PLANT DISEASE PREDICTION

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INTRODUCTION

- Plant disease identification is a study that includes analysing data linked to numerous plants using machine learning techniques.
- The purpose of this research is to create a identification model that can effectively diagnose and categories plant diseases based on plant symptoms.
- The initial stage is to collect information on the many illnesses that impact each of these plants. This might include gathering photographs of afflicted plants as well as information on the symptoms and environmental circumstances linked with each disease.

PROBLEM STATEMENT

- Plant disease cause significant losses in crop yields, which ultimately affect the global food supply and economy.
- Early detection and accurate diagnosis of plant diseases are crucial for effective disease management.
- However, the traditional methods are time consuming, expensive and require specialized skills
- To address this challenge, we develop a reliable and accurate system for predicting plant disease based on leaf images. The system should be able to classify the type of disease and its severity with the high accuracy.
- Additionally, the system should be scalable and easily deployable to enable farmers and agriculatural workers to use it in the field.

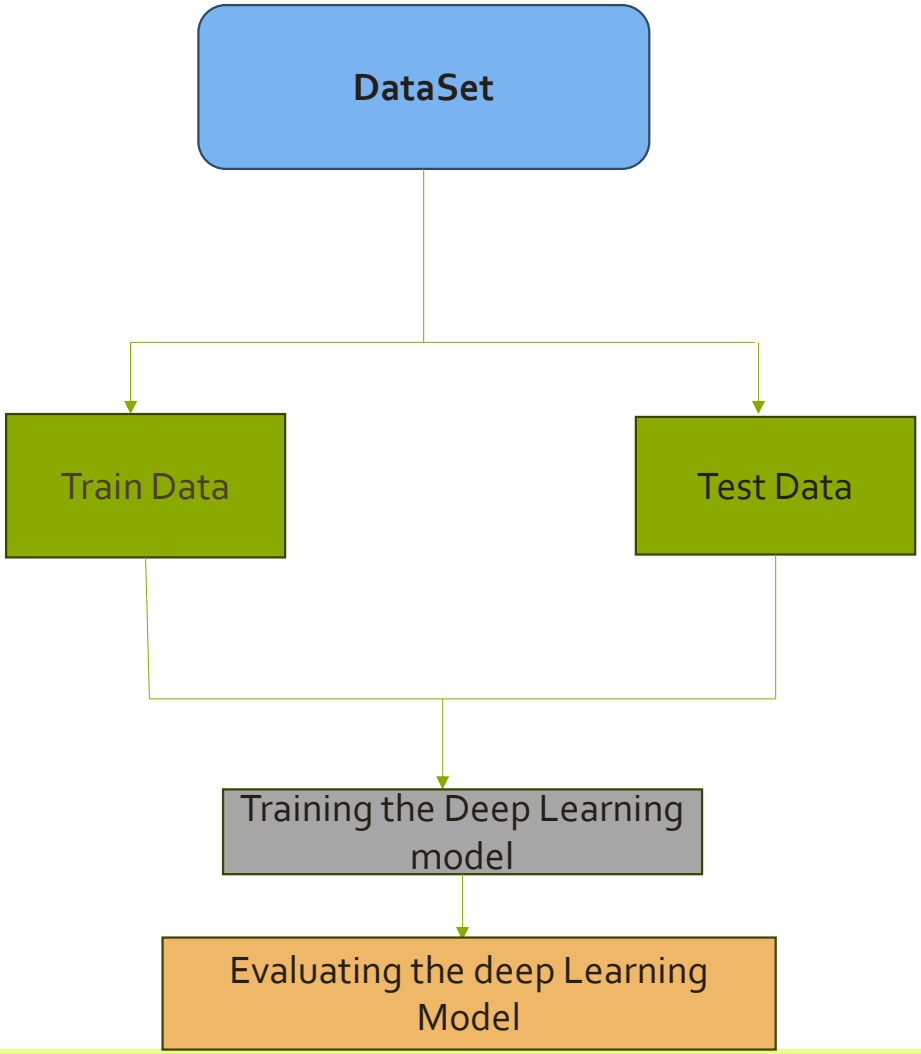
Existing System

- There are now several approaches for prediction plant illness, especially for lemon plants, rose bushes and cactus plants etc. These systems primarily rely on traditional illness detection methods, such as visual examination and expert manual diagnosis.
- One of the major drawbacks of old approaches is that they are typically time-consuming and prone to mistakes owing to the subjective nature of human diagnosis. Furthermore. Traditional methods may not always be accurate in identifying diseases in their early stages, resulting in delayed treatment and potentially damage.
- Recent improvements in Machine learning and computer vision have resulted in the creation of automated plant disease identification systems to solve these difficulities. Image recognition algorithms are used in these systems to analyze plant photos and detect the presence of disease signs.

PROPOSED SYSTEM

- Based on current technologies, a suggested system for plant disease identification would entail the creation of mobile app that combines machine learning and image recognition to diagnose illness in lemon plants, rose bushes and cactus plants etc..
- The software would allow users to photograph their plant and submit it to the system, which would then analyse the image and deliver a diagnostic of the plant's illness.
- The app would also give information on treatment alternatives and illness preventive techniques.
- Overall, a smartphone app that combines machine learning and pictures recognition to identify plant illness would provide a rapid, accurate and accessible tool for farmers, gardeners and other plant lovers to diagnose and cure diseades in lemon plants, rose bushes and cactus plant etc..

Architecture



plant_dieases_predication.ipynb

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```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 187ms/step
array([1.4180335e-04, 9.9984300e-01, 1.5176247e-05], dtype=float32)
```

```
[ ] labels = train_generator.class_indices
    labels = {v: k for k, v in labels.items()}
    labels
```

```
{0: 'Healthy', 1: 'Powdery', 2: 'Rust'}
```

```
[ ] predicted_label = labels[np.argmax(predictions)]
    print(predicted_label)
```

```
Powdery
```

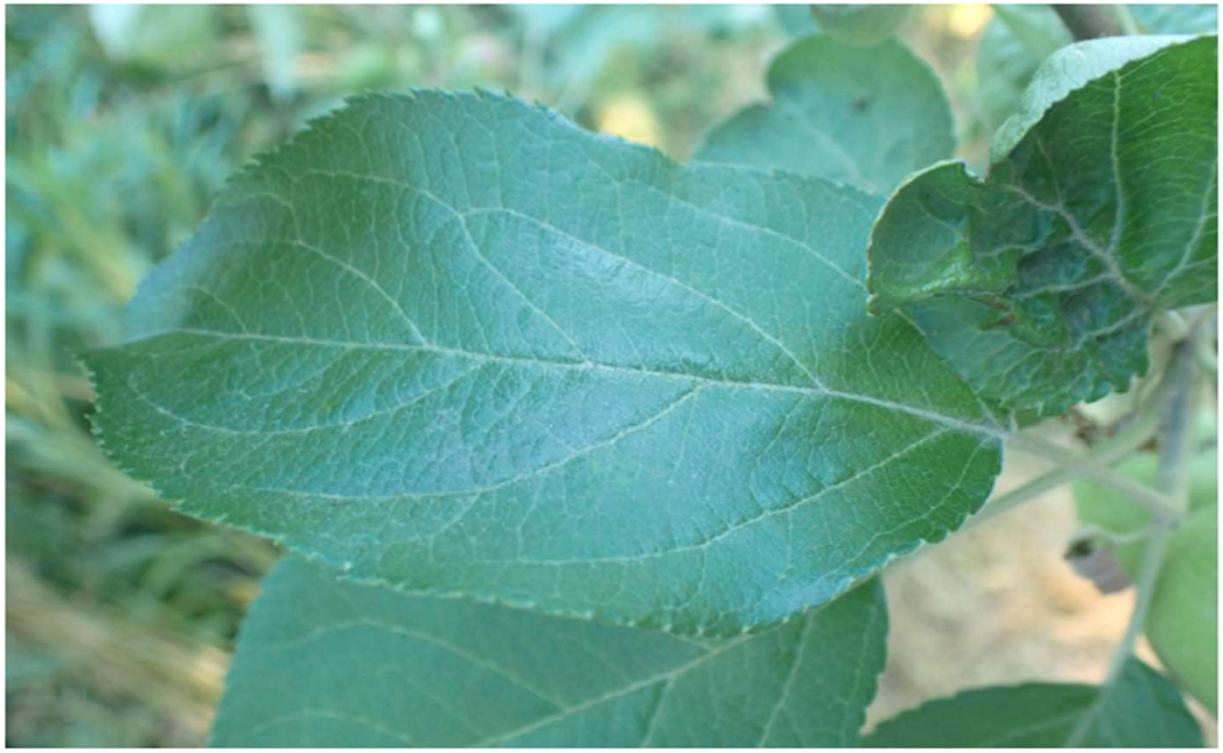
```
!pip install streamlit
```

```
Collecting streamlit
  Downloading streamlit-1.39.0-py2.py3-none-any.whl.metadata (8.5 kB)
Requirement already satisfied: altair<6,>=4.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (4.2.2)
Requirement already satisfied: blinker<2,>=1.0.0 in /usr/lib/python3/dist-packages (from streamlit) (1.4)
Requirement already satisfied: cachetools<6,>=4.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (5.5.0)
Requirement already satisfied: click<9,>=7.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (8.1.7)
Requirement already satisfied: numpy<3,>=1.20 in /usr/local/lib/python3.10/dist-packages (from streamlit) (1.26.4)
Requirement already satisfied: packaging<25,>=20 in /usr/local/lib/python3.10/dist-packages (from streamlit) (24.1)
Requirement already satisfied: pandas<3,>=1.4.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (2.2.2)
Requirement already satisfied: pillow<11,>=7.1.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (10.4.0)
Requirement already satisfied: protobuf<6,>=3.20 in /usr/local/lib/python3.10/dist-packages (from streamlit) (3.20.3)
Requirement already satisfied: pyarrow>=7.0 in /usr/local/lib/python3.10/dist-packages (from streamlit) (16.1.0)
```

```python
from PIL import Image
import IPython.display as display

image_path = '/content/drive/MyDrive/archive/Test/Test/Healthy/8ddaa5a5caa5caa8.jpg'

with open(image_path, 'rb') as f:
    display.display(display.Image(data=f.read(), width=500))
```



```
image_path = '/content/drive/MyDrive/archive/Test/Test/Rust/82add70df6ab2854.jpg'

with open(image_path, 'rb') as f:
    display.display(display.Image(data=f.read(), width=500))
```

```python
history = model.fit(train_generator,
                    batch_size=32,
                    epochs=20,

                    validation_data=validation_generator,
                    validation_batch_size=32
                    )
model.save("disease_disease_recognition.h5")
```

```
Epoch 1/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 230s 5s/step - accuracy: 0.8410 - loss: 0.3980 - val_accuracy: 0.8667 - val_loss: 0.5410
Epoch 2/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 219s 5s/step - accuracy: 0.9337 - loss: 0.2171 - val_accuracy: 0.8333 - val_loss: 0.4566
Epoch 3/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 230s 5s/step - accuracy: 0.9425 - loss: 0.1977 - val_accuracy: 0.8667 - val_loss: 0.3149
Epoch 4/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 217s 5s/step - accuracy: 0.9065 - loss: 0.2396 - val_accuracy: 0.8000 - val_loss: 0.4550
Epoch 5/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 216s 5s/step - accuracy: 0.9104 - loss: 0.2508 - val_accuracy: 0.8667 - val_loss: 0.4042
Epoch 6/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 225s 5s/step - accuracy: 0.9610 - loss: 0.1330 - val_accuracy: 0.8833 - val_loss: 0.3551
Epoch 7/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 222s 5s/step - accuracy: 0.9743 - loss: 0.0807 - val_accuracy: 0.8667 - val_loss: 0.4837
Epoch 8/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 227s 5s/step - accuracy: 0.9647 - loss: 0.1036 - val_accuracy: 0.9000 - val_loss: 0.3694
Epoch 9/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 252s 5s/step - accuracy: 0.9807 - loss: 0.0648 - val_accuracy: 0.9333 - val_loss: 0.2276
Epoch 10/20
42/42 ━━━━━━━━━━━━━━━━━━━━ 260s 5s/step - accuracy: 0.9738 - loss: 0.1007 - val_accuracy: 0.9167 - val_loss: 0.4084
```

```
with open(image_path, 'rb') as f:
    display.display(display.Image(data=f.read(), width=500))
```

```
[ ] predictions = model.predict(x)
    predictions[0]
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 187ms/step
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[ ] predicted_label = labels[np.argmax(predictions)]
    print(predicted_label)
```
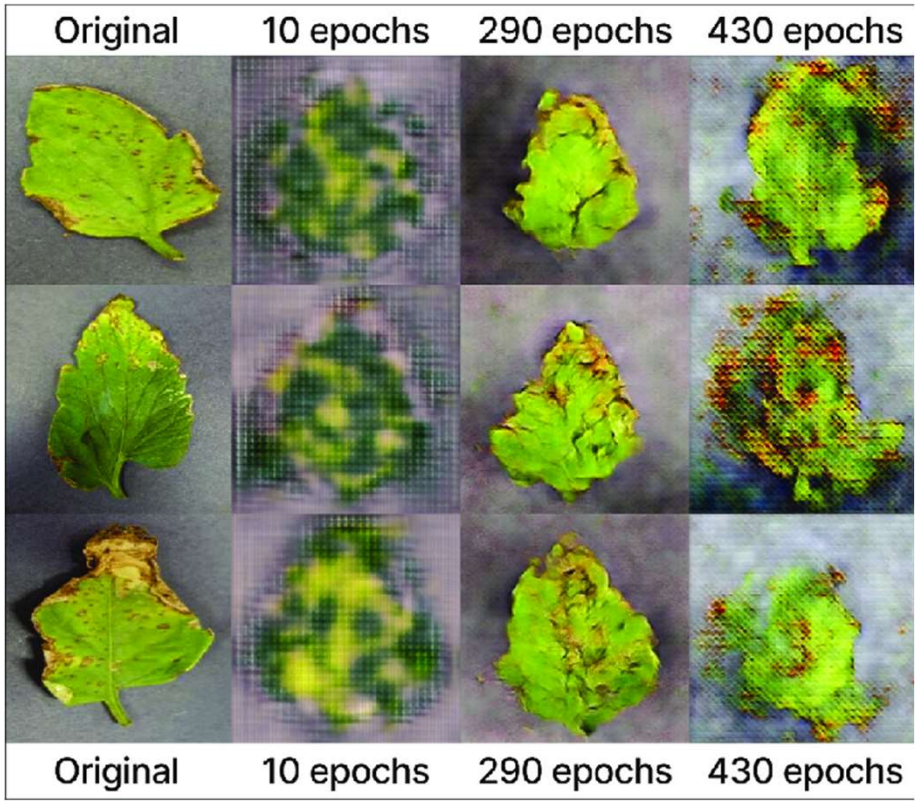

```
Powdery
```

CONCLUSION AND FUTURE SCOPE

In the current day scenario, plant disease diagnosis using machine learning models has the potential to revolutionise agriculture by allowing farmers to diagnose and treat plant diseases rapidly and reliably. This technique can improve the efficiency and efficacy of plant disease control by utilising the power of image recognition algorithms and massive databases.



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