

Documentation

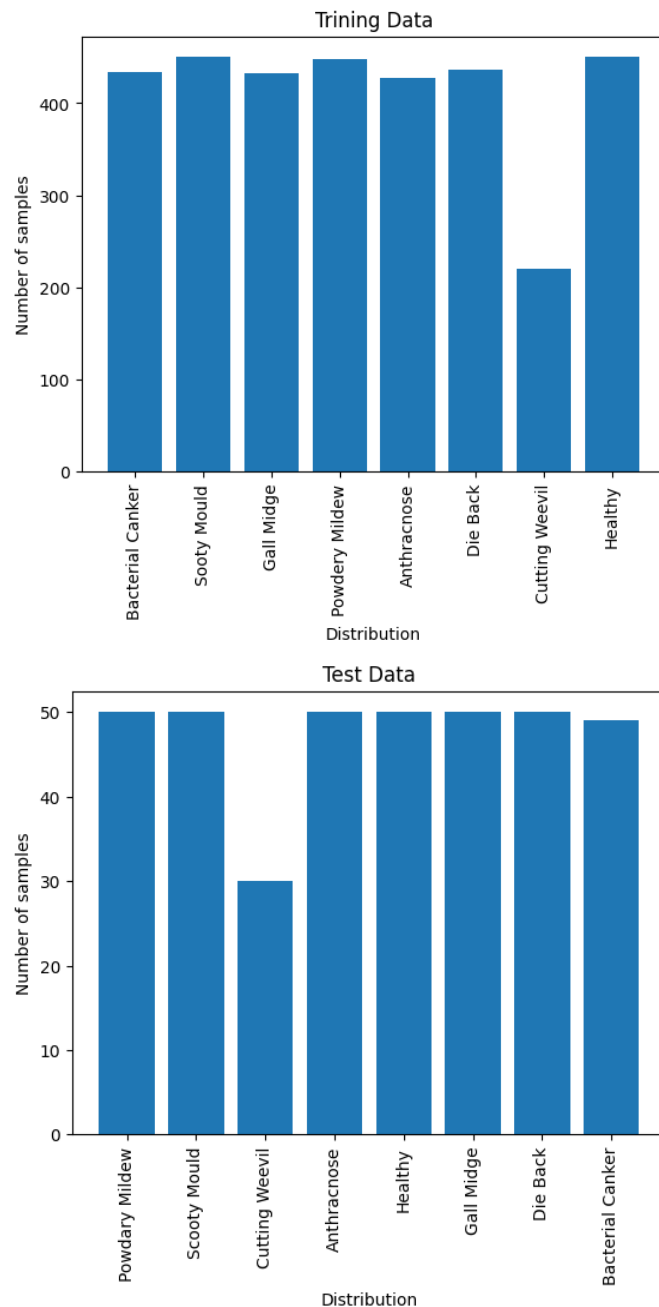
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The Dataset

MangoLeafBD is a Data set that contains **3299** samples for training and **379** samples for testing.

The Distribution of The Classes



The data is imbalanced (Cutting Weevil).

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Samples From Different Classes

Anthraxnose



Bacterial_Canker



Cutting_Weevil



Die_Back



Gall_Midge



Healthy



Powdary_Mildew



Sooty_Mould



The Models

Inception v3

Overview

Inception-v3 is a powerful image recognition model that has been shown to attain greater than 78.1% accuracy on the ImageNet dataset. It is also relatively fast and efficient, making it a good choice for deploying image classification models in real-world applications.

Parameters and Approaches

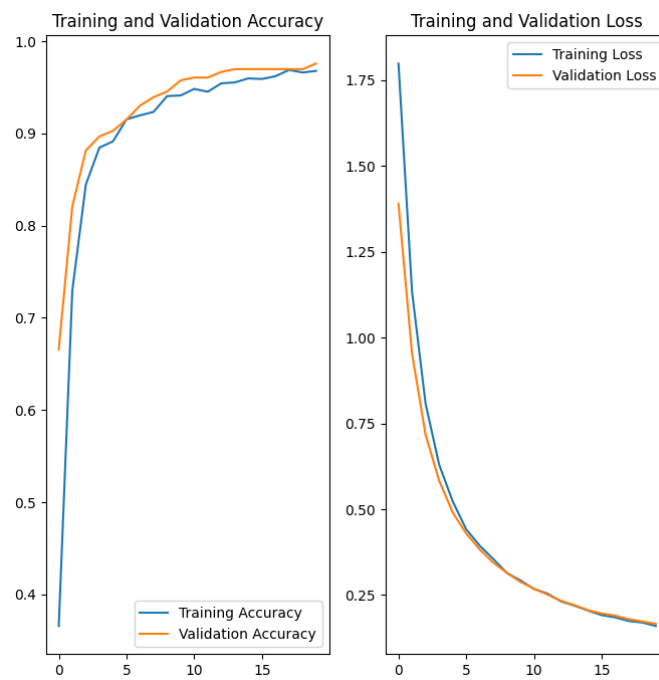
- **Image Dimensions:**
 - Input: (None, 299 , 299 , 3)
 - Output: (None, 8)
- **Validation split:**

It is 0.1 of the training data
- **Augmentation**
 - RandomFlip('horizontal')
 - RandomBrightness(factor=0.2)
 - RandomContrast(factor=0.2)
- **Model Architecture**
 - Data Augmentation layer
 - Preprocess the input (for inception (rescaling and resizing))
 - Inception v3 pretrained model
 - GlobalAveragePooling2D layer
 - Dropout(0.2)
 - Dense layer with 8 nodes (number of classes) with a softmax activation function
- **Callbacks**
 - Early Stopping (monitor = val_loss, patience = 3)
- **Compilation Parameters**
 - Optimizer: Adam(learning_rate=0.0001) (0.0001/10 for fine-tuning)
 - Loss function: categorical cross entropy
 - Matrix : Accuracy

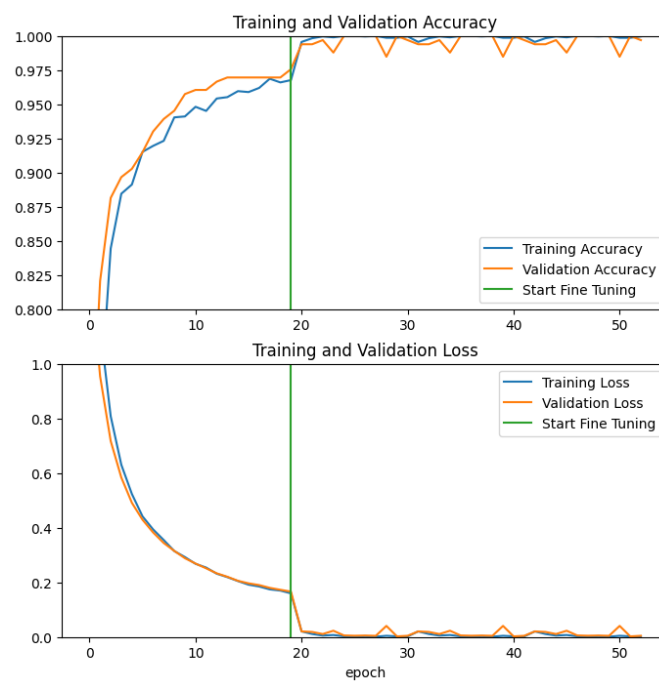
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Training

Transfer Learning



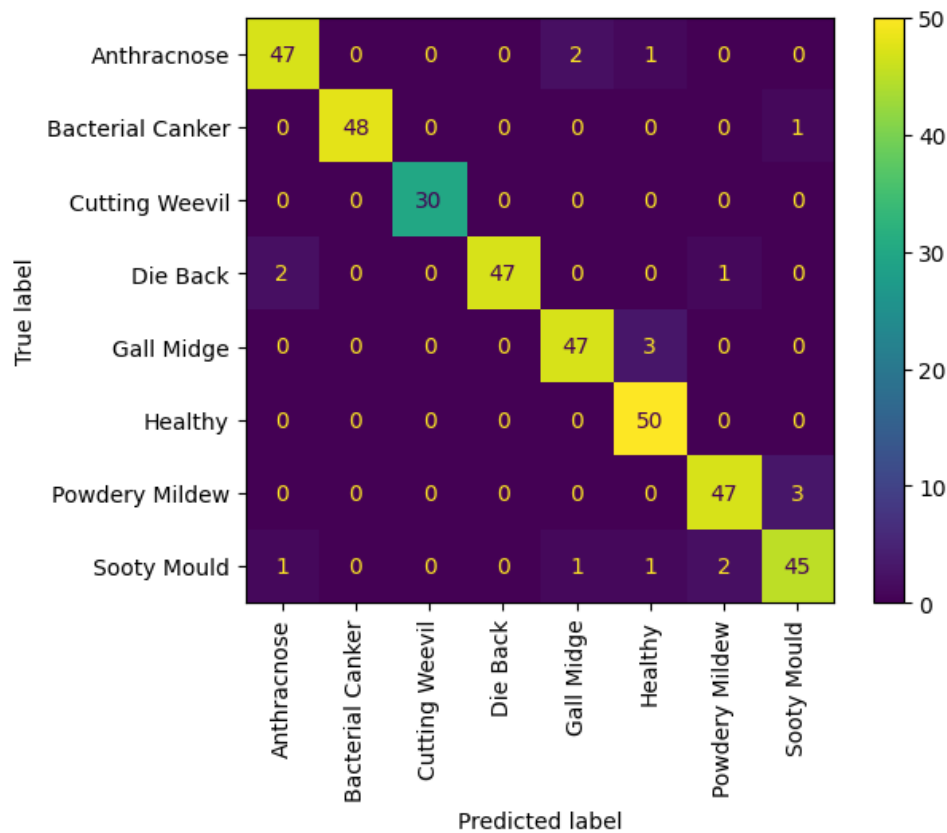
Fine-Tuning



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Results (On Test Data)

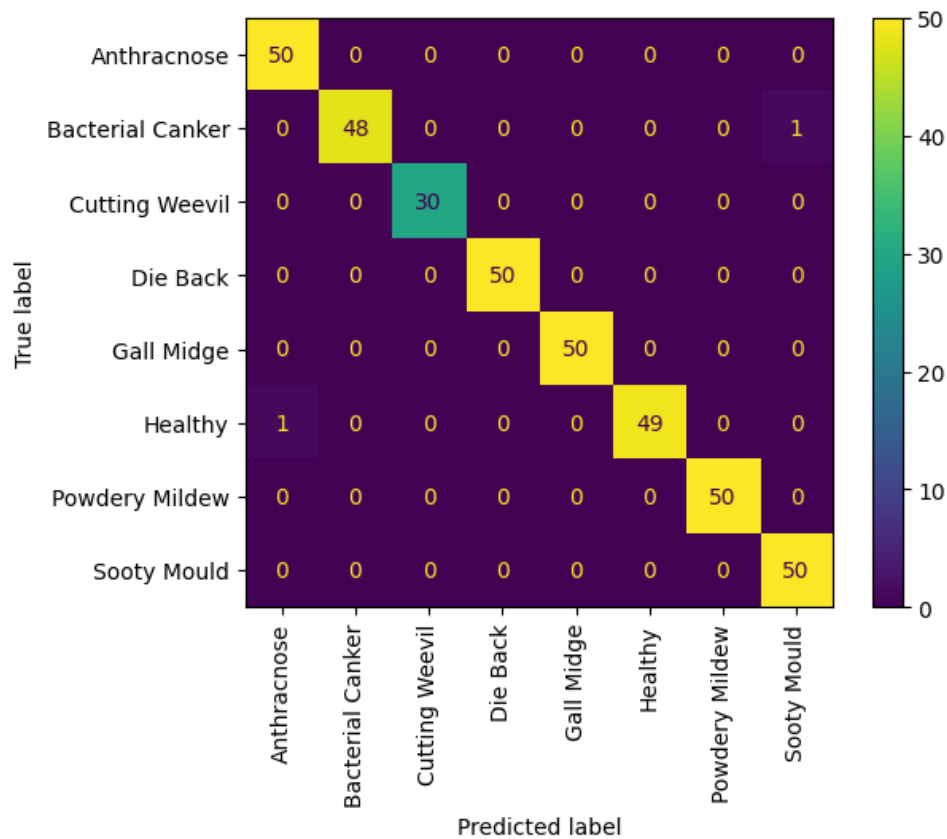
Transfer Learning



	precision	recall	f1-score	support
Anthracnose	0.94	0.94	0.94	50
Bacterial Canker	1.00	0.98	0.99	49
Cutting Weevil	1.00	1.00	1.00	30
Die Back	1.00	0.94	0.97	50
Gall Midge	0.94	0.94	0.94	50
Healthy	0.91	1.00	0.95	50
Powdery Mildew	0.94	0.94	0.94	50
Sooty Mould	0.92	0.90	0.91	50
accuracy			0.95	379
macro avg	0.96	0.95	0.96	379
weighted avg	0.95	0.95	0.95	379

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Fine-Tuning



	precision	recall	f1-score	support
Anthracnose	0.98	1.00	0.99	50
Bacterial Canker	1.00	0.98	0.99	49
Cutting Weevil	1.00	1.00	1.00	30
Die Back	1.00	1.00	1.00	50
Gall Midge	1.00	1.00	1.00	50
Healthy	1.00	0.98	0.99	50
Powdery Mildew	1.00	1.00	1.00	50
Sooty Mould	0.98	1.00	0.99	50
accuracy			0.99	379
macro avg	1.00	0.99	0.99	379
weighted avg	0.99	0.99	0.99	379

A Comparison

	Transfer Learning		Fine-Tuning	
Accuracy	Training: validation: Testing:	0.9677 0.9757 0.9525	Training: validation: Testing:	0.9997 0.9970 0.9947
Precision	0.9534		0.9948	
Recall	0.9525		0.9947	
F1-Score	0.9525		0.9947	
ROC AUC	0.9984		1.0	
Time	16 min		3 min	
Epochs	20		10	
Model File Size	83.9 MB		175.6 MB	
Trainable Parameters	16392 (64.03 KB)		12016520 (45.84 MB)	
Non-Trainable parameters	21802784 (83.17 MB)		9802656 (37.39 MB)	
Trainable variables	2		42	