

# **Project Title: Plant Growth Monitoring System**

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## **Code:**

- Python File Which Detect the Plant Healthy or Unhealthy:

```
from google.colab import drive
drive.mount('/content/drive')
```

```
import numpy as np
import matplotlib.pyplot as plt
import keras
import pandas
from keras.preprocessing.image import img_to_array
import os
from keras.preprocessing.image import load_img
from keras.preprocessing.image import ImageDataGenerator
from keras.applications.vgg19 import VGG19, preprocess_input, decode_predictions
training_data_generator= ImageDataGenerator(zoom_range=0.5, shear_range=0.3, rescale=1/255, horizontal_flip=True)
validation_data_generator= ImageDataGenerator(rescale= 1/255)
train = training_data_generator.flow_from_directory(directory="/content/drive/MyDrive/train",target_size=(256,256),batch_size=32)
val = validation_data_generator.flow_from_directory(directory="/content/drive/MyDrive/valid",target_size=(256,256),batch_size=32)
from keras.layers import Dense, Flatten
```

```

from keras.models import Model
from keras.applications.vgg19 import VGG19
import keras
base_model = VGG19(input_shape=(256,256,3),include_top=False)
for layer in base_model.layers:
    layer.trainable=False
x = Flatten()(base_model.output)
x= Dense(units=38, activation='softmax')(x)
model =Model(base_model.input, x)
model.compile(optimizer='adam',loss=keras.losses.categorical_crossentropy,metrics=['accuracy']
)
from keras.callbacks import ModelCheckpoint, EarlyStopping
es =EarlyStopping(monitor='val_accuracy',min_delta=0.01,patience=3,verbose=1)
mc =ModelCheckpoint(filepath="best_model.h",monitor='val_accuracy',min_delta=0.01,patience=3,verbose=1,save_best_only=True)
cb=[es,mc]
his = model.fit_generator(train,steps_per_epoch=16,epochs=50,verbose=1,callbacks=cb,validation_data=val,validation_steps=16)
from keras.callbacks import ModelCheckpoint, EarlyStopping
es =EarlyStopping(monitor='val_accuracy',min_delta=0.01,patience=3,verbose=1)
mc =ModelCheckpoint(filepath="best_model.h",monitor='val_accuracy',min_delta=0.01,patience=3,verbose=1,save_best_only=True)
cb=[es,mc]
from keras.models import load_model
model=load_model('/content/best_model.h')
acc =model.evaluate_generator(val)[1]
print(acc)
ref=dict(zip(list(train.class_indices.values()),list(train.class_indices.keys())))
def prediction(path):
    img=load_img(path,target_size=(256,256))
    i=img_to_array(img)

```

```
im=preprocess_input(i)
img=np.expand_dims(im,axis=0)
pred =np.argmax(model.predict(img))
print(pred)
print(f"The plant diagnosed as{ref[pred]}")
path="/content/drive/MyDrive/precaution/"+f'{pred}'+".txt"
f=open(path)
print(f.read())
```

```
path="/content/drive/MyDrive/livetest/leaveimage.jpg"
prediction(path)
```

- Index.html

```
{% extends "import.html" % }
```

```
{% block content % }
```

```
<style>
```

```
.hidden {
```

```
display: none;
```

```
}
```

```
button{
```

```
color:white;
```

```
background-color: green;
```

```
border:none;
```

```
}
```

```
</style>
```

```
<center>
```

<br><h2>Plant Disease Diagnosis</h2><br>

<button onClick="toggleTable()">Precaution</button>

<table id="myTable" style="width:50%" class="hidden">

<tr>

<th>Disease name</th>

<th>Precaution to Be given</th>

</tr>

<tr>

<td>Tomato\_Late\_blight</td>

<td>Apply a copper based fungicide (2 oz/ gallon of water) every 7 days or less, following heavy rain or when the amount of disease is increasing rapidly</td>

</tr>

<tr>

<td>Tomato\_Septoria\_leaf\_spot</td>

<td>1. Removal and destruction of the affected plant parts.<br>

2. Seed treatment with Thiram or Dithane M-45 (2 g/kg seed) is useful in checking seed borne infection. <br>

3. In the field spraying with Mancozeb 0.2 % effectively controls the disease. <br>

</td>

</tr>

<tr>

<td>Tomato\_Leaf\_Mold</td>

<td>1. Scout for tomato leaf mold during periods of high humidity (over 85%).

2. Optimal temperature is between 71 °F and 75 °F, but disease can occur at temperatures as low as 50 °F and as high as 90 °F.

3. The first leaf mold infections of the season have been observed in the first week of June in Minnesota high tunnel tomatoes.

4. Stake, string or prune to increase airflow in and around the plant.

5. Sterilize stakes, ties, trellises, etc. with 10% household bleach or commercial sanitizer.

6. Circulate air in greenhouses or tunnels with vents and fans and by rolling up high tunnel sides to reduce humidity around plants.

</td>

</tr>

<tr>

<td> Tomato\_Bacterial\_Spot</td>

<td>1. Disease-free seed and seedlings should always be used and the crop should be rotated with non-host crops so as to avoid last years crop residue.<br>

2. Seed treatment with mercuric chloride (1:1000) is also recommended for control of the disease.<br>

3. Spraying with a combination of copper and organic fungicides in a regular preventative spray program at 5 to 10-day intervals or Spraying with Agrimycin-100 (100 ppm) thrice at 10 days intervals effectively control the disease.

</td>

</tr>

<tr>

<td>Tomato\_Early\_blight</td>

<td>1. Removal and destruction of crop debris.<br>

2. Practising crop rotation helps to minimize the disease incidence.<br>

3. Spray the crop with Mancozeb 0.2 % for effective disease control.</td>

</tr>

<tr>

<td>Pepper\_\_bell\_\_Bacterial\_spot</td>

<td> 1. Transplant treatment with streptomycin.<br>

2. Copper sprays and other topical treatments.<br>

3. Plant activator sprays. <br>

4. Biological or microbial products. <br>

</td>

</tr>

<tr>

<td>Potato\_\_Early\_blight</td>

<td>1. Prune or stake plants to improve air circulation and reduce fungal problems.<br>

2. Make sure to disinfect your pruning shears (one part bleach to 4 parts water) after each cut.<br>

3. Keep the soil under plants clean and free of garden debris. Add a layer of organic compost to prevent the spores from splashing back up onto vegetation.<br>

4. Drip irrigation and soaker hoses can be used to help keep the foliage dry.<br>

5. For best control, apply copper-based fungicides early, two weeks before disease normally appears or when weather forecasts predict a long period of wet weather. Alternatively, begin treatment when disease first appears, and repeat every 7-10 days for as long as needed.<br>

6. Containing copper and pyrethrins, Bonide Garden Dust is a safe, one-step control for many insect attacks and fungal problems. For best results, cover both the tops and undersides of leaves

with a thin uniform film or dust. Depending on foliage density, 10 oz will cover 625 sq ft. Repeat applications every 7-10 days, as needed.</td>

</tr>

<tr>

<td>Poatato\_Late\_blight</td>

<td>1. Plant resistant cultivars when available.<br>

2. Remove volunteers from the garden prior to planting and space plants far enough apart to allow for plenty of air circulation.<br>

3. Water in the early morning hours, or use soaker hoses, to give plants time to dry out during the day — avoid overhead irrigation.<br>

4. Destroy all tomato and potato debris after harvest (see Fall Garden Cleanup).</td>

</tr>

</table>

<br><br>

<form id="upload-file" method="post" enctype="multipart/form-data">

<input type="file" name="file" class="btn btn-success" id="imageUpload" accept=".png, .jpg, .jpeg">

</form>

<div class="image-section" style="display:none;">

<br><br>

```
<div>
```

```
    <button type="button" class="btn btn-info btn-lg " id="btn-predict">Predict!</button>
```

```
</div>
```

```
</div>
```

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

```
<h3 id="result">
```

```
    <span> </span>
```

```
</h3>
```

```
</center><br><br>
```

```
<script>
```

```
function toggleTable() {
```

```
    document.getElementById("myTable").classList.toggle("hidden");
```

```
}
```

```
</script>
```

```
{% endblock %}
```