Fertilizers Recommendation System for Disease Prediction

PROJECT REPORT

Submitted by

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In

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1 INTRODUCTION

Fertilizer Recommendation system for disease Prediction is a simple ML and DL based website which recommends the best crop to grow, fertilizers to use and the diseases caught by your crops.

1.1 PROJECT OVERVIEW:

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.

1.2 PUPRPOSE:

➢ It allows us to predict which crops would be appropriate for a given climate.
➢ The proposed method uses SVM to classify tree leaves, identify the disease and suggest the fertilizer.
➢ The proposed method is compared with the existing CNN based leaf disease prediction. The proposed SVM technique gives a better result

2 LITERATURE SURVEY:

2.1 EXISTING PROBLEM:

In our case When a pathogen that is already present or invades successfully to plant host tissues and cells results in plant disease. It is important to fix the problem because Plant diseases reduce the amount of food available to humans by ultimately interfering with crop yields. This can cause inadequate food for humans which result in starvation or death in the worst cases.

2.2 REFERENCES:

[1] Tanha Talaviya, Dhara Shah, Nivedita Patel, Manan Shah, "Implementation of artificial intelligence in agriculture for optimisation of irrigation and application of pesticides and herbicides" Volume 4, 2020, Pages 58-73.

[2] Anurag Saxena, Truptimayee Suna and Dipankar Saha Regi, "Application of Artificial Intelligence in Indian Agriculture" 2020.

[3] Nilay Ganatra and Atul Patel, "A Survey on Diseases Detection and Classification of Agriculture Products using Image Processing and Machine Learning", International Journal of Computer Applications (0975 – 8887) Volume 180 – No.13, January 2018.

[4] Ngozi Clara Eli-Chukwu, "Applications of Artificial Intelligence in Agriculture: A Review", Engineering, Technology & Applied Science Research Vol. 9, No. 4, 2019, 4377- 4383.

5] Dr.K.Thangadurai, K.Padmavathi, "Computer Visionimage Enhancement For Plant Leaves Disease Detection", 2014 World Congress on Computing and Communication Technologies.
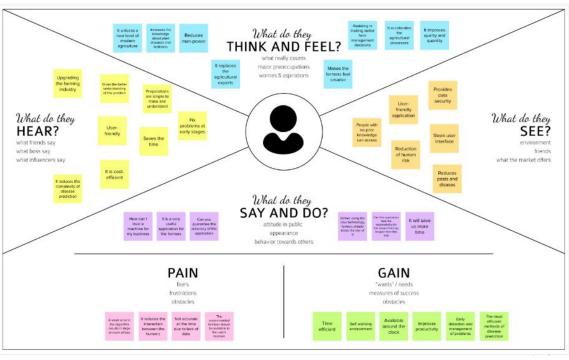
2.3   PROBLEM STATEMENT DEFINITION:

This is a challenging task for a country like India, where agriculture feeds approximately 42% of the population. And the outcomes for the farmer of choosing the wrong crop for land is moving towards metro city for livelihoods, suicide, quitting the agriculture and give land on lease to industrialist or use for the non-agriculture purpose. The outcome of wrong crop selection is less yield and less profit.

3 IDEATION AND PROPOSED SOLUTION:

3.1   EMPATHY MAP:

An empathy map is a collaborative tool team can use to gain a deeper insight into their customers.

3.2   IDEATION AND PROPOSED SOLUTION:

Ideation is often closely related to the practice of brainstorming, a specific technique that is utilized to generate new ideas. A principal difference between ideation and brainstorming is that ideation is commonly more thought of as being an individual pursuit, while brainstorming is almost always a group activity.
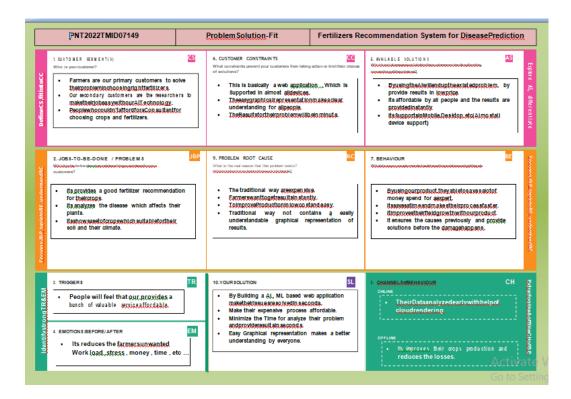
3.3 PROPOSED SOLUTION:

The solution to the problem is machine learning. This system recommends the best crop to grow on your land based on the nutritional value of the soil and along with the climate of that region. It also recommends the best fertilizer for each crop, which is a challenging task. The cultivation recommendation features a database of soil nitrogen, phosphorus and potassium for modern agriculture. The ensemble technique is used to create a recommendation model that combines multiple machine-learning predictions. The models recommend the right harvest based on the value of the soil and the best fertilizer.

Proposed Solution

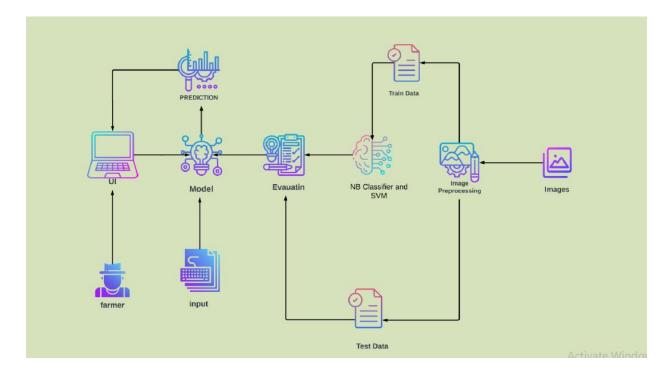| S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	This is a challenging task for a country like India, where agriculture feeds approximately 42% of the population. And the outcomes for the farmer of choosing the wrong crop for land is moving towards metro city for livelihoods, suicide, quitting the agriculture and give land on lease to industrialist or use for the non-agriculture purpose. The outcome of wrong crop selection is less yield and less profit.
2.	Idea / Solution description	The solution to the problem is machine learning. This system recommends the best crop to grow on your land based on the nutritional value of the soil and along with the climate of that region. It also recommends the best fertilizer for each crop, which is a challenging task. The cultivation recommendation features a database of soil nitrogen, phosphorus and potassium for modern agriculture. The ensemble technique is used to create a recommendation model that combines multiple machine-learning predictions. The models recommend the right harvest based on the value of the soil and the best fertilizer.
3.	Novelty / Uniqueness	This system recommends solution for more complicated problems like choosing best fertilizer for every crop. It also takes care of the most important issue i.e., when plants get caught by heterogeneous diseases that affect fewer amounts of agriculture production and compromise quality.
4.	Social Impact / Customer Satisfaction	This system is being implemented into agriculture so that it is easier for farmers to grow and maximize their yield.
5.	Business Model (Revenue Model)	Predicting the fertilizers, Analyzing the ailment in a faucet makes the lifestyles of farmers easy with minimum subscriptions might offer a suitable go-back for the organization. This system adds lots of value to the company and the enterprise in society.
6.	Scalability of the Solution	This completely modular system makes it easily expandable and business efficient for customized fire detection, with significant cost, Easy operability and management.

3.4 PROBLEM SOLUTION FIT:

Problem-Solution canvas is a tool for entrepreneurs, marketers and corporate innovators, which help them, identify solutions with higher chances for a solution adoption, reduce time spent on solution testing and get a better overview of current situation.

PNT2022TMID07149	Problem Solution-Fit	Fertilizers Recommendation System for DiseasePrediction

1. CUSTOMER SEGMENT(S) — CS
Who is your customer?
- Farmers are our primary customers to solve their problem in choosing right fertilizers.
- Our secondary customers are the researchers to make their jobs easy without AI Technology.
- People who couldn't afford for a Consultant for choosing crops and fertilizers.

6. CUSTOMER CONSTRAINTS — CC
What constraints prevent your customers from taking action or limit their choice of solutions?
- This is basically a web application. Which is Supported in almost all devices.
- The easy graphical representation make a clear understanding for all people.
- The Results for their problem will be in minute.

5. AVAILABLE SOLUTIONS — AS
- By using the AI will end up the existed problem. by provide results in low price.
- Its affordable by all people and the results are provided instantly.
- Its Support in Mobile, Desktop, etc (Almost all device support)

2. JOBS-TO-BE-DONE / PROBLEMS — J&P
- Its provides a good fertilizer recommendation for their crops.
- Its analyze the disease which affects their plants.
- Its show us a set of crop which suitable for their soil and their climate.

9. PROBLEM ROOT CAUSE — RC
What is the real reason that this problem exists?
- The traditional way are expensive.
- Farmers want to get result in stantly.
- To improve Production in low cost and easy.
- Traditional way not contains a easily understandable graphical representation of results.

7. BEHAVIOUR — BE
- By using our product, they able to save a lot of money spend for a expert.
- Its save so time and make the process faster.
- It improve their field growth with our product.
- It ensures the causes previously and provide solutions before the damage happens.

1. TRIGGERS — TR
- People will feel that our provides a bunch of valuable service affordable.

4. EMOTIONS: BEFORE/ AFTER — EM
- Its reduces the farmers unwanted Work load , stress , money , time , etc ...

10. YOUR SOLUTION — SL
- By Building a AI, ML based web application make their issue are solve it in seconds.
- Make their expensive process affordable.
- Minimize the Time for analyze their problem and provide result in seconds.
- Easy Graphical representation makes a better understanding by everyone.

8. CHANNELS of BEHAVIOUR — CH
ONLINE
- Their Data analyzed early with help of cloud rendering

OFFLINE
- Its improves their crops production and reduces the losses.

4 REQUIREMENT ANALYSIS:

Analysis made while working on the solution The batch sizes are varied and tested. For different batch sizes, the CNN gives different accuracies. The batch size determines the number of iterations per epoch. Another important hyper parameter is the number of epochs. This determines accuracy and it has high influence on accuracy compared to other hyper parameters. The accuracy can be varied from 80% to 90% in vegetable dataset and 95% to 98% in the case of fruit dataset by increasing the number of epochs. The size of test dataset and train dataset also has very high influence on accuracies. The accuracy can be increased by using more number of images in train dataset. The computational time for model building is increased when the size of the train dataset increased and also number of epochs increased. The batch size of train dataset and test dataset also play a vital role in computational time. The Neural Network complexity is increased when more number of convolutional layers increased. If the number of layers increased, better accuracy result will obtain. At the same increasing the number of layers in CNN leads to more training time and also requires more time to build a model. The model .h5 size depends on the size of train datasets. But the memory requirement depends on the size of train dataset and CNN architecture complexity.

5 PROJECT DESIGN:

Project design is an early phase of the project lifecycle where ideas, processes, resources, and deliverables are planned out. A project design comes before a project plan as it's a broad overview whereas a project plan includes more detailed information. A project design is the process of outlining all of a project's stages and creating a project plan. It includes a strategy of ideas, resources and processes to achieve project goals and keep within a budget and deadline. Project managers could add flowcharts, sketches, photo impressions and prototypes to help fully outline the project. Project managers present the project plan to senior stakeholders and investors to get final approval before beginning the project. In many cases, project managers create more than one pan for each project so stakeholders can choose which one they think would work best for the project.

5.1 USER STORIES:

A user story is an informal, general explanation of a software feature written from the perspective of the end user or customer. The purpose of a user story is to articulate how a piece of work will deliver a particular value back to the customer.

6 PROJECT PLANNING AND SCHEDULING:

6.1 SPRINT PLANNING AND ESTIMATION:

The objective of the Estimation would be to consider the User Stories for the Sprint by Priority and by the Ability of the team to deliver during the Time Box of the Sprint.

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1		USN-1	As a user I have problem in finding the disease Because as farmer we face many problems such as finding the actual disease and best fertilizer is quite difficult.	3	Medium	Nithyalakshmi
Sprint-1	Modelling Phase	USN-2	DataSet - Collect the sample images of disease affected leaves of different kind of varieties and unpredictable disease affected leaves.	2	Medium	Nithyalakshmi, Emalda, Dharshini, Arun
Sprint-1		USN-3	Image Preprocessing - Preprocess the collected disease affected images such as rotating to grayscale, calling.	3	Low	Emalda, Nithyalakshmi
Sprint-1		USN-4	Train and test the collected dataset and to measure the accuracy of the dataset.	4	Medium	Emalda, Nithyalakshmi
Sprint-2		USN-5	Model building - Create a CNN model for the image segmentation	5	High	Arun, Dharshini
Sprint-2		USN-6	Cnn model evaluation - Evaluating the cnn model to check the accuracy and precision.	3	High	Arun, Dharshini
Sprint-2	Development Phase	USN-7	SVM algorithm - Use of svm is classifies the images and give 95% accuracy.	5	High	Emalda, Dharshini
Sprint-2		USN-8	Database creation for each dataset classes.	3	Medium	Nithyalakshmi, Emalda, Dharshini, Arun

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-2		USN-9	User database creation for the user details.	2	Low	Nithyalakshmi, Emalda, Dharshini, Arun
Sprint-2		USN-10	Description Page - It contains the details of predicting criteria and user guides.	3	Medium	Arun
Sprint-3		USN-11	Login Page - Login the user with phone number and email id.	2	Low	Nithyalakshmi
Sprint-3		USN-12	Creation of about us, feedback and rating page	3	Medium	Emalda
Sprint-3		USN-13	Dashboard and Input page creation - Contains user profiles and predicting accuracy. Input page we can able to feed the input images.	2	Low	Dharshini
Sprint-3		USN-14	Prediction page - Show the prediction based on the user input.	2	Low	Emalda, Nithyalakshmi
Sprint-4		USN-15	Model Load – API creation using flask	4	Medium	Arun, Dharshini
Sprint-4	Deployment Phase	USN-16	Connecting User interface and backend API calls	5	High	Nithyalakshmi, Emalda, Dharshini, Arun
Sprint-4		USN-17	Deployment of the application by using IBM cloud	5	High	Nithyalakshmi, Emalda, Dharshini, Arun
Sprint-4	Testing Phase	USN-18	Function testing-Checking usability and accessibility and Non Fuction testing-Checking scalability	5	High	Nithyalakshmi, Emalda, Dharshini, Arun
Sprint-4		USN-19	Testing the application as a user all user interfaces will be working properly with check the prediction accuracy.	5	High	Nithyalakshmi, Emalda, Dharshini, Arun

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	10	6 Days	24 Oct 2022	29 Oct 2022	10	30 Oct 2022
Sprint-2	15	6 Days	31 Oct 2022	05 Nov 2022	15	06 Nov 2022
Sprint-3	15	6 Days	07 Nov 2022	12 Nov 2022	15	13 Nov 2022
Sprint-4	10	6 Days	14 Nov 2022	19 Nov 2022	10	20 Nov 2022

7 CODING AND SOLUTIONING:

7.1 PYTHON CODE

```python
import requests
from tensorflow.keras.preprocessing import image
from tensorflow.keras.models import load_model
import numpy as np
import pandas as pd
import tensorflow as tf
from flask import Flask, request, render_template, redirect, url_for
import os
from werkzeug.utils import secure_filename
from tensorflow.python.keras.backend import set_session

app = Flask(__name__)
global sess

global graph
graph=tf.compat.v1.get_default_graph()




model = load_model(r"C:\Users\dhars\OneDrive\Desktop\IBM project\flask\uploads\fruit.h5")
model1=load_model(r"C:\Users\dhars\OneDrive\Desktop\IBM
    project\flask\uploads\vegetable.h5")



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


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

@app.route('/predict',methods=['POST'])

def predict():
    if request.method == 'POST':

        f = request.files['image']


        basepath = os.path.dirname(__file__)
        file_path = os.path.join(
```

```
        basepath, 'Dataset Plant Disease', 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.predict(x)
        preds = np.argmax(preds)
        print(preds)
        df=pd.read_excel('precautions - veg.xlsx')
        print(df.iloc[preds]['caution'])
    else:
        preds = model1.predict(x)
        preds = np.argmax(preds)

        df=pd.read_excel('precautions - fruits.xlsx')
        print(df.iloc[preds]['caution'])


    return df.iloc[preds]['caution']

if __name__ == "__main__":
    app.run(debug=True,use_reloader=False)
```

7.2   HTML CODE

HOME

```
<!DOCTYPE html>
<html>
<head>
 <meta charset="UTF-8">
 <meta name="viewport" content="width=device-width, initial-scale=1">
 <link rel="icon" href="data:,">
 <title> Plant Disease Prediction</title>
 <link href='https://fonts.googleapis.com/css?family=Pacifico' rel='stylesheet' type='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'>
```

```html
<link href='https://fonts.googleapis.com/css?family=Open+Sans+Condensed:300' rel='stylesheet' type='text/css'>
<link rel="stylesheet" href="{{ url_for('static', filename='css/style.css') }}">
<link href='https://fonts.googleapis.com/css?family=Merriweather' rel='stylesheet'>
<link href='https://fonts.googleapis.com/css?family=Josefin Sans' rel='stylesheet'>
<link href='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: 14px 16px;
  text-decoration: none;
  font-size: 18px;
}

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

```css
  color: black;
}

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

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

body {
 font-family:'Times New Roman', Times, serif;
 background-image: url("../static/images/s1.jpg");
 background-color:#ffffff;
 background-repeat: no-repeat;
 background-size:cover;
 background-position: 0px 0px;
 }
 .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: 0 12px 16px 0 rgba(0,0,0,0.24), 0 17px 50px 0 rgba(0,0,0,0.19);
}
form {border: 3px solid #f1f1f1; margin-left:400px;margin-right:400px;}

input[type=text], input[type=password] {
 width: 100%;
 padding: 12px 20px;
```

```css
    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: 24px 0 12px 0;
}

img.avatar {
    width: 30%;
    border-radius: 50%;
}

.container {
    padding: 16px;
}
```

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

/* Change styles for span and cancel button on extra small screens */
@media screen and (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: 10px solid blue;
}
.left,.right{
 box-sizing: content-box;
 height: 400px;
 margin:20px;
 border: 10px solid blue;
}
```

```css
.mySlides {display: none;}
img {vertical-align: middle;}

/* Slideshow container */
.slideshow-container {
 max-width: 1000px;
 position: relative;
 margin: auto;
}

/* Caption text */
.text {
 color: #f2f2f2;
 font-size: 15px;
 padding: 8px 12px;
 position: absolute;
 bottom: 8px;
 width: 100%;
 text-align: center;
}
/* The dots/bullets/indicators */
.dot {
 height: 15px;
 width: 15px;
 margin: 0 2px;
 background-color: #bbb;
 border-radius: 50%;
 display: inline-block;
 transition: background-color 0.6s ease;
}

.active {
 background-color: #717171;
}

/* Fading animation */
.fade {
 -webkit-animation-name: fade;
 -webkit-animation-duration: 1.5s;
```

```css
  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 */
@media only screen and (max-width: 300px) {
  .text {font-size: 11px}
}
</style>
</head>

<body>

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

   <a class="active" href="{{ url_for('home')}}">Home</a>
   <a href="{{ url_for('prediction')}}">Predict</a>
 </div>
</div>

<div style="background-color:#ffffff;">
<div style="width:60%;float:left;">
<div        style="font-size:40px;color:#013220;font-family:Montserrat;padding-left:20px;text-
align:center;padding-top:10%;">
<b>Fertilizers Recommendation System<br> For Disease Prediction!!</b>
</div><br>
```

```html
<div      style="font-size:20px;color:#ffffff;font-family:Arial      Black;padding-left:70px;padding-
right:30px;text-align:justify;">Agriculture is one of the major sectors worls wide. Over the years
it has developed and the use of new technologies and equipment replaced almost all the traditional
methods of farming. The plant diseases 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 in detecting the diseases by observing the spots on the leaves, which
inturn saves effort and labour costs.</div><br><br>
</div>
</div>
<div style="width:40%;float:right;"><br><br>

</div>
</div>

<div class="home">

<br>

</div>

<script>
var slideIndex = 0;
showSlides();

function showSlides() {
 var i;
 var slides = document.getElementsByClassName("mySlides");
 var dots = document.getElementsByClassName("dot");
 for (i = 0; i < slides.length; i++) {
  slides[i].style.display = "none";
 }
 slideIndex++;
 if (slideIndex > slides.length) {slideIndex = 1}
 for (i = 0; i < dots.length; i++) {
  dots[i].className = dots[i].className.replace(" active", "");
 }
 slides[slideIndex-1].style.display = "block";
 dots[slideIndex-1].className += " active";
 setTimeout(showSlides, 2000); // Change image every 2 seconds
}
```

```
</script>
</body>
</html>
```

PREDICT

```
<!DOCTYPE html>
<html >

<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <title> Plant Disease Prediction</title>
  <link href='https://fonts.googleapis.com/css?family=Pacifico' rel='stylesheet' type='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'>
<link href="https://cdn.bootcss.com/bootstrap/4.0.0/css/bootstrap.min.css" rel="stylesheet">
    <script src="https://cdn.bootcss.com/popper.js/1.12.9/umd/popper.min.js"></script>
    <script src="https://cdn.bootcss.com/jquery/3.3.1/jquery.min.js"></script>
    <script src="https://cdn.bootcss.com/bootstrap/4.0.0/js/bootstrap.min.js"></script>
<link href='https://fonts.googleapis.com/css?family=Open+Sans+Condensed:300' rel='stylesheet'
type='text/css'>
<link href='https://fonts.googleapis.com/css?family=Merriweather' rel='stylesheet'>
<link href='https://fonts.googleapis.com/css?family=Josefin Sans' rel='stylesheet'>
<link href='https://fonts.googleapis.com/css?family=Montserrat' rel='stylesheet'>
<link href="{{ 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%;
```

```css
                    height:8%;
                    text-align: center;
            }
            .topnav {
  overflow: hidden;
  background-color: #333;
}

.topnav-right a {
  float: left;
  color: #f2f2f2;
  text-align: center;
  padding: 14px 16px;
  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-image: url("../static/images/s2.jpg");
 background-color:#ffffff;
 background-repeat: no-repeat;
```

```css
   background-size:cover;
   background-position: 0px 0px;
   }
.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 1px 1px rgba(0,0,0,0.3);
       border: 1px solid rgba(0,0,0,0.3);
       border-radius: 4px;
       box-shadow: inset 0 -5px 45px rgba(100,100,100,0.2), 0 1px 1px rgba(255,255,255,0.2);
       -webkit-transition: box-shadow .5s ease;
       -moz-transition: box-shadow .5s ease;
       -o-transition: box-shadow .5s ease;
       -ms-transition: box-shadow .5s ease;
       transition: box-shadow .5s ease;
}


</style>
</head>

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

<div class="header">
 <div        style="width:50%;float:left;font-size:2vw;text-align:left;color:white;        padding-
top:1%">Plant Disease Prediction</div>
```

```html
   <div class="topnav-right" style="padding-top:0.5%;">



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

                      <br>
                     </div>
                     <div class="col-sm-6">
                          <div>
                               <h4>Drop in the image to get the prediction  </h4>
               <form        action    =      ""      id="upload-file"      method="post"
enctype="multipart/form-data">
                          <select name="plant">

                               <option     value="select"     selected>Select     plant
type</option>
                               <option value="fruit">Fruit</option>
                               <option value="vegetable">Vegetable</option>
          </select><br>
                          <label         for="imageUpload"          class="upload-label"
style="background: #28272c;">
                               Choose...
                          </label>
                          <input type="file" name="image" id="imageUpload" accept=".png,
.jpg, .jpeg">
                     </form>


                     <div class="image-section" style="display:none;">
                          <div class="img-preview">
                               <div id="imagePreview">
                               </div>
                          </div>
                          <div>
```

```html
                                    <button type="button" class="btn btn-info btn-lg " id="btn-
predict" style="background: #28272c;">Predict!</button>
                        </div>
                </div>

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

                <h3>
                        <span       id="result"      style="font-size:17px;color:white;font-
family:Arial Black;"> </span>
                </h3>

        </div>
                </div>

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

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

8 RESULT

9 ADVANTAGES & DISADVANTAGES

9.1 ADVANTAGES

- ➢ Fertilizers provide crops with nutrients like potassium, phosphorus, and nitrogen, which allow crops to grow bigger, faster, and to produce more food. Nitrogen in particular is an essential nutrient for the growth of every organism on Earth. Nitrogen is all around us and makes up about 78% of the air you breathe.
- ➢ Sometimes plants need a quick fix to survive, in this type of cases fertilizers play a vital role to improve plants' health. plants need nutrients that can be absorbed quickly which is fulfilled by fertilizers. They are easily soluble and fastly absorbed by plants and as soon as possible it helps to regain and boost plant health.
- ➢ As the population is increasing, there is a huge demand for food, so good yield is required to fulfill the demand. Here fertilizers become helpful for the good production of crops due to their numerous benefits which promote the fast and healthy growth of plants. For large production, fertilizers become compulsory.

9.2 DISADVANTAGES

- ➢ Fertilizers are man-made so they need production in factories which makes them costlier than naturally made manure. But it is important for plant nutrients so it is in demand and thus it has high value.
- ➢ Fertilizers are used in moderate quantities if we use excessive fertilizers it surely damages the roots of plants and their tissues and thus plants can die. fertilizers are used according to the need of the plant. Unnecessary use of them can affect the plant's health specially if plants have good fertile soil.
- ➢ There are many types of fertilizers in the market, some of them are chemically made. These chemical fertilizers are harmful to humans and plants also. Skin irritation, respiratory problems commonly occur due to fertilizers. Can pass harmful chemical in our food which affects.
- ➢ Fertilizers can reduce the quality of soil and can harm microorganisms in the soil. Long-term use disturbs the pH of the soil and also reduces the microbial activities which are naturally good for plants.

10 CONCLUSION

The authors proposed a new approach for the soil based fertilizer prediction system. The proposed system was able to analyze the soil nutrient type efficiently, kind of leaf disease present in the crop and predict the fertilizer in a proficient manner. The approach was flexible, and can be extended to the needs of the users in a better manner. The proposed method was carried out with five different crops.

11 FUTURE SCOPE

The proposed model in this project work can be extended to image recognition. The entire model can be converted to application software using python to exe software. The real time image classification, image recognition and video processing are possible with help OpenCV python library. This project work can be extended for security applications such as figure print recognition, iris recognition and face recognition.

12 APPENDIX

The Project deliverables are uploaded in Git repository and in the IBM dashboard.

GIT LINK
https://github.com/IBM-EPBL/IBM-Project-27223-1660050924