RICE LEAF EARLY DETECTION

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INTRODUCTION

What is Feature Extraction?

Feature extraction is the process of transforming raw data into meaningful representations for machine learning models. It helps in improving model performance by reducing the dimensionality of the data while retaining essential information.

Why is Feature Extraction Important?

- Reduces computational complexity
- Enhances model accuracy
- Removes irrelevant and redundant data
- Helps in better visualization and interpretation

CLASSIFICATION

Models Used:

1. Feature Extraction:

- MobileNetV2

2. Train

- Random Forest
- SVM(Support Vector Machine)

CLASSIFICATION

1. Load Dataset

```
Classes found: ['healthy', 'leaf_scald', 'narrow_brown_spot', 'leaf_blast', 'brown_spot', 'bacterial_leaf_blight']
Class 'healthy' contains 350 images.
Sample images: ['healthy (108).jpg', 'healthy (111).jpg', 'healthy (112).jpg', 'healthy (102).jpg', 'healthy (100).jpg']
Class 'leaf_scald' contains 350 images.
Sample images: ['leaf_scald (100).jpg', 'leaf_scald (10).jpg', 'leaf_scald (1).jpg', 'leaf_scald (101).jpg', 'leaf_scald (129).jpg']
Class 'narrow_brown_spot' contains 350 images.
Sample images: ['narrow_brown (110).jpg', 'narrow_brown (1).jpg', 'narrow_brown (111).jpg', 'narrow_brown (115).jpg', 'narrow_brown (107).jpg']
Class 'leaf_blast' contains 350 images.
Sample images: ['leaf_blast (1).jpg', 'leaf_blast (120).jpg', 'leaf_blast (111).jpg', 'leaf_blast (106).jpg', 'leaf_blast (116).jpg']
Class 'brown_spot' contains 350 images.
Sample images: ['brown_spot (10).jpg', 'brown_spot (1).jpg', 'brown_spot (106).jpg', 'brown_spot (104).jpg', 'brown_spot (100).JPG']
Class 'bacterial_leaf_blight' contains 350 images.
Sample images: ['bacterial_leaf_blight (100).JPG', 'bacterial_leaf_blight (10).JPG', 'bacterial_leaf_blight (102).JPG', 'bacterial_leaf_blight (105).JPG', 'bacterial_
```

2. Feature Extraction

```
<ipython-input-12-1df5674cf30e>:2: UserWarning: `input_shape` is undefined or non-square, or `rows` is not in [96, 128, 160, 192, 224]. Weights for input shape (224,
  feature_extractor = MobileNetV2(weights="imagenet", include_top=False, input_shape=(256, 256, 3))
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/mobilenet_v2/mobilenet_v2_weights_tf_dim_ordering_tf_kernels_1.0_224_no_top.h5
9406464/9406464 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
Feature extraction model loaded successfully!
```

CLASSIFICATION

TRAIN

3.SVM(Support Vector Machine)

```
SVM Accuracy: 0.9295774647887324
                      precision    recall  f1-score   support

bacterial_leaf_blight       1.00      0.92      0.96        13
           brown_spot       0.88      0.88      0.88        66
              healthy       0.93      0.96      0.94        67
           leaf_blast       0.88      0.86      0.87        69
           leaf_scald       1.00      0.99      0.99        77
    narrow_brown_spot       0.94      0.97      0.95        63

             accuracy                           0.93       355
            macro avg       0.94      0.93      0.93       355
         weighted avg       0.93      0.93      0.93       355
```

CLASSIFICATION

TESTING

3.Random Forest

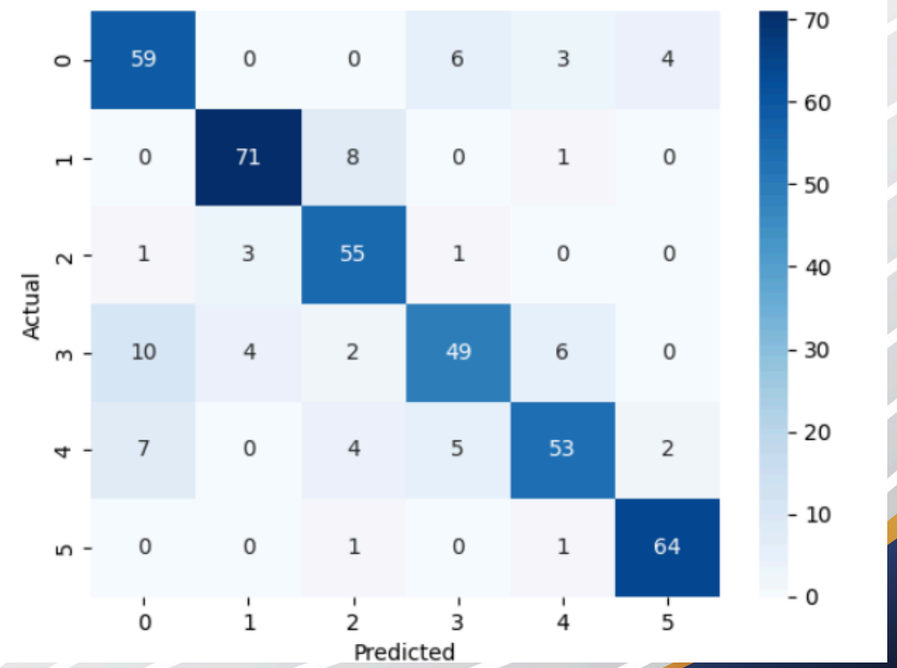
```
Random Forest Accuracy: 0.923943661971831
                      precision    recall  f1-score   support

bacterial_leaf_blight       1.00      0.92      0.96        13
           brown_spot       0.90      0.85      0.88        66
              healthy       0.93      0.97      0.95        67
           leaf_blast       0.83      0.84      0.83        69
           leaf_scald       1.00      1.00      1.00        77
    narrow_brown_spot       0.94      0.95      0.94        63

             accuracy                           0.92       355
            macro avg       0.93      0.92      0.93       355
         weighted avg       0.92      0.92      0.92       355
```

PREDICTION

VOTE BASED CLASSIFIER

- SVM
- XG Boost
- Random Forest

	precision	recall	f1-score	support
0	0.77	0.82	0.79	72
1	0.91	0.89	0.90	80
2	0.79	0.92	0.85	60
3	0.80	0.69	0.74	71
4	0.83	0.75	0.79	71
5	0.91	0.97	0.94	66
accuracy			0.84	420
macro avg	0.83	0.84	0.83	420
weighted avg	0.84	0.84	0.83	420



PREDICTION

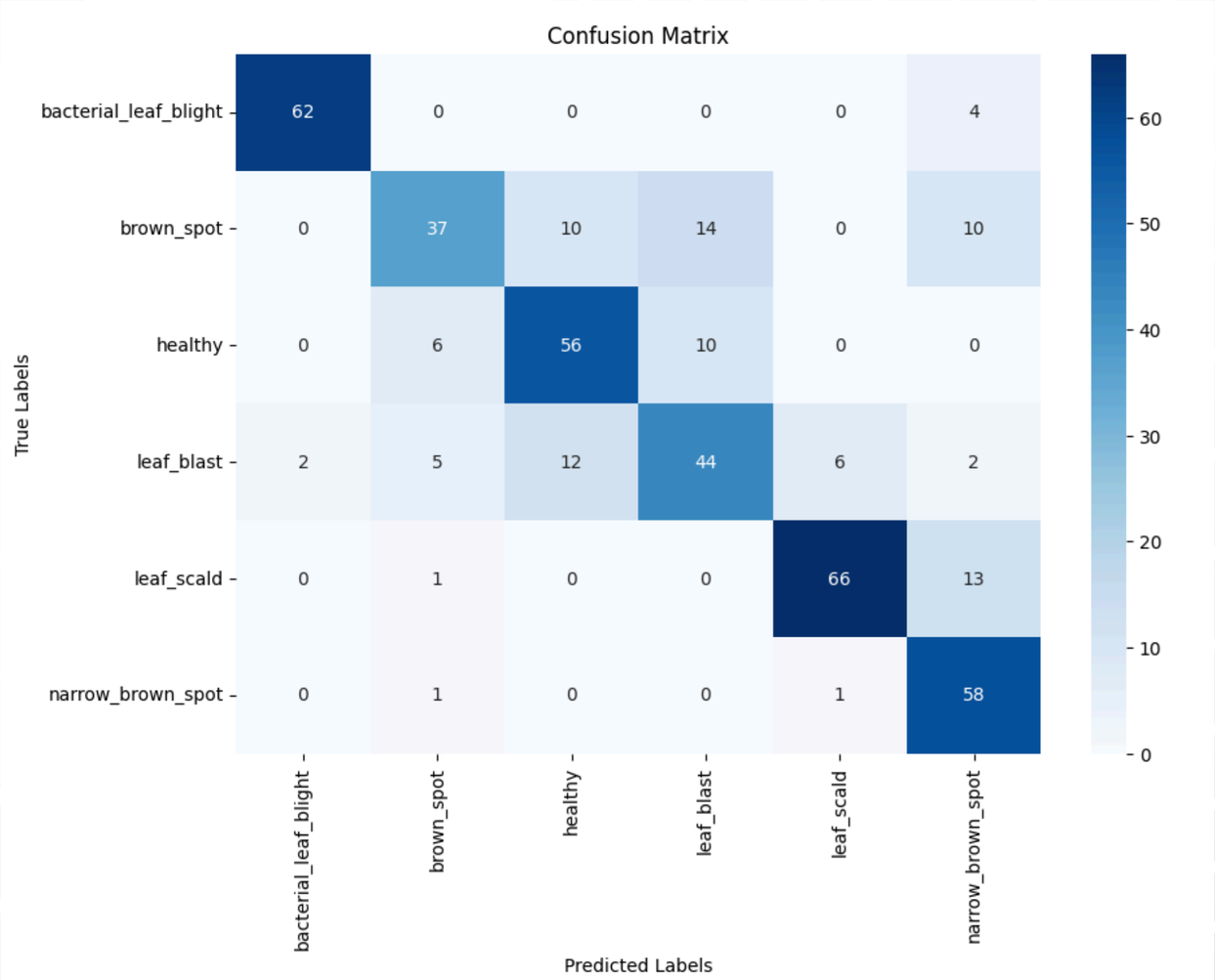
- FBEWT(FIXED BOUNDARY EMPIRICAL WAVELET TRANSFORM)
- DWT(DISCRETE WAVELET TRANSFORM)

Accuracy: 0.7690476190476191
Classification Report:

	precision	recall	f1-score	support
bacterial_leaf_blight	0.97	0.94	0.95	66
brown_spot	0.74	0.52	0.61	71
healthy	0.72	0.78	0.75	72
leaf_blast	0.65	0.62	0.63	71
leaf_scald	0.90	0.82	0.86	80
narrow_brown_spot	0.67	0.97	0.79	60
accuracy			0.77	420
macro avg	0.77	0.77	0.77	420
weighted avg	0.78	0.77	0.77	420

PREDICTION

- FBEWT(FIXED BOUNDARY EMPIRICAL WAVELET TRANSFORM)
- DWT(DISCRETE WAVELET TRANSFORM)

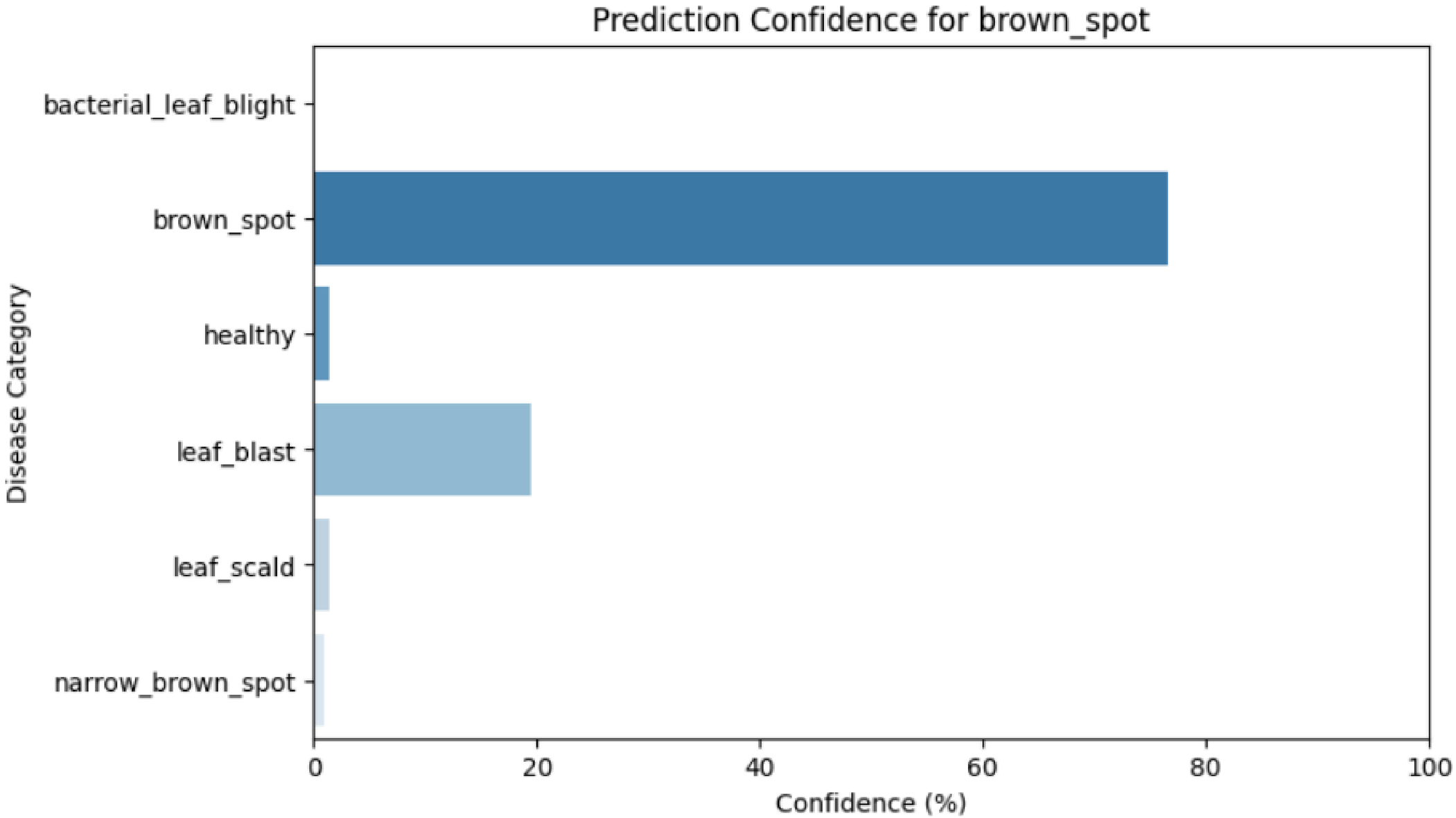


PREDICTION

EFFICIENTNET

```
Accuracy: 0.8404761904761905
Classification Report:
                      precision    recall  f1-score   support

bacterial_leaf_blight       0.83      0.93      0.88        72
           brown_spot       0.90      0.75      0.82        80
              healthy       0.77      0.90      0.83        60
           leaf_blast       0.75      0.63      0.69        71
           leaf_scald       0.93      0.97      0.95        71
    narrow_brown_spot       0.85      0.88      0.87        66

             accuracy                           0.84       420
            macro avg       0.84      0.84      0.84       420
         weighted avg       0.84      0.84      0.84       420
```

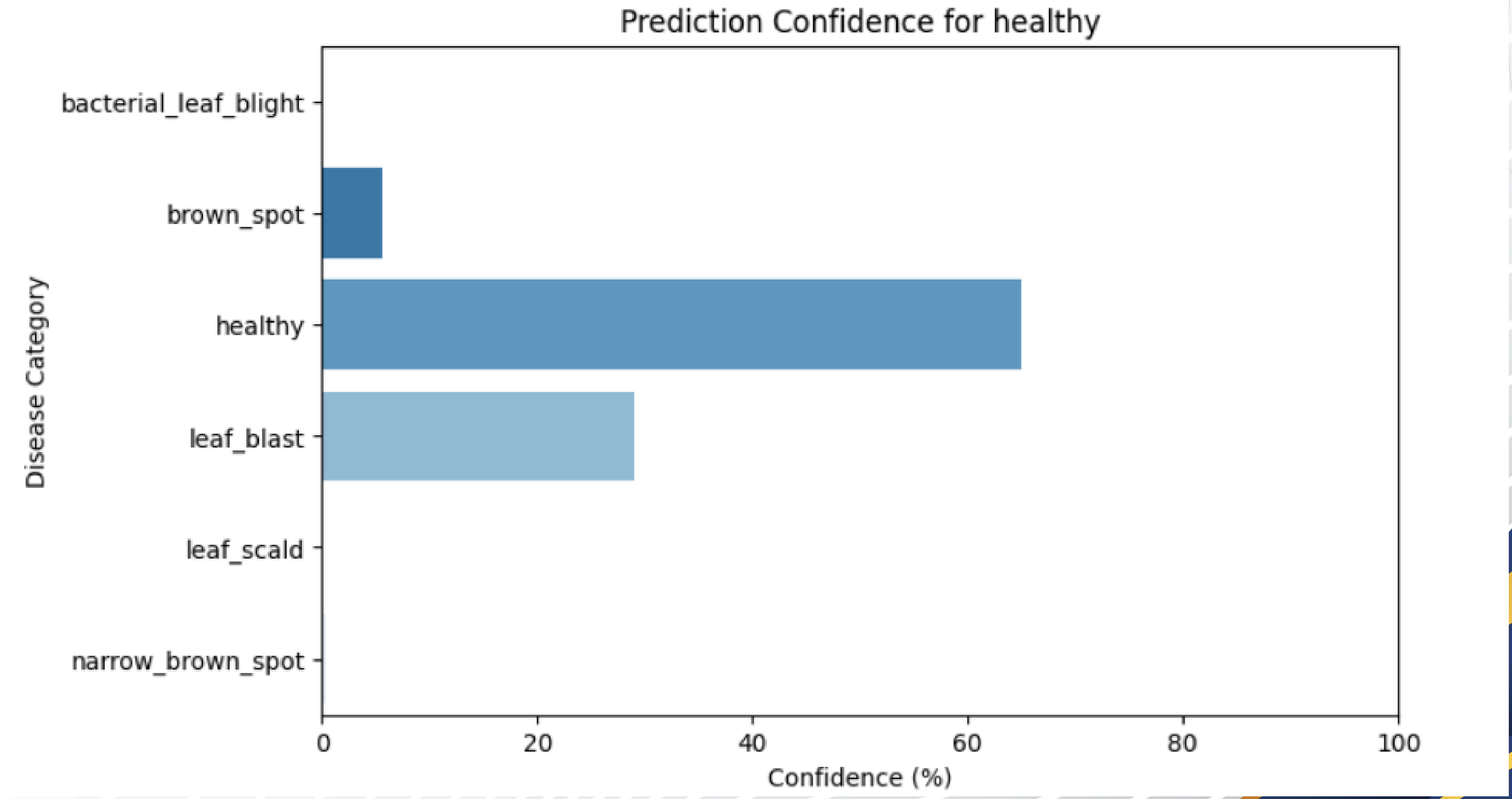
RESULT


Prediction Confidence for brown_spot
bacterial_leaf_blight
brown_spot
healthy
leaf_blast
leaf_scald
narrow_brown_spot
Disease Category
0
20
40
60
80
100
Confidence (%)

RESULT

Predicted: brown_spot (Confidence: 76.59%)

RESULT


Prediction Confidence for healthy
bacterial_leaf_blight
brown_spot
healthy
leaf_blast
leaf_scald
narrow_brown_spot
Disease Category
0
20
40
60
80
100
Confidence (%)

RESULT

THANK YOU