

POTATO LEAF CLASSIFICATION

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Introduction

In this project, we aim to classify potato leaf diseases using deep learning techniques. By leveraging convolutional neural networks (CNNs), we can accurately identify and categorize different stages of disease in potato leaves, aiding in timely and effective agricultural interventions.

OUR DATASET

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- The dataset comprises **4062 images of potato leaves.**
- Images are categorized into three classes: Early Blight, Healthy, and Late Blight.
- Each image is **256x256 pixels**, ensuring uniformity for model training.

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CLASSES





CLASSES

Early Blight

Characterized by dark spots with concentric rings on older leaves.

Healthy

Leaves without any visible signs of disease.

Late Blight

Symptoms include brown or black lesions on leaves, often accompanied by white fungal growth on the undersides.



Training the Model

MODEL TRAINING PROCESS

MODEL 1: CUSTOM CNN

- A custom-built convolutional neural network.
- Trained for 25 epochs using augmented training data.

MODEL 2: TRANSFER LEARNING WITH INCEPTIONV3

- Utilized the pre-trained InceptionV3 model, adding custom dense layers for classification.
- Also trained for 25 epochs with data augmentation.

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- Data augmentation techniques applied to prevent overfitting.
- Models evaluated on separate validation and test datasets to assess performance.

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MODEL RESULTS

Model 1: Custom CNN

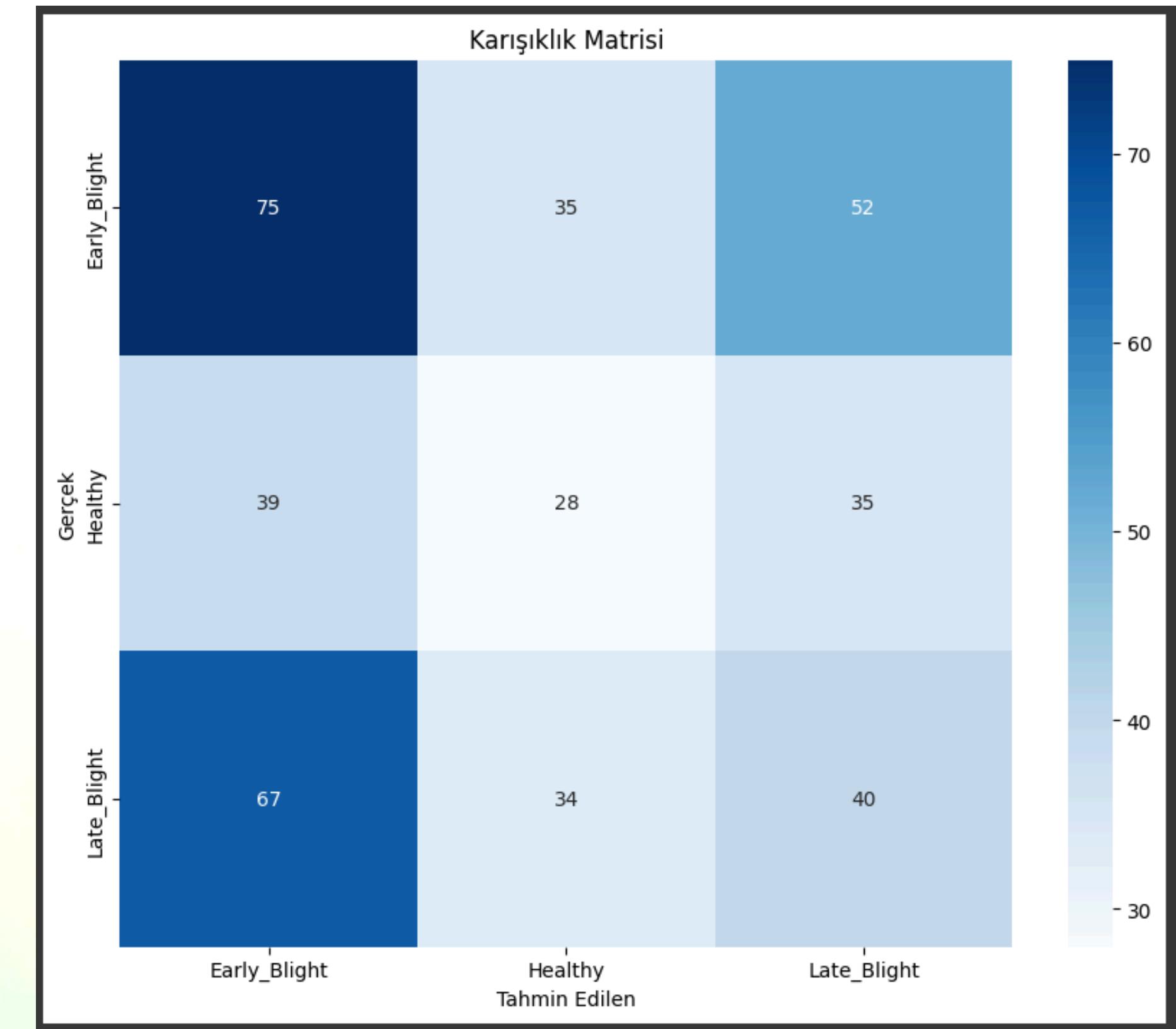
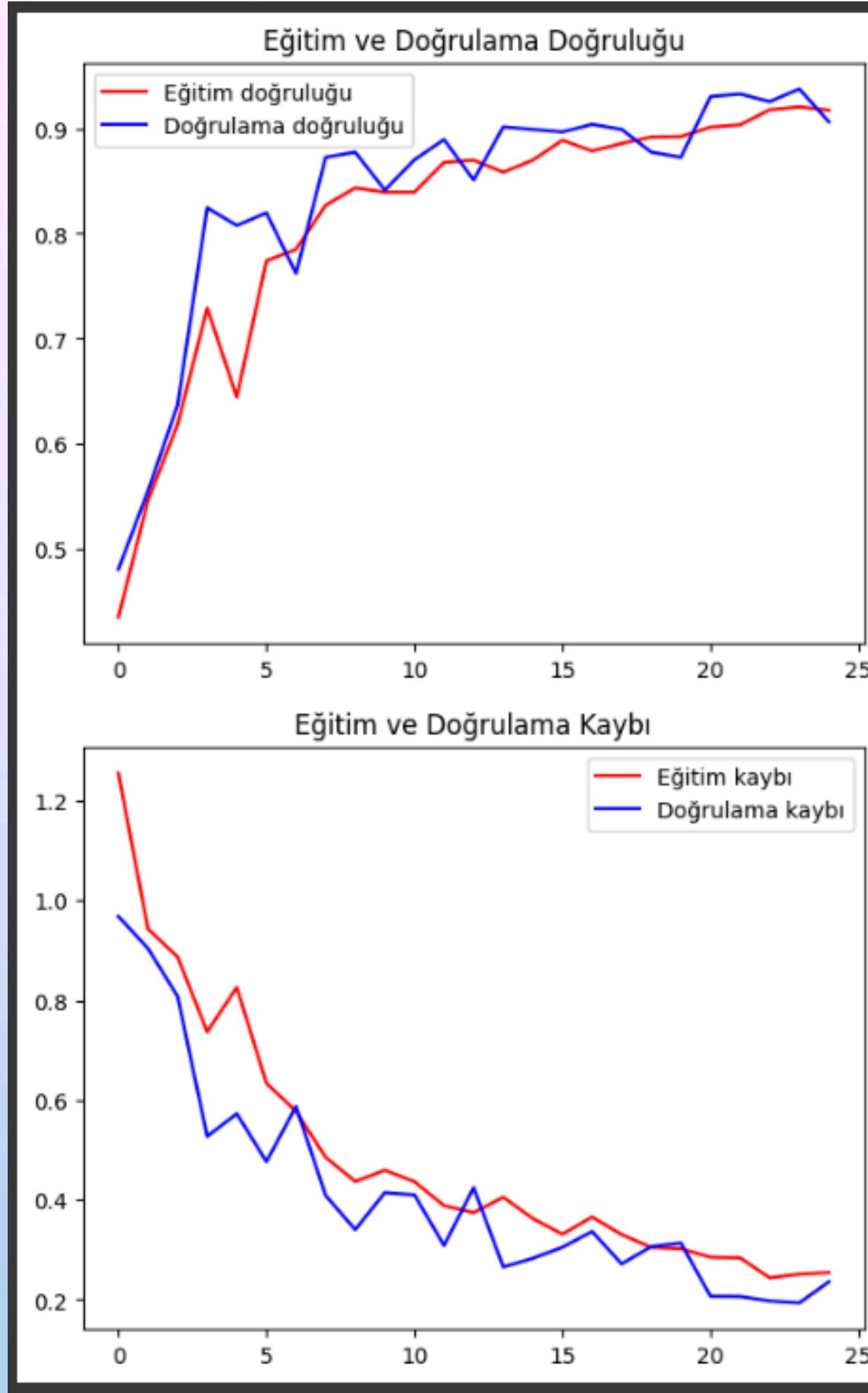
Test Accuracy: 91.15%

Classification Report:

Early Blight: Precision: 0.41, Recall: 0.46, F1-Score: 0.44

Healthy: Precision: 0.29, Recall: 0.27, F1-Score: 0.28

Late Blight: Precision: 0.31, Recall: 0.28, F1-Score: 0.30



MODEL RESULTS

Model 2: Transfer Learning with InceptionV3

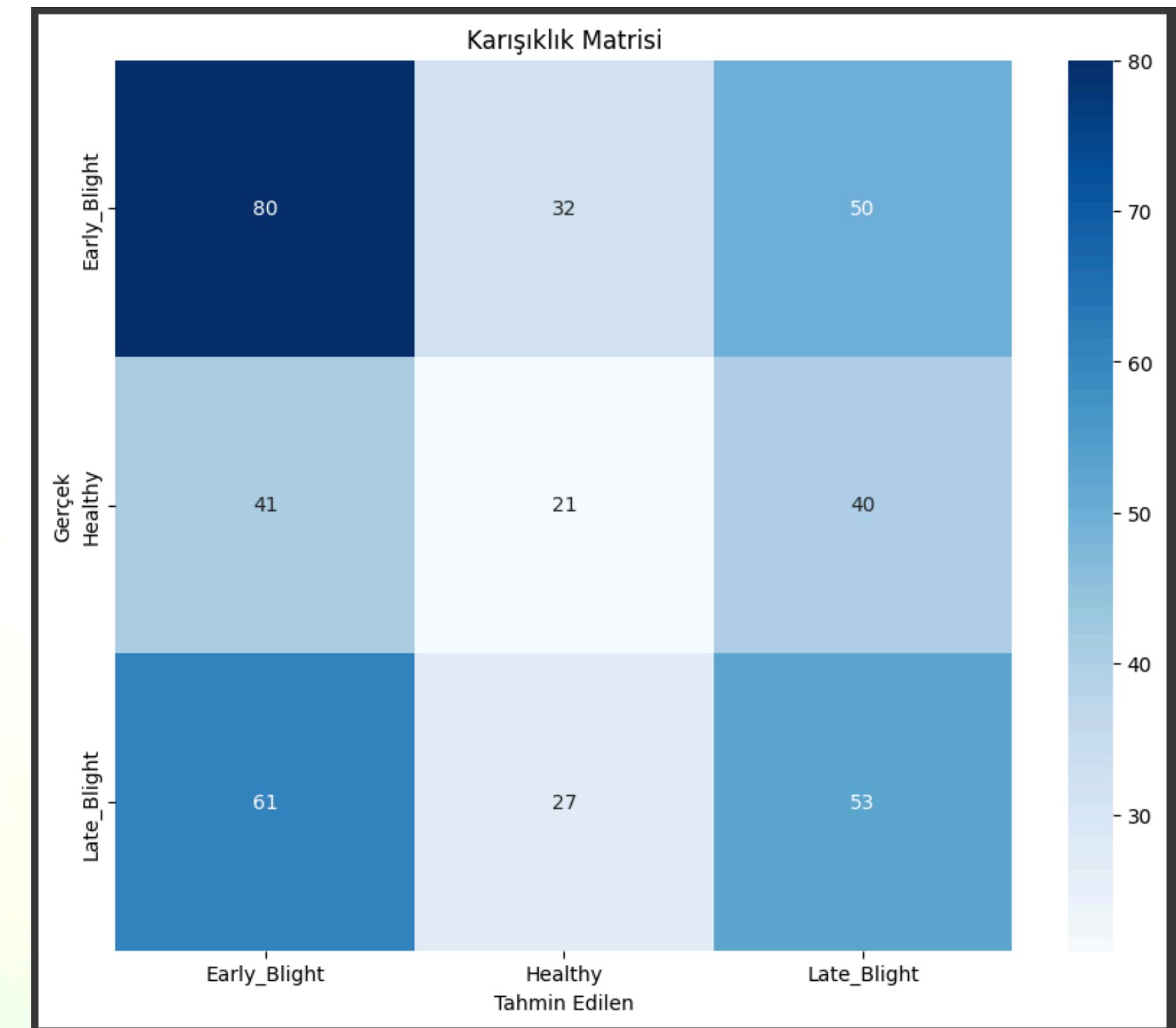
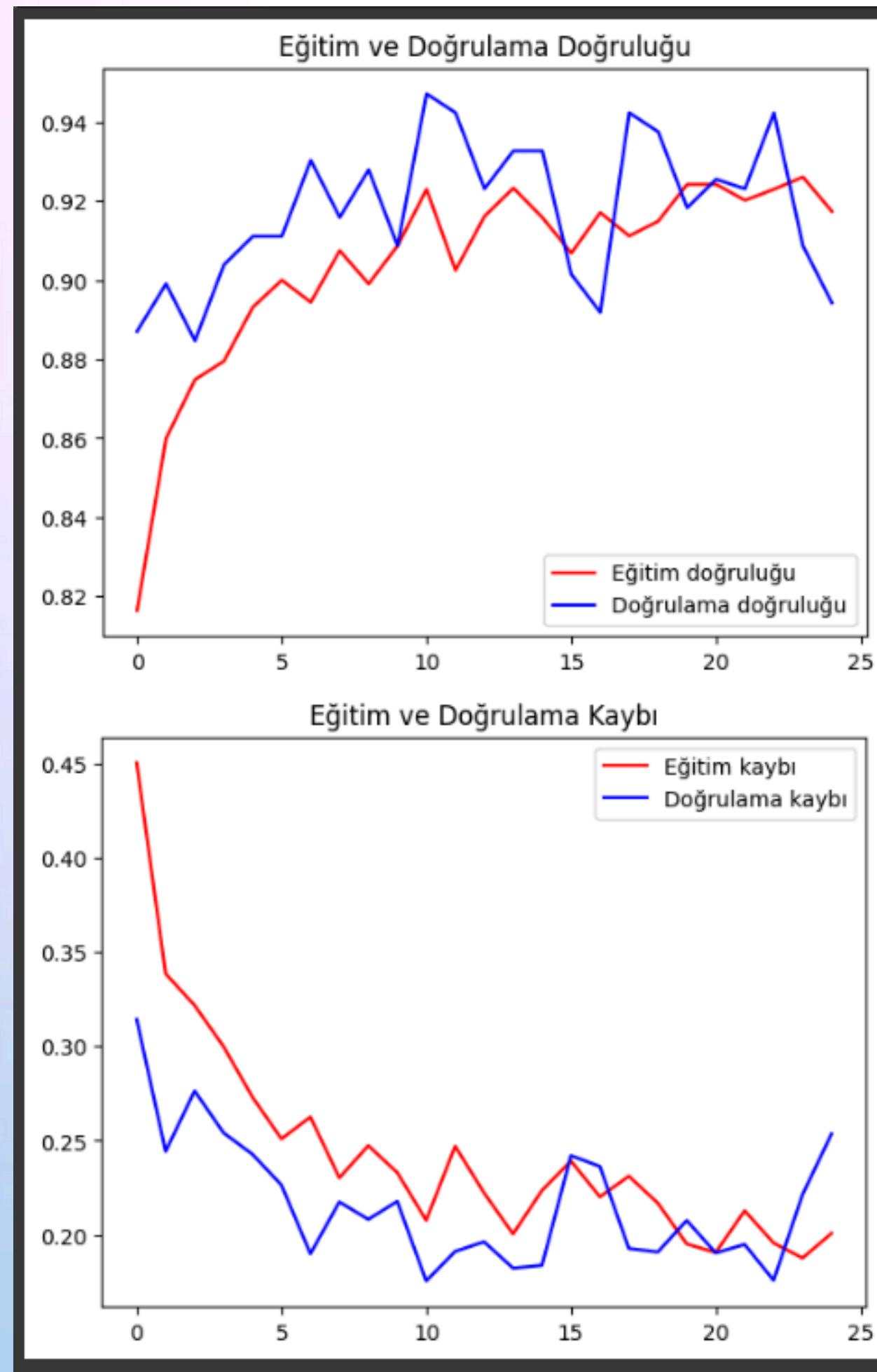
Test Accuracy: 90.89%

Classification Report:

Early Blight: Precision: 0.44, Recall: 0.49, F1-Score: 0.47

Healthy: Precision: 0.26, Recall: 0.21, F1-Score: 0.23

Late Blight: Precision: 0.37, Recall: 0.38, F1-Score: 0.37



CONCLUSION

- Both models demonstrated strong overall accuracy in classifying potato leaf diseases.
 - Transfer Learning with InceptionV3 slightly outperformed the custom CNN in terms of precision and recall for Early Blight and Late Blight.
 - Model 1 had a marginally better test accuracy.
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- Future improvements could involve refining data augmentation techniques and experimenting with different pre-trained models.
- The project highlights the potential of deep learning in agricultural disease management, enabling timely and precise intervention.



THANK YOU

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