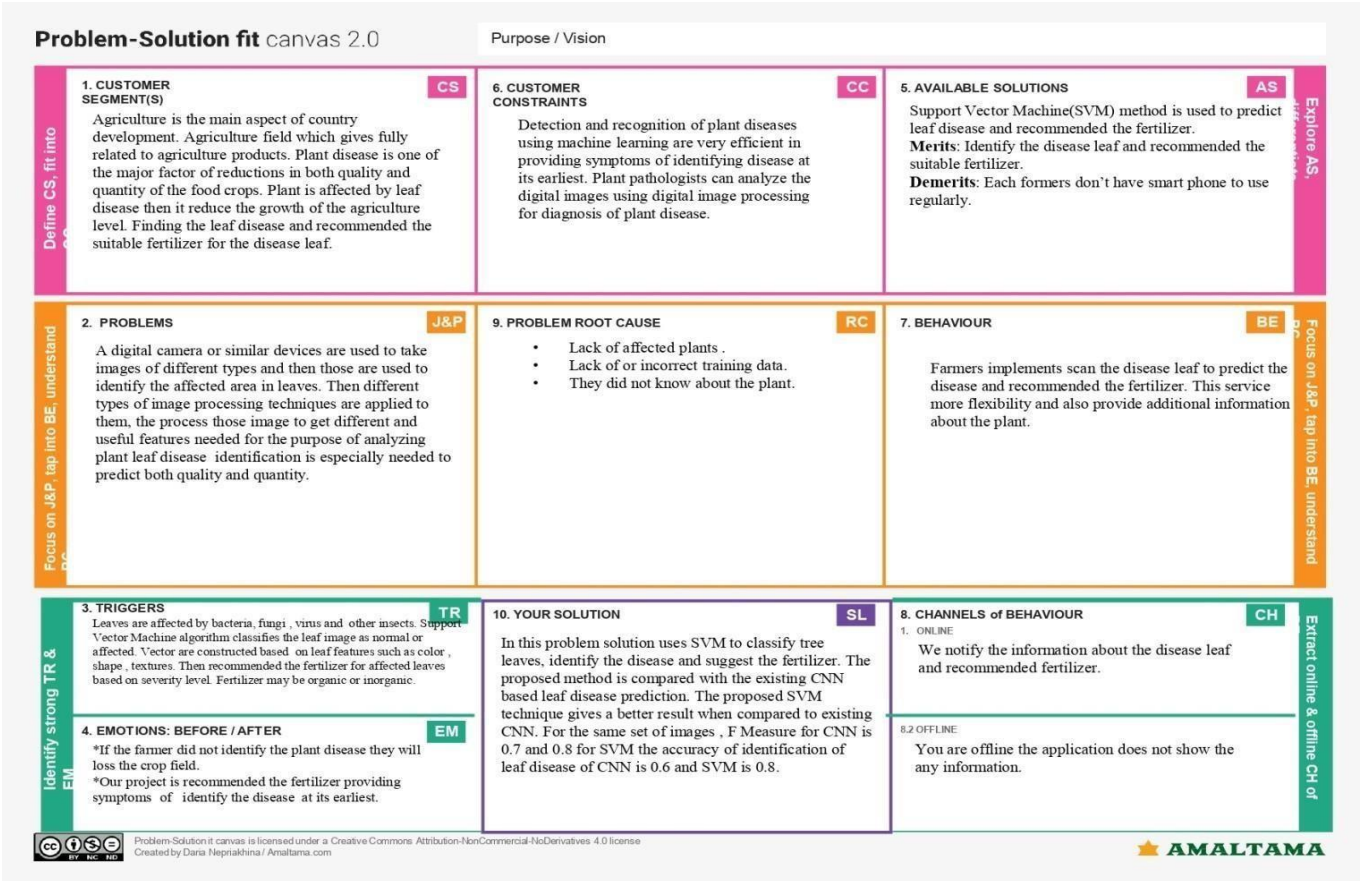



### Idea Prioritization

It deals with the prioritizing of the big ideas in order of highest to lowest likes.



## 3.3Problem Solution Fit




## 3.4 Proposed Solution

| S.No. | Parameter | Description |
|---|---|---|
| 1. | **Problem Statement (Problem to be solved)** | Fertilizers recommendation system for disease prediction using Artificial intelligence. |
| 2. | **Idea / Solution description** | The main idea is to predict the plant disease and recommed fertilizer.<br>•Collecting the data sets. then we have to scan the leaf and analyze the disease through patten maching of the current data sets.<br>•Then the fertilizer is recommed for the disease.<br>•We can also identify fruit and vegtable and recommed fertilizer. |

| | | |
|---|---|---|
| 3. | **Novelty / Uniqueness** | Providing informatiion about the near by fertilizer store.<br>•Providing web sites about the availability of fertilizer that is being recommed get remedy for the disease.<br>•Providing additional information about the plant. |
| 4. | **Social Impact /Customer Satisfaction** | •Farmer can get more satisfication through this processing.<br>•It increase yield and insure healthy produce by supplying the right balance of nutrients to the soil.<br>•Increases fertilizer use efficeincy and reduce leaching, resulting in better tree growth greater yeild and give quality fruits. |
| 5. | **Business Model (Revenue Model)** | •Through Advertsement we can sell our project to the private organization and public sectors.<br>•we can also give advertsement through the social media.<br>•Disease prediction in plant is a more important factor in farmer industry and it let to economic development.<br>•By giving additional information<br>about the fertilizer it is very useful for farmers. |
| 6. | **Scalability of the Solution** | Byre commending fertilizers avoiding disease affected by a plants . |

# CHAPTER-4

# REQUIREMENT ANALYSIS

## 4.1 Functional Requirements

| FRNo. | Functional Requirement(Epic) | Sub Requirement(Story/Sub-Task) |
|---|---|---|
| FR-1 | User registration | Registration through FormRegistrationthroughG mail RegistrationthroughLinkedIN |
| FR-2 | User Confirmation | ConfirmationviaEmail ConfirmationviaOTP |
| FR-3 | Upload Image | If image can upload he applications of disease can recommended fertilizer. |
| FR-4 | Accessing datasets | Datasets are retrieved f rom Excel file. |
| FR-5 | Web application | Detectand Recommend inthefieldcanbecontrolledbywebapplicat ion. |

## 4.2 Non-Functional Requirements

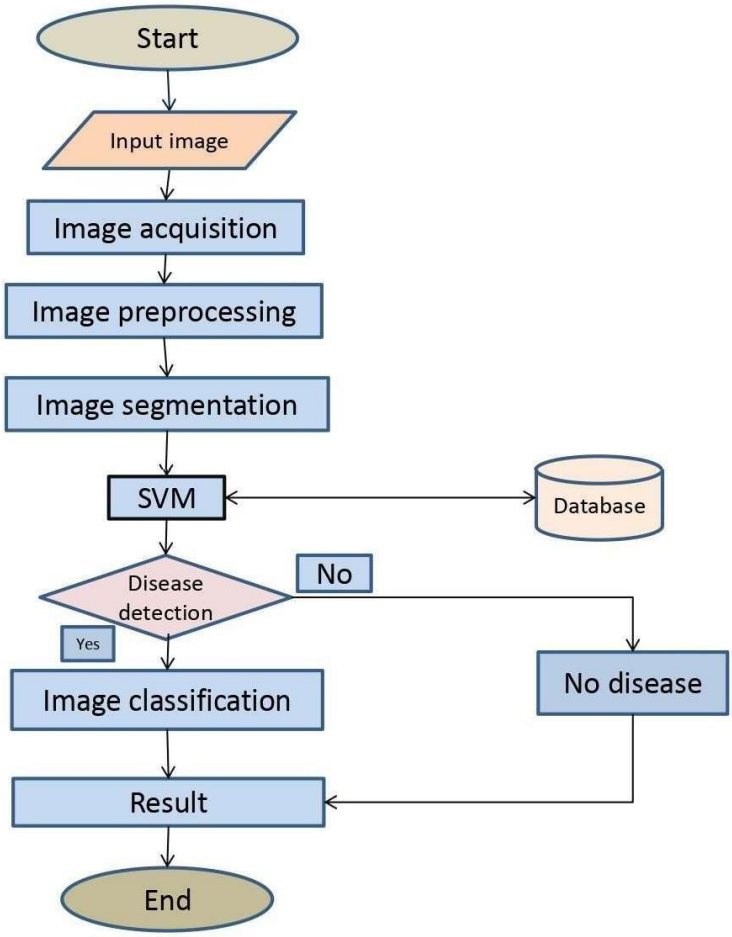
| FRNo. | Non-FunctionalRequirement | Descriptio n |
|---|---|---|
| NFR-1 | **Usability** | Crop and fertilizer recommendation system help the farmer to identify the disease |
| NFR-2 | **Security** | The proposed method combines two major aspects in farming, pest identification and insecticide recommendation. |
| NFR-3 | **Reliability** | It is easy to use so that health issue can be avoided. |
| NFR-4 | **Performance** | Precision fertilizer and precision crops is mostly used. they used to predict the crop in artificial intelligence. |
| NFR-5 | **Availability** | Reduces the losses as ammonia,nitrate leachiong, apply the right rate apply accurately. |
| NFR-6 | **Scalability** | If the soil is not replensied with nutrients through fertilizing crop yields will deteriorate over time. |

## CHAPTER-5

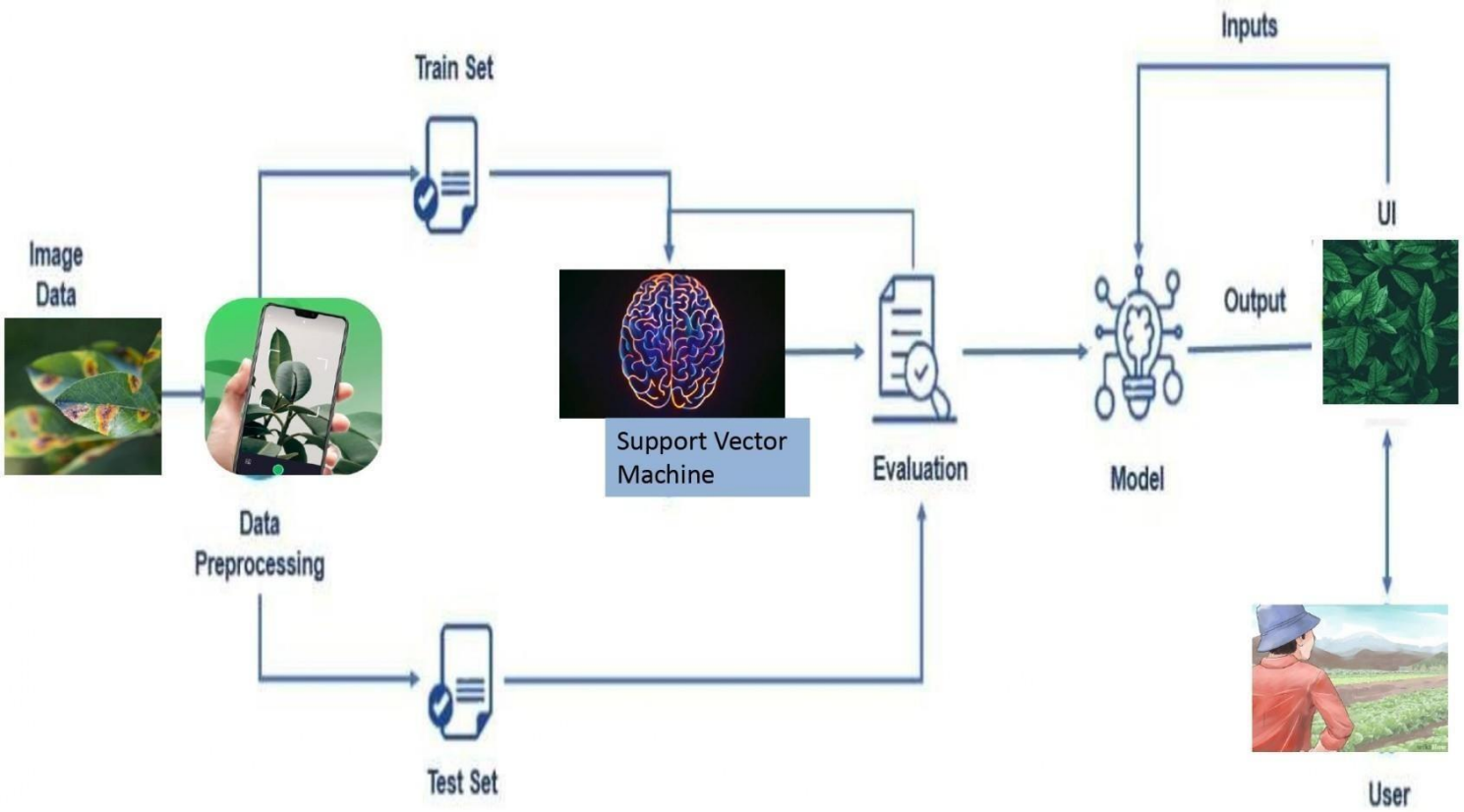
## PROJECT DESIGN

### 5.1 DATA FLOW DIAGRAM

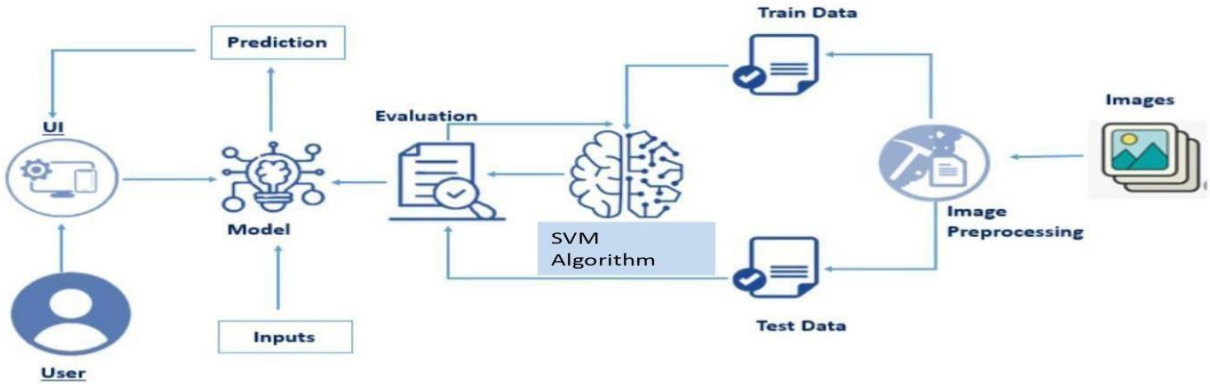
**Data Flow Diagram:**



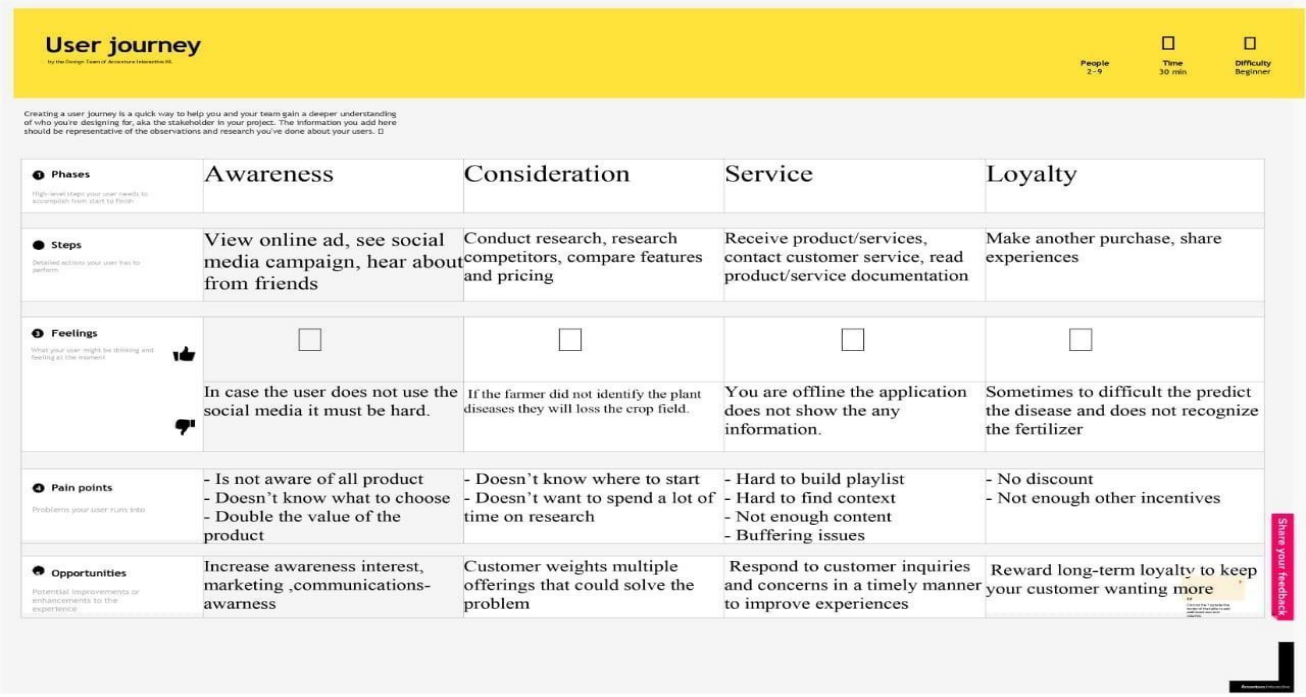
### 5.2 Solution & Technical Architecture




**TECHNOLOGY ARCHITECTURE:**



## 5.3 Customer Journey Map



User journey

by the Design Team of Accenture Interactive ML

People 2 - 9 | Time 30 min | Difficulty Beginner

Creating a user journey is a quick way to help you and your team gain a deeper understanding of who you're designing for, aka the stakeholder in your project. The information you add here should be representative of the observations and research you've done about your users. ☐

| Phases<br>High-level steps your user needs to accomplish from start to finish | Awareness | Consideration | Service | Loyalty |
|---|---|---|---|---|
| Steps<br>Detailed actions your user has to perform | View online ad, see social media campaign, hear about from friends | Conduct research, research competitors, compare features and pricing | Receive product/services, contact customer service, read product/service documentation | Make another purchase, share experiences |
| Feelings<br>What your user might be thinking and feeling at the moment | ☐ | ☐ | ☐ | ☐ |
| | In case the user does not use the social media it must be hard. | If the farmer did not identify the plant diseases they will loss the crop field. | You are offline the application does not show the any information. | Sometimes to difficult the predict the disease and does not recognize the fertilizer |
| Pain points<br>Problems your user runs into | - Is not aware of all product<br>- Doesn't know what to choose<br>- Double the value of the product | - Doesn't know where to start<br>- Doesn't want to spend a lot of time on research | - Hard to build playlist<br>- Hard to find context<br>- Not enough content<br>- Buffering issues | - No discount<br>- Not enough other incentives |
| Opportunities<br>Potential improvements or enhancements to the experience | Increase awareness interest, marketing ,communications-awarness | Customer weights multiple offerings that could solve the problem | Respond to customer inquiries and concerns in a timely manner to improve experiences | Reward long-term loyalty to keep your customer wanting more |

Share your feedback

# CHAPTER-6

# PROJECT PLANNING PHASE

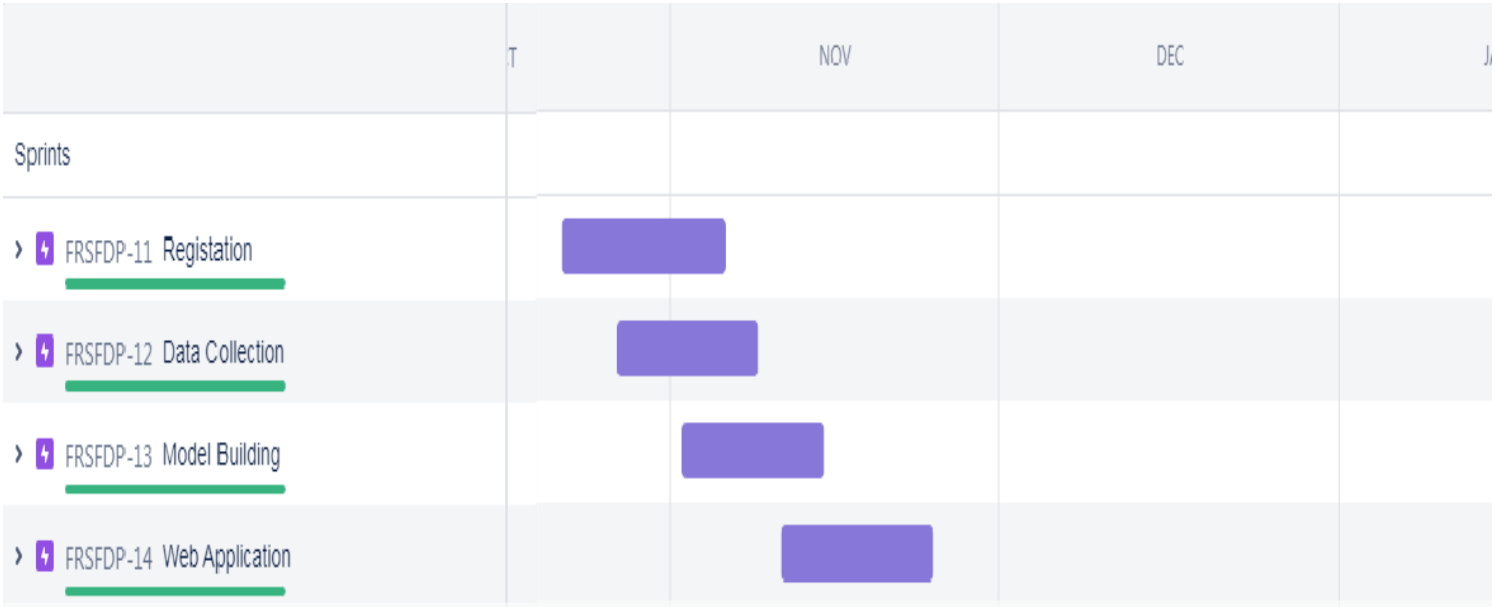
## 6.1 Sprint Planning, Schedule & Estimation

| Sprint | Functional Requirement (Epic) | User StoryNumber | User Story/Task | StoryPoints | Priority | TeamMembers |
|---|---|---|---|---|---|---|
| Sprint-1 | Registration | USN-1 | As a farmer, I can register for the application by entering my email, password ,and Confirming my password. | 2 | High | AnishFathima M<br>Emili S<br>Ishwarya R<br>Lakshmipriya S<br>Priyadharshini A |
| Sprint-1 | UserConfirmation | USN-2 | As a farmer, I will receive on firmation email once I have registered for the application | 1 | Medium | AnishFathima M<br>Emili S<br>IshwaryaR<br>Lakshmipriya S<br>PriyadharshiniA |
| Sprint-1 | Login | USN-3 | Asafarmer,Icanlogintothe application by entering email &password | 2 | High | AnishFathima M<br>Emili S<br>IshwaryaR<br>Lakshmipriya S<br>Priyadharshini A |
| Sprint-2 | DataCollection Image Processing | USN-1 | Downloadthedatasetusedin DigitalNaturalist–AIEnabledtoolsforBiodiversityResearchers. Improving the image data thatsuppresses unwilling distortionsorenhancessomeimagefeaturesimportant for further processing,although performing. | 2 | High | AnishFathima<br>Emili S<br>IshwaryaR<br>Lakshmipriya S<br>Priyadharshini A |
| Sprint-3 | Model Build Test Model | USN-1 | Theaugmentedandpre-processedimage data, In begin our modelbuilding,thisactivity The model is to be tested withdifferentimagestoknowifitisworkingcorrectly. | 2 | High | AnishFathima M<br>Emili S<br>Ishwarya R<br>Lakhsmipirya S<br>Priyadharshini A |
| Sprint-4 | WebApplication | USN-1 | AsaFarmer,Iwillshowthe currentInformationofthePlant. | 1 | Medium | AnishFathimaM<br>Emili S<br>Ishwarya R<br>Lakshmipriya S<br>Priyadharshini A |

## 6.2 Sprint Delivery Schedule

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 20 | 4 Days | 24 Oct 2022 | 27 Oct 2022 | 20 | 29 Oct 2022 |
| Sprint-2 | 20 | 5 Days | 28 Oct 2022 | 01 Nov 2022 | 20 | 04 Nov 2022 |
| Sprint-3 | 20 | 8 Days | 02 Nov 2022 | 09 Nov 2022 | 20 | 11 Nov 2022 |
| Sprint-4 | 20 | 9 Days | 10 Nov 2022 | 18 Nov 2022 | 20 | 19 Nov 2022 |

### 6.3 Reports From JIRA



# CHAPTER-7

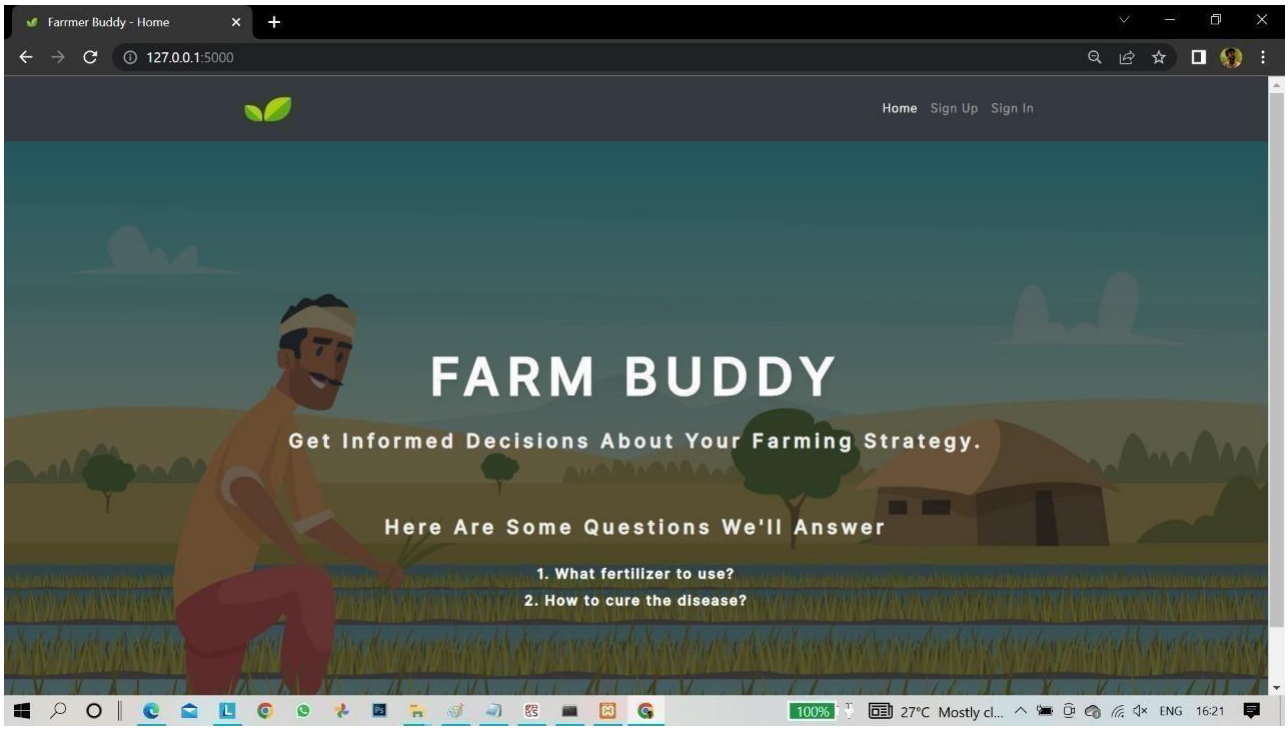
# CODING AND SO L UT I O N

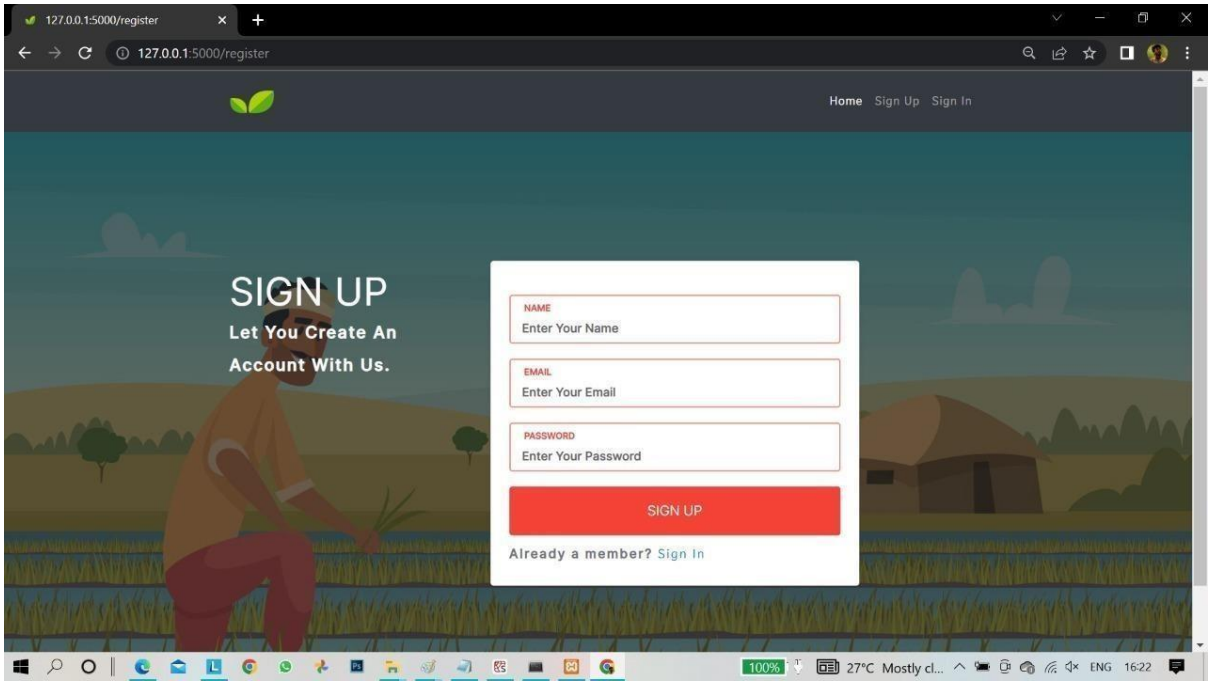
## 7.1 Feature

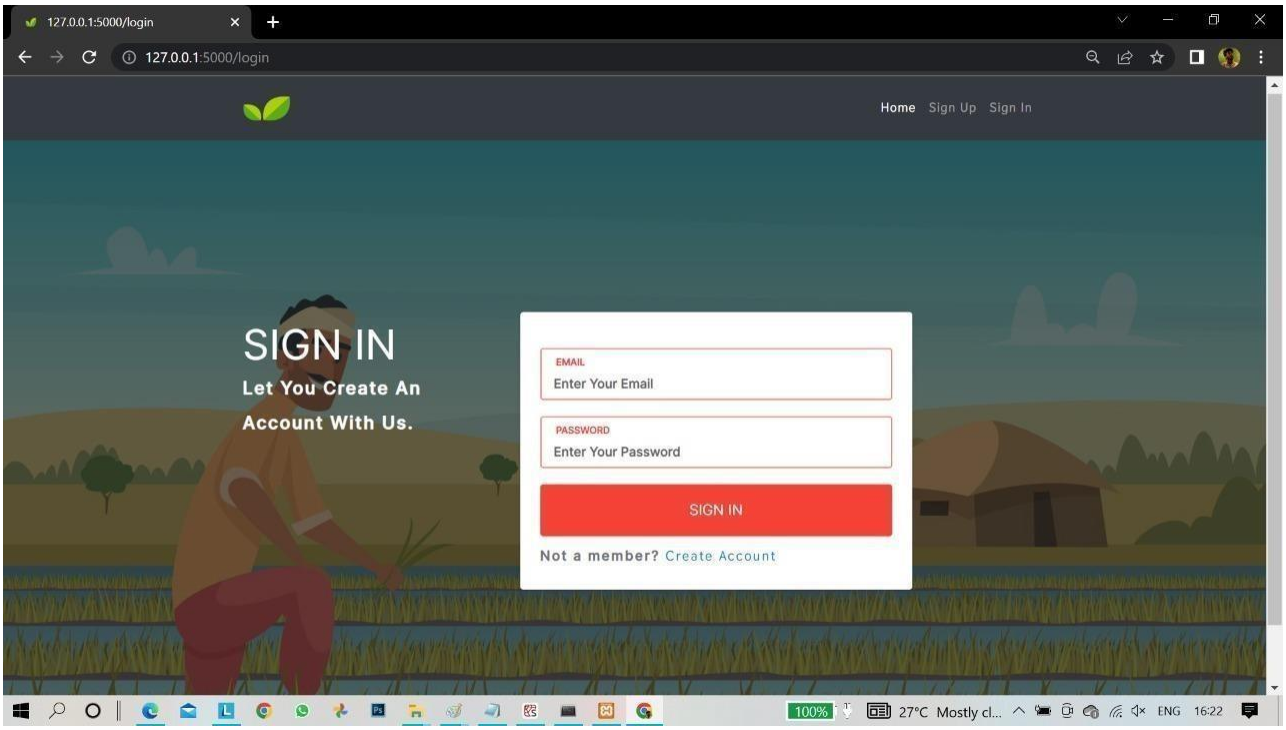
```
# Importing essential libraries and modules

from flask import Flask, render_template, request, Markup import numpy as np
import pandas as pd
from utils.disease import disease_dic from utils.fertilizer import fertilizer_dic import requests
import config import pickle import io import torch
from torchvision import transforms from PIL import Image
from utils.model import ResNet9 import mysql.connector
conn=mysql.connector.connect(host="localhost", user="root", password="", database="login")
cursor=conn.cursor()


disease_classes = ['Apple       Black_rot',
'Apple  healthy',
'Corn_(maize)  Northern_Leaf_Blight', 'Corn_(maize)       healthy',
'Peach   Bacterial_spot', 'Peach          healthy', 'Pepper,bell Bacterial_spot',

'Pepper,bell healthy', 'Potato Early_blight', 'Potato Late_blight', 'Potato healthy', 'Tomato
Bacterial_spot', 'Tomato                Late_blight', 'Tomato                Leaf_Mold',
'TomatoSeptoria_leaf_spot']
disease_model_path = 'models/plant-disease-model.pth' disease_model = ResNet9(3,
len(disease_classes)) disease_model.load_state_dict(torch.load(
disease_model_path, map_location=torch.device('cpu'))) disease_model.eval()
def predict_image(img, model=disease_model): """
Transforms image to tensor and predicts disease label
:params: image
:return: prediction (string) """
transform = transforms.Compose([ transforms.Resize(256), transforms.ToTensor(),
])
image = Image.open(io.BytesIO(img)) img_t = transform(image)
img_u = torch.unsqueeze(img_t, 0)

# Get predictions from model yb = model(img_u)
# Pick index with highest probability
_, preds = torch.max(yb, dim=1)
prediction = disease_classes[preds[0].item()] # Retrieve the class label
return prediction

app = Flask(_name_)
```

```
# render home page @app.route('/')
def home():
title = 'Farmer Buddy - Home'
return render_template('index.html', title=title)

@app.route('/fertilizer')
def fertilizer_recommendation(): title = 'Farmer Buddy'
return render_template('fertilizer.html', title=title) @app.route('/login', methods=['GET', 'POST'])
def login(): # put application's code here

return render_template('login.html')

@app.route('/register', methods=['GET', 'POST']) def register():
return render_template('register.html')

@app.route('/success', methods=['GET', 'POST']) def success():
return render_template('success.html')

@app.route('/login_validation', methods=['POST']) def login_validation():
email=request.form.get('email') password=request.form.get('password')

cursor.execute("""SELECT * FROM users WHERE email LIKE'{}' AND password LIKE
'{}'""".format(email,password))
users = cursor.fetchall()

if len(users)>0:
return render_template('success.html') else:
return render_template('login.html', prediction_text = "1" )

@app.route('/add_user', methods=['POST']) def add_user():
name= request.form.get('name') email = request.form.get('email')
password = request.form.get('password')

cursor.execute("""INSERT INTO users(id, name, email, password) VALUES
(NULL,'{}','{}','{}')""".format(name,email,password))
conn.commit()
return render_template('login.html', prediction_text = "0")

@app.route('/fertilizer-predict', methods=['POST']) def fert_recommend():
title = 'Farmer Buddy'

crop_name = str(request.form['cropname']) N = int(request.form['nitrogen'])
P = int(request.form['phosphorous']) K = int(request.form['pottasium'])
# ph = float(request.form['ph'])

df = pd.read_csv('Data/fertilizer.csv')

nr = df[df['Crop'] == crop_name]['N'].iloc[0]
```

```
pr = df[df['Crop'] == crop_name]['P'].iloc[0]
kr = df[df['Crop'] == crop_name]['K'].iloc[0]

n = nr - N p = pr - P k = kr – K
k = kr - K
temp = {abs(n): "N", abs(p): "P", abs(k): "K"} max_value = temp[max(temp.keys())]
if max_value == "N": if n < 0:
key = 'NHigh' else:
key = "Nlow"
elif max_value == "P": if p < 0:
key = 'PHigh' else:
key = "Plow"
else:
if k < 0:
key = 'KHigh' else:
key = "Klow"

response = Markup(str(fertilizer_dic[key]))
return render_template('fertilizer-result.ht,ml', recommendation=response, title=title) # render disease
prediction result page
@app.route('/disease-predict', methods=['GET', 'POST']) def disease_prediction():
title = 'Farmer Buddy'

if request.method == 'POST': if 'file' not in request.files:
return redirect(request.url) file = request.files.get('file') if not file:
return render_template('disease.html', title=title) try:
img = file.read()

prediction = predict_image(img)

prediction = Markup(str(disease_dic[prediction]))
return render_template('disease-result.html', prediction=prediction, title=title) except:
pass
return render_template('disease.html', title=title)

# if name == '_main_': app.run(debug=False)
```


Farrmer Buddy - Home
127.0.0.1:5000
Home Sign Up Sign In
FARM BUDDY
Get Informed Decisions About Your Farming Strategy.
Here Are Some Questions We'll Answer
1. What fertilizer to use?
2. How to cure the disease?


127.0.0.1:5000/register
127.0.0.1:5000/register
Home Sign Up Sign In
SIGN UP
Let You Create An
Account With Us.
NAME
Enter Your Name
EMAIL
Enter Your Email
PASSWORD
Enter Your Password
SIGN UP
Already a member? Sign In


127.0.0.1:5000/login
127.0.0.1:5000/login
Home
Sign Up
Sign In
SIGN IN
Let You Create An
Account With Us.
EMAIL
Enter Your Email
PASSWORD
Enter Your Password
SIGN IN
Not a member? Create Account
100%
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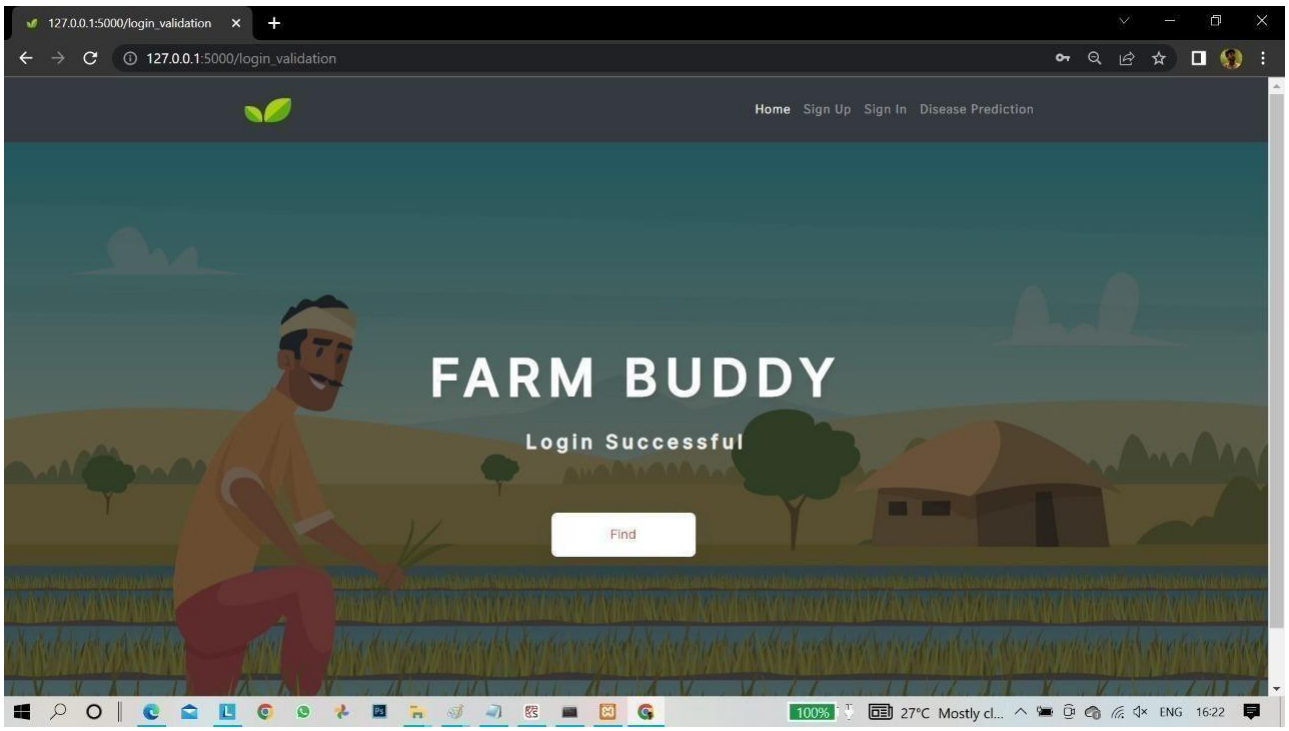
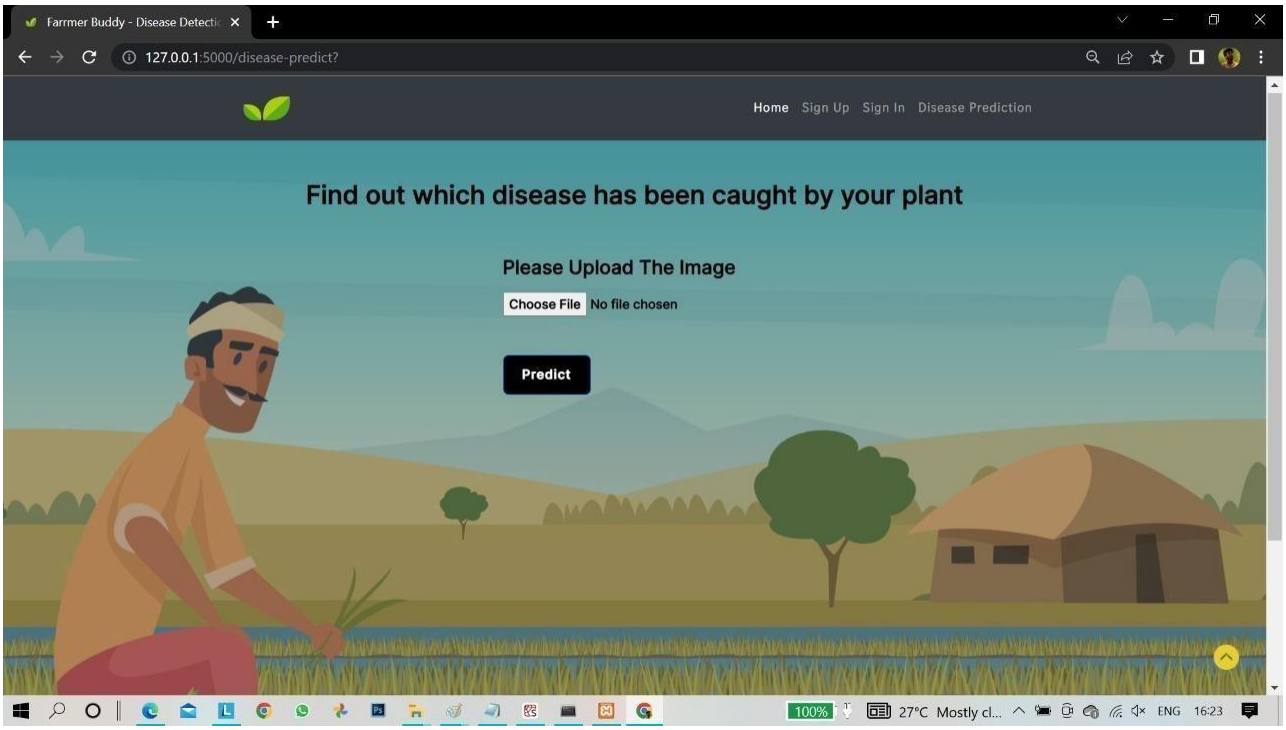
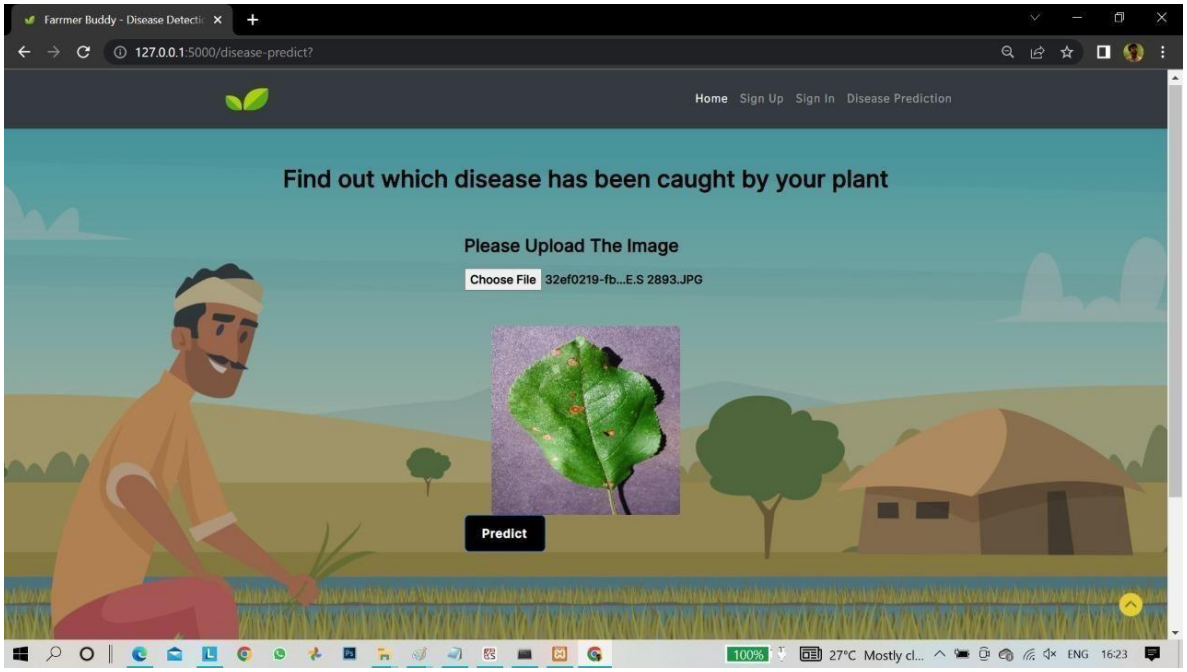
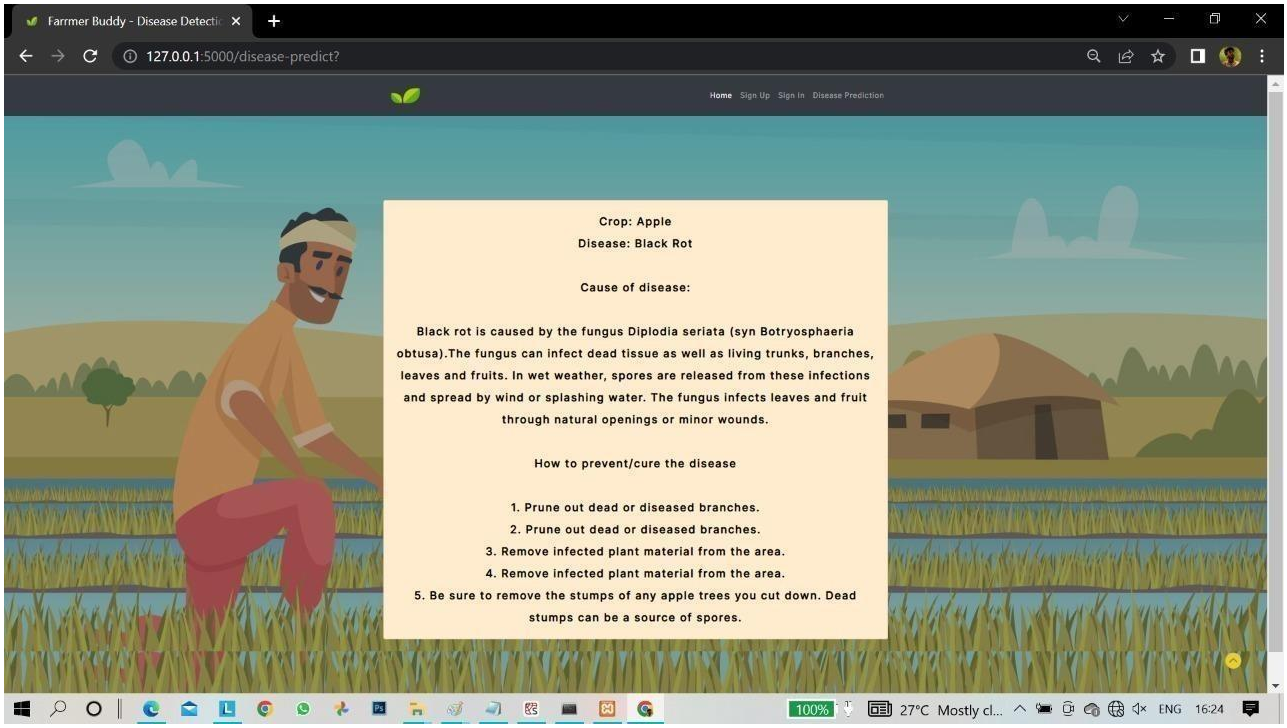

127.0.0.1:5000/login_validation
127.0.0.1:5000/login_validation
Home
Sign Up
Sign In
Disease Prediction
FARM BUDDY
Login Successful
Find
100%
27°C Mostly cl...
ENG
16:22


Farrmer Buddy - Disease Detecti
127.0.0.1:5000/disease-predict?
Home
Sign Up
Sign In
Disease Prediction
Find out which disease has been caught by your plant
Please Upload The Image
Choose File
No file chosen
Predict


Farrmer Buddy - Disease Detecti
127.0.0.1:5000/disease-predict?
Home
Sign Up
Sign In
Disease Prediction
Find out which disease has been caught by your plant
Please Upload The Image
Choose File
32ef0219-fb...E.S 2893.JPG
Predict


Farrmer Buddy - Disease Detecti
127.0.0.1:5000/disease-predict?
Home Sign Up Sign In Disease Prediction
Crop: Apple
Disease: Black Rot
Cause of disease:
Black rot is caused by the fungus Diplodia seriata (syn Botryosphaeria obtusa).The fungus can infect dead tissue as well as living trunks, branches, leaves and fruits. In wet weather, spores are released from these infections and spread by wind or splashing water. The fungus infects leaves and fruit through natural openings or minor wounds.
How to prevent/cure the disease
1. Prune out dead or diseased branches.
2. Prune out dead or diseased branches.
3. Remove infected plant material from the area.
4. Remove infected plant material from the area.
5. Be sure to remove the stumps of any apple trees you cut down. Dead stumps can be a source of spores.
100%
27°C Mostly cl...
ENG
16:24

# CHAPTER-8

# TESTING

## 8.1 Test cases

| Test case ID | Feature Type | Component | Test Scenario | Pre-Requisite | Steps To Execute | Test Data | Expected Result | Actual Result | Status | Commnets | TC for Automation(Y/N) | BUG ID | Executed By |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HomePage_TC_OO1 | Functional | Home Page | Verify user is able to see the home page or not. | | 1.Enter URL and click go<br>2.verify whether the user is able to see the home page. | Enter URL and click go | User able to see the home page | Working as expected | Pass | Nil | N | _ | Ishwarya R |
| HomePage_TC_OO2 | UI | Home Page | Verify the UI elements in Home Page | | 1.Enter URL and click go<br>2.Verify the UI elements in Home Page. | Enter URL and click go | Application should show below UI elements: | Working as expected | pass | Nil | N | _ | AnishFathima M |
| RegisterPage_TC_OO3 | Functional | RegisterPage | A Register page is able to will Input the user data. | | 1.Enter URL and click go<br>2.Verify the UI elements in Home Page<br>3.Click the signin button | Click in sign up home page | Application should show 'Incorrect email or password ' validation message. | Working as expected | pass | Nil | N | | Emili S |
| LoginpageTC_OO 4 | Functional | login page | Verify user is able to redirect to predict page or not. | | 1.Enter URL and click go<br>2.Click on Predict button<br>3.Verify whether the user to redirect to predict page or not. | Click in sign in home page | Application should show 'Incorrect email or password ' validation message. | Working as expected | pass | Nil | N | _ | Lakshmipriya S |
| PredictPage_TC_OO5 | UI | Predict page | Verify the UI elements in Predict Page | | 1.Enter URL and click go<br>2.Verify the UI elements in Predict Page. | Click the predict button and redirect to predict page | Application should show below UI elements:<br>Dropdown List , Upload file Button, Predict button. | Working as expected | pass | Nil | N | _ | Priyadharshini A |
| PredictPage_TC_OO6 | Functional | Predict page | Verify user is able to select the dropdown value or not. | | 1.Enter URL and click go<br>2.Click on Predict button<br>3.Verify whether the user to redirect to predict page or not.<br>4.Verify user is able to select the dropdown value or not. | Fruit or Vegetable | Application should shows user to choose fruit or vegetable option in dropdown list. | Working as expected | pass | Nil | N | _ | Emili S , Anishfathima M |
| PredictPage_TC_OO7 | Functional | Predict page | Verify user is able to upload the image or not. | | 1.Enter URL and click go<br>2.Click on Predict button<br>3.Verify whether the user to redirect to predict page or not.<br>4.Verify user is able to select the dropdown value or not.<br>5.Verify user is able to upload the images or not | Images to be Uploaded | Application should shows the uploaded image. | Working as expected | pass | Nil | N | _ | Ishwarya , Lakshmipriya |
| PredictPage_TC_OO8 | Functional | Predict page | Verify whether the image is predicted correctly or not | | 1.Enter URL and click go<br>2.Click on Predict button<br>3.Verify whether the user to redirect to predict page or not.<br>4.Verify user is able to select the dropdown value or not.<br>5.Verify user is able to upload the images or not<br>6. Verify whether the image is predicted correctly or not | Click the Prediet Button | Application shows the predicted output | Working as expected | pass | Nil | N | _ | Emili S<br>Anishfathima M<br>Ishwarya R<br>Lakshmipriya S<br>Priyadharshini A |

## User Acceptance Testing

### 8.2 Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [Fertilizers Recommendation System For Disease Prediction] project at the time of the release to User Acceptance Testing (UAT).

**Defect Analysis**

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.

| Resolution | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal |
|---|---|---|---|---|---|
| By Design | 7 | 3 | 6 | 5 | 21 |
| Duplicate | 4 | 0 | 3 | 0 | 7 |
| External | 1 | 2 | 0 | 1 | 4 |
| Fixed | 14 | 1 | 3 | 8 | 26 |
| Not Reproduced | 0 | 0 | 1 | 0 | 1 |
| Skipped | 0 | 0 | 1 | 1 | 2 |
| Won't Fix | 0 | 4 | 2 | 0 | 6 |
| Totals | 26 | 11 | 18 | 19 | 67 |

Test Case Analysis

This report shows the number of test cases that have passed, failed, and untested

| Section | Total Cases | Not Tested | Fail | Pass |
|---|---|---|---|---|
| Print Engine | 5 | 0 | 0 | 5 |
| Client Application | 30 | 0 | 0 | 30 |
| Security | 2 | 0 | 0 | 2 |
| Outsource Shipping | 1 | 0 | 0 | 1 |
| Exception Reporting | 7 | 0 | 0 | 7 |
| Final Report Output | 9 | 0 | 0 | 9 |
| Version Control | 1 | 0 | 0 | 1 |

# CHAPTER-9
# RESULTS

## 9.1 Performance Metrics

```
In [37]: model.summary()
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d (Conv2D)              (None, 126, 126, 32)      896
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 63, 63, 32)        0
_________________________________________________________________
flatten (Flatten)            (None, 127008)            0
=================================================================
Total params: 896
Trainable params: 896
Non-trainable params: 0
_________________________________________________________________
```

```
In [49]: model.fit_generator(x_train,steps_per_epoch=len(x_train),validation_data=x_test,validation_steps=len(x_test),epochs=10)
```

```
Epoch 1/10
699/699 [==============================] - 504s 720ms/step - loss: 2.5996 - accuracy: 0.1236 - val_loss: 2.5827 - val_accuracy: 0.1307
Epoch 2/10
699/699 [==============================] - 503s 719ms/step - loss: 2.5669 - accuracy: 0.1268 - val_loss: 2.5753 - val_accuracy: 0.1307
Epoch 3/10
699/699 [==============================] - 504s 721ms/step - loss: 2.5635 - accuracy: 0.1268 - val_loss: 2.5737 - val_accuracy: 0.1307
Epoch 4/10
699/699 [==============================] - 505s 722ms/step - loss: 2.5628 - accuracy: 0.1268 - val_loss: 2.5739 - val_accuracy: 0.1307
Epoch 5/10
699/699 [==============================] - 507s 725ms/step - loss: 2.5626 - accuracy: 0.1268 - val_loss: 2.5738 - val_accuracy: 0.1307
Epoch 6/10
699/699 [==============================] - 518s 740ms/step - loss: 2.5625 - accuracy: 0.1268 - val_loss: 2.5735 - val_accuracy: 0.1307
Epoch 7/10
699/699 [==============================] - 524s 749ms/step - loss: 2.5625 - accuracy: 0.1268 - val_loss: 2.5745 - val_accuracy: 0.1307
Epoch 8/10
699/699 [==============================] - 510s 729ms/step - loss: 2.5626 - accuracy: 0.1268 - val_loss: 2.5739 - val_accuracy: 0.1307
Epoch 9/10
699/699 [==============================] - 512s 732ms/step - loss: 2.5625 - accuracy: 0.1268 - val_loss: 2.5734 - val_accuracy: 0.1307
Epoch 10/10
699/699 [==============================] - 512s 733ms/step - loss: 2.5625 - accuracy: 0.1268 - val_loss: 2.5741 - val_accuracy: 0.1307
```

```
Out[49]: <tensorflow.python.keras.callbacks.History at 0x7f956d0ac040>
```

# CHAPTER-10

## ADVANTAGES & DISADVANTAGES

### 10.1 ADVANTAGE:

- ✓ It classifies the leaf image as normal or affected.
- ✓ Recommend the fertilizer for affected leaves based on severity level
- ✓ Farmer can get more satisfaction through this processing

### 10.2 DISADVANTAGE:

- ✓ Lack of affected Plants.
- ✓ They did know about the disease plant what fertilizer to use..
- ✓ If the farmer did identify the plant disease they will loss the crop field.

# CHAPTER-11

# CONCLUSION

The core strategy of this project is to predict the crop based on the soil nutrient content and the location where the crop is growing. This system will help he farmers to choose the right crop for their land and to give the suitable amount of fertilizer to produce the maximum yield. The Support Vector Machine algorithm helps to predict the crop the precisely based on the pre-processed crop data. This system will also help the new comers to choose the crop which will grow in their area andproduce them a good profit. A decent amount of profit will attract more people towards theagriculture

# CHAPTER-12

## FUTURE SCOPE

As of now we have just built the web application which apparently takes the input as an image and then predict the out in the near future we can develop an application which computer vision and AI techniquesto predict the infection once you keep the camera near the plant or leaf this could make our project even more usable This further research is implementing the proposed algorithm with the existing public datasets. Also, various segmentation algorithms can be implemented to improve accuracy. The proposed algorithm can be modified further to identify the disease that affects the various plant organs such as vegetables and fruits.

# CHAPTER-13

## APPENDIX

**Github : http://bitly.ws/wZep**

**Demo Link : http://bitly.ws/wZe7**