Problem Statement 2

Cotton Leaf Disease Prediction

Take Dataset from Kaggle

https://www.kaggle.com/datasets/546ad5032f88920df36e5f929f33be6bf013f6e178ef d34a163d08252e6077a6

Apply CNN, SVM to predict the Cotton Leaf Disease with different epoch value such as 10,20,30 etc. and learning rate (0.25,0.50,0.75 etc)
Show performance analysis of CNN and SVM with different epoch value and learning rate. Write your conclusion based on it.

Solution by Team Infinite

Explanation:

Dataset:

Given dataset was not splitted into training and testing therefore we created a new folder with train test val folder having other subfolder cotton dataset using the split folders module

The data was divided in 8:1:1 ratio

https://drive.google.com/drive/folders/1sqZyEyJ2qXPPLKpG6Lkb9QrCYbP6B23 u

Load Images and Data Preprocessing

Here, the parameters for preprocessing the images used are:

- rescale: Rescales the pixel values of the image by a factor of 1./255, so that they lie between 0 and 1.
- shear_range: Applies shear transformation to the input image with a shear intensity of 0.2 radians.
- zoom_range: Applies zoom transformation to the input image with a zoom intensity of 0.2.
- horizontal_flip: Randomly flips the input image horizontally.

CNN model initialised with different layers being added

Summary report of CNN

```
cnn.summary()
```

```
Model: "sequential"
_____
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 64, 64, 32)        896

 max_pooling2d (MaxPooling2D  (None, 32, 32, 32)        0
 )

 conv2d_1 (Conv2D)           (None, 32, 32, 32)        9248

 max_pooling2d_1 (MaxPooling  (None, 16, 16, 32)        0
 2D)

 flatten (Flatten)           (None, 8192)              0

 dense (Dense)               (None, 128)               1048704

 dense_1 (Dense)             (None, 4)                 516

=================================================================
Total params: 1,059,364
Trainable params: 1,059,364
Non-trainable params: 0
```
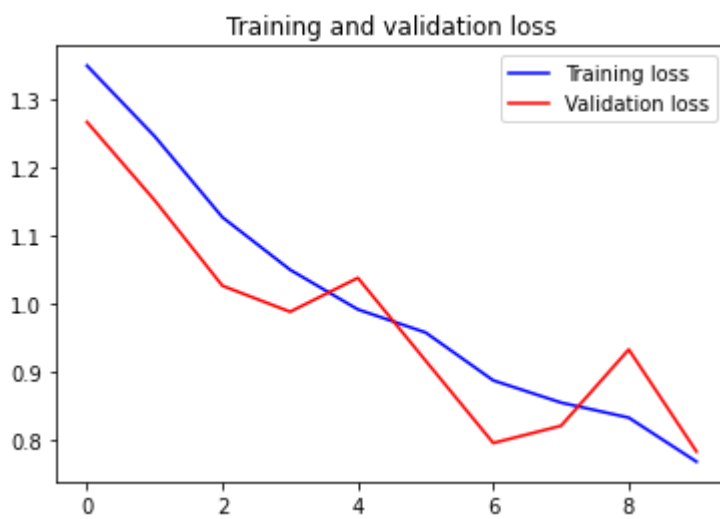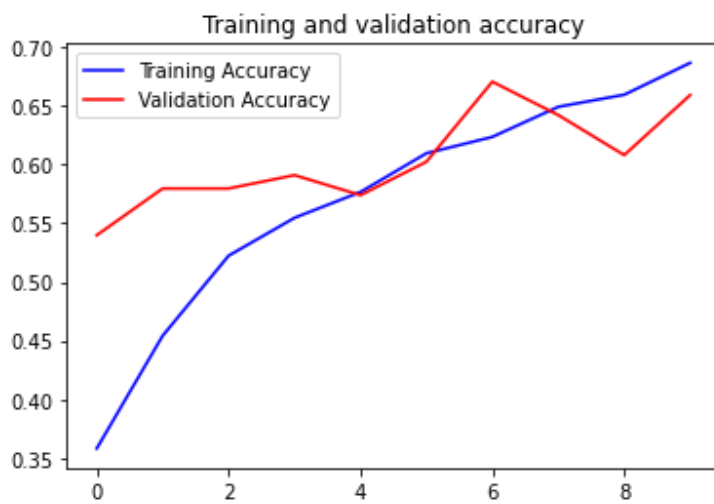
Training

Epoch = 10 and Learning Rate = 0.25

Testing on the random image from Test dataset

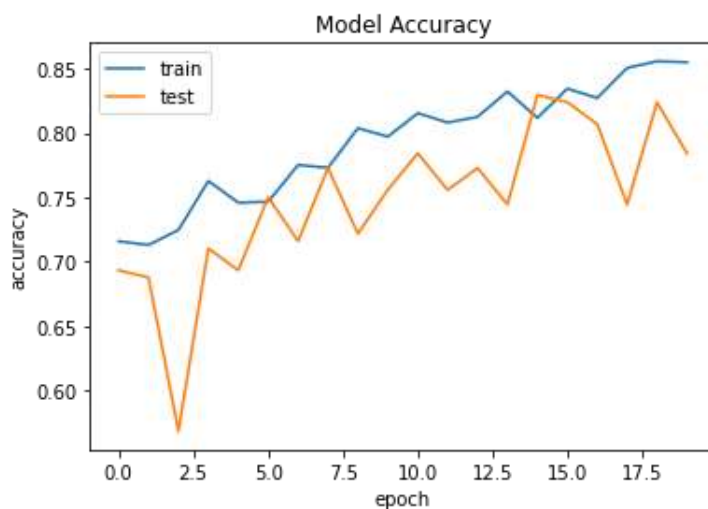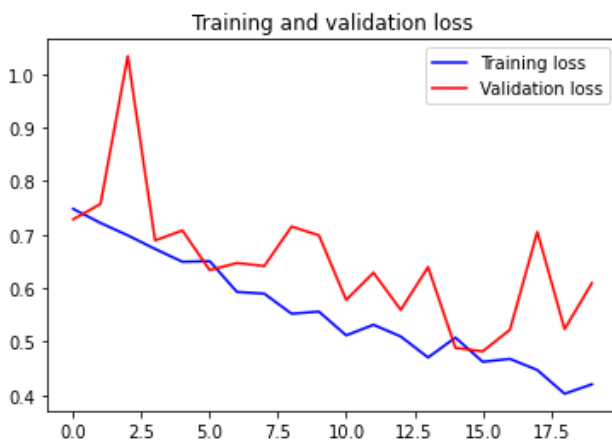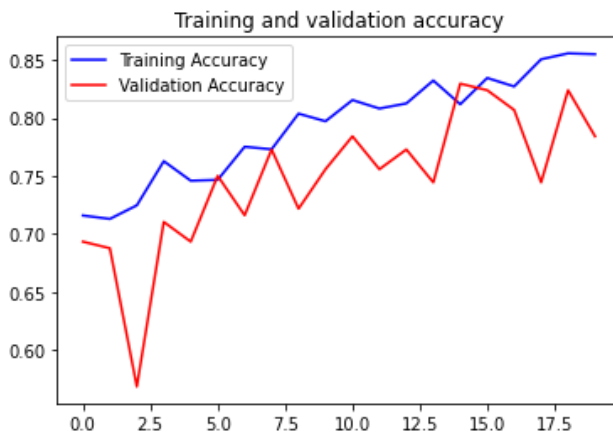Our model correctly predict the image i.e. the cotton disease predicted id curl virus
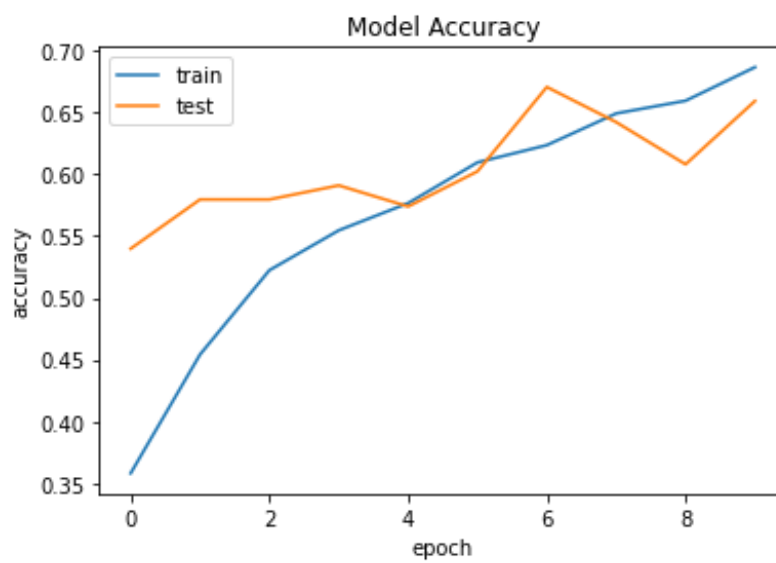
Training and validation accuracy

Training and validation loss

Model Accuracy

Epoch = 20 and Learning Rate = 0.50

on the same image from Test dataset as done for earlier epoch

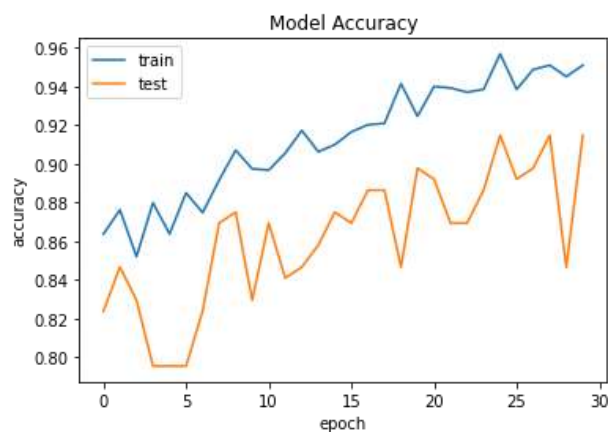Our model correctly predict the image i.e. the cotton disease predicted id curl virus

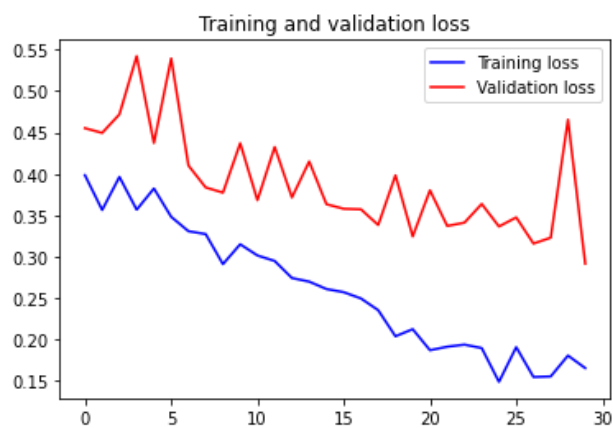Epoch = 30 and Learning Rate = 0.75

on the same image from Test dataset as done for earlier epoch

Our model correctly predict the image i.e. the cotton disease predicted id curl virus

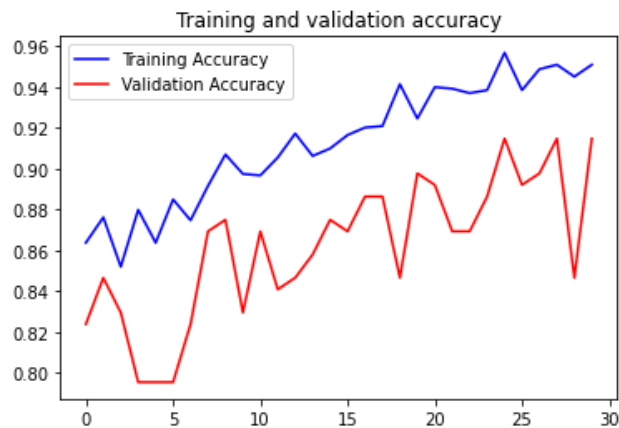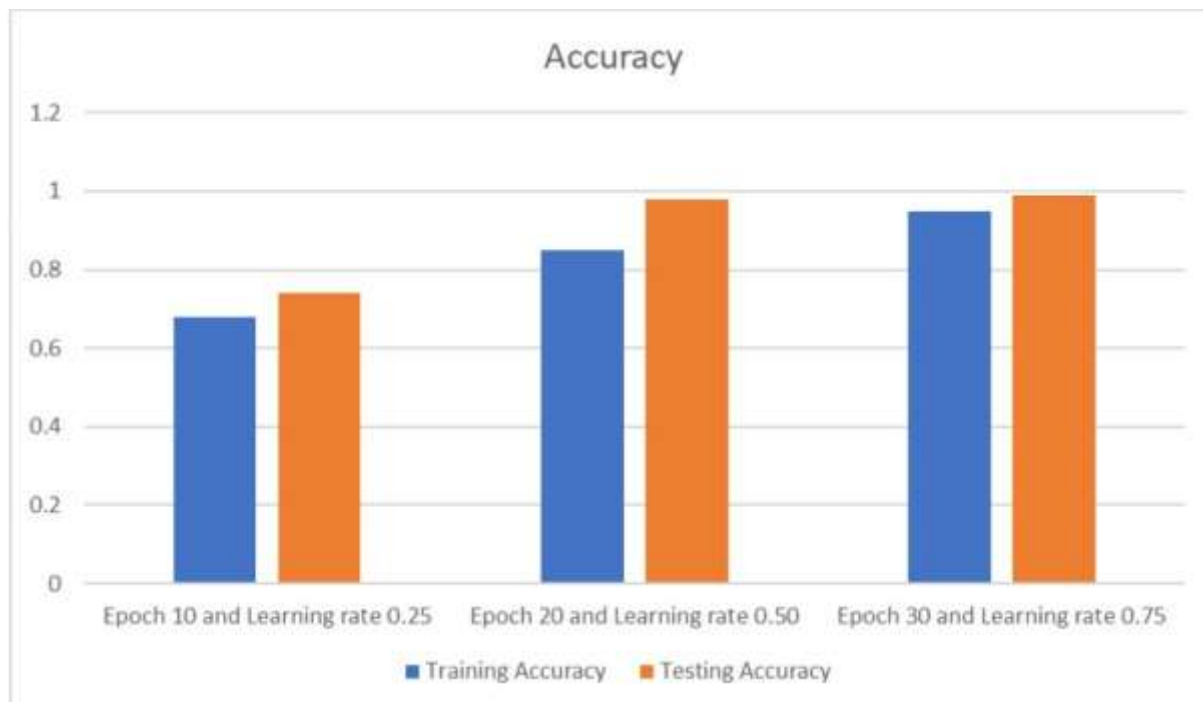## Conclusion:

We have tested the model with same image for different epochs and learning rate

At start, epoch 10 and learning rate = 0.25 for that training accuracy was 0.68 and testing accuracy was 0.74

Then we trained the model with epoch 20 and learning rate = 0.50 for that training accuracy was 0.85 and testing accuracy for the same image was 0.98

After incresing the epoch further to 30 and learning rate to 0.95 the training accuracy was increased to 0.99 but there was increase in testing accuracy