Input shape = (224,224)

Optimizer = Adam

Epochs = 30

Activation = Relu

Classifier = SoftMax

|  |  |  |  |
| --- | --- | --- | --- |
| **Model** | **Training Accuracy** | **Validation Accuracy** | **Confusion Matrix** |
| CNN(Best till Now) | 0.9909 | 0.9596 | Confusion of Common Rust to Gray Leaf Spot |
| InceptionV3 | 0.9147 | 0.9219 | Overfitting Everything to Common Rust |
| InceptionV3\* | 0.9576 | 0.9531 | Overfitting Each and Every image to Common Rust |
| ResNet50\*\* | 0.8242 | 0.8516 | Predicting Healthy and Common Rust |
| ResNet50\*\*\* | 0.8886 | 0.8529 | Better than Previous ones but not the best |
| ResNet50^ | 0.9027 | 0.8724 | Predicting Common Rust, Gray Leaf Spot and Healthy with a lot of confusion |
| InceptionResNetV2\*\* | 0.9562 | 0.9661 | Overfitting Everything to Blight |
| MobileNetV2 | 0.9301 | 0.9518 | Predicting Healthy and Common Rust and Overfitting other classes |
| MobileNetV2\*\* | 0.9554 | 0.9297 | Predicting Healthy and Common Rust and Overfitting other classes |
| VGG16\*\*\* | 0.9707 | 0.9753 | Did not predicted Blight, and confused many diseases for Gray Leaf Spot |
| VGG16# |  |  |  |
| DenseNet121\*\* | 0.9601 | 0.9714 | Overfitting Everything to Common Rust |
| DenseNet121^ | 0.9720 | 0.9818 | Overfitting Everything to Common Rust |

\*Last Convolution Layer is fine tuned.

\*\*Last 2 Convolution Layer are fine tuned.

\*\*\*Last 3 Convolution Layer are fine tuned.

# The full model is trained, and ImageNet weights are not used at all.

^ Last 1/5th of the layers are fine tuned.

For Transfer Learning Models layers added for Classification are: -

* GlobalAveragePooling2D()
* Dense(256)
* Dropout(0.5)
* Dense(4, activation='softmax')

**Training Different CNN Models**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Changes done on CNN** | **Epochs** | **Training Accuracy** | **Validation Accuracy** | **Confusion Matrix** |
| Base Model | 30 | 0.9909 | 0.9596 | Confusion of Common Rust to Gray Leaf Spot |
| Removing all dropouts except the last one | 25 | 0.9907 | 0.9701 | Confusion of Common Rust to Gray Leaf Spot and Blight to Gray Leaf Spot |
|  |  |  |  |  |
|  |  |  |  |  |