

# Comparison Chart of question 3

# Resnet50 (Original and Augmented data)

## Original dataset

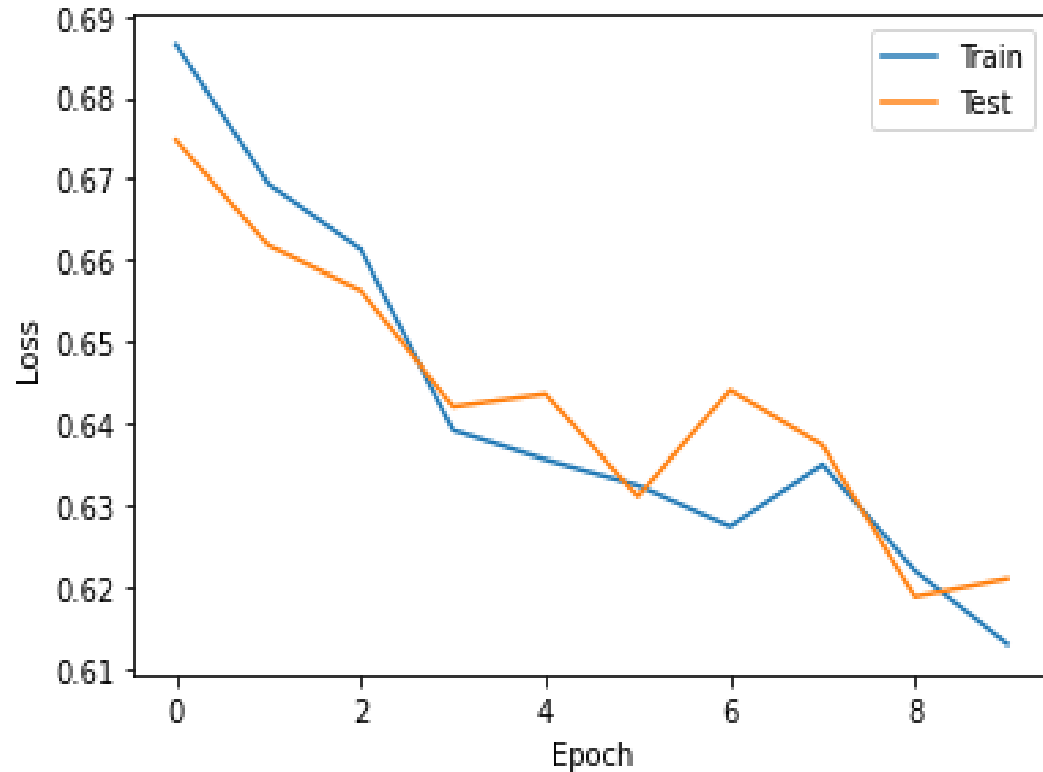
```
Epoch 1/10
32/32 [=====] - 28s 807ms/step - loss: 0.6865 - accuracy: 0.5427 - val_loss: 0.6747 - val_accuracy: 0.5714
Epoch 2/10
32/32 [=====] - 25s 799ms/step - loss: 0.6694 - accuracy: 0.5970 - val_loss: 0.6619 - val_accuracy: 0.5985
Epoch 3/10
32/32 [=====] - 24s 761ms/step - loss: 0.6614 - accuracy: 0.6121 - val_loss: 0.6563 - val_accuracy: 0.5907
Epoch 4/10
32/32 [=====] - 24s 767ms/step - loss: 0.6392 - accuracy: 0.6402 - val_loss: 0.6421 - val_accuracy: 0.6255
Epoch 5/10
32/32 [=====] - 24s 768ms/step - loss: 0.6356 - accuracy: 0.6352 - val_loss: 0.6437 - val_accuracy: 0.6139
Epoch 6/10
32/32 [=====] - 24s 750ms/step - loss: 0.6325 - accuracy: 0.6241 - val_loss: 0.6311 - val_accuracy: 0.6448
Epoch 7/10
32/32 [=====] - 24s 759ms/step - loss: 0.6274 - accuracy: 0.6352 - val_loss: 0.6442 - val_accuracy: 0.6139
Epoch 8/10
32/32 [=====] - 24s 761ms/step - loss: 0.6350 - accuracy: 0.6271 - val_loss: 0.6374 - val_accuracy: 0.6100
Epoch 9/10
32/32 [=====] - 25s 774ms/step - loss: 0.6220 - accuracy: 0.6623 - val_loss: 0.6188 - val_accuracy: 0.6718
Epoch 10/10
32/32 [=====] - 26s 802ms/step - loss: 0.6130 - accuracy: 0.6673 - val_loss: 0.6210 - val_accuracy: 0.6409
```

## Augmented dataset

```
Epoch 1/10
32/32 [=====] - 28s 810ms/step - loss: 0.7429 - accuracy: 0.5819 - val_loss: 0.6410 - val_accuracy: 0.6216
Epoch 2/10
32/32 [=====] - 24s 773ms/step - loss: 0.6467 - accuracy: 0.6191 - val_loss: 0.6108 - val_accuracy: 0.6718
Epoch 3/10
32/32 [=====] - 24s 771ms/step - loss: 0.6365 - accuracy: 0.6352 - val_loss: 0.6255 - val_accuracy: 0.6448
Epoch 4/10
32/32 [=====] - 25s 798ms/step - loss: 0.6569 - accuracy: 0.6281 - val_loss: 0.6205 - val_accuracy: 0.6371
Epoch 5/10
32/32 [=====] - 24s 762ms/step - loss: 0.6396 - accuracy: 0.6442 - val_loss: 0.6040 - val_accuracy: 0.6680
Epoch 6/10
32/32 [=====] - 24s 749ms/step - loss: 0.6811 - accuracy: 0.6141 - val_loss: 0.5945 - val_accuracy: 0.6795
Epoch 7/10
32/32 [=====] - 24s 744ms/step - loss: 0.6164 - accuracy: 0.6593 - val_loss: 0.6408 - val_accuracy: 0.6255
Epoch 8/10
32/32 [=====] - 24s 773ms/step - loss: 0.6355 - accuracy: 0.6442 - val_loss: 0.5906 - val_accuracy: 0.6757
Epoch 9/10
32/32 [=====] - 24s 760ms/step - loss: 0.5983 - accuracy: 0.6764 - val_loss: 0.5971 - val_accuracy: 0.6680
Epoch 10/10
32/32 [=====] - 24s 750ms/step - loss: 0.6394 - accuracy: 0.6392 - val_loss: 0.6247 - val_accuracy: 0.6371
```

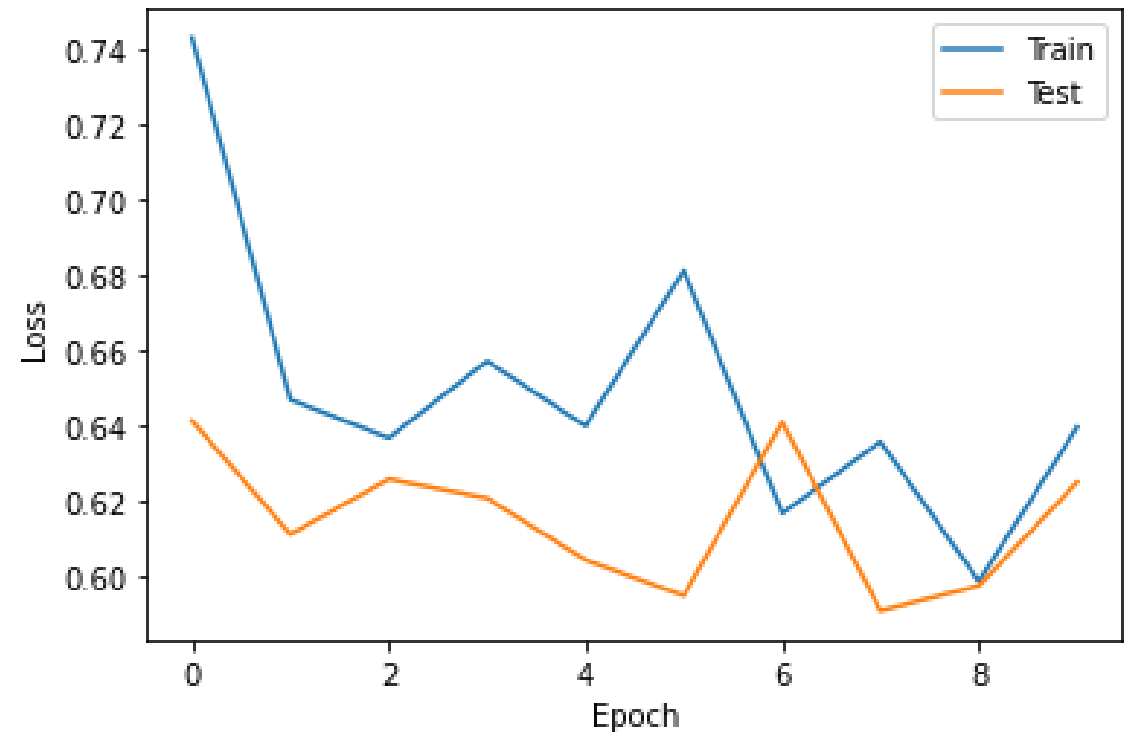
# Loss Plots

CNN Model loss values



Original dataset

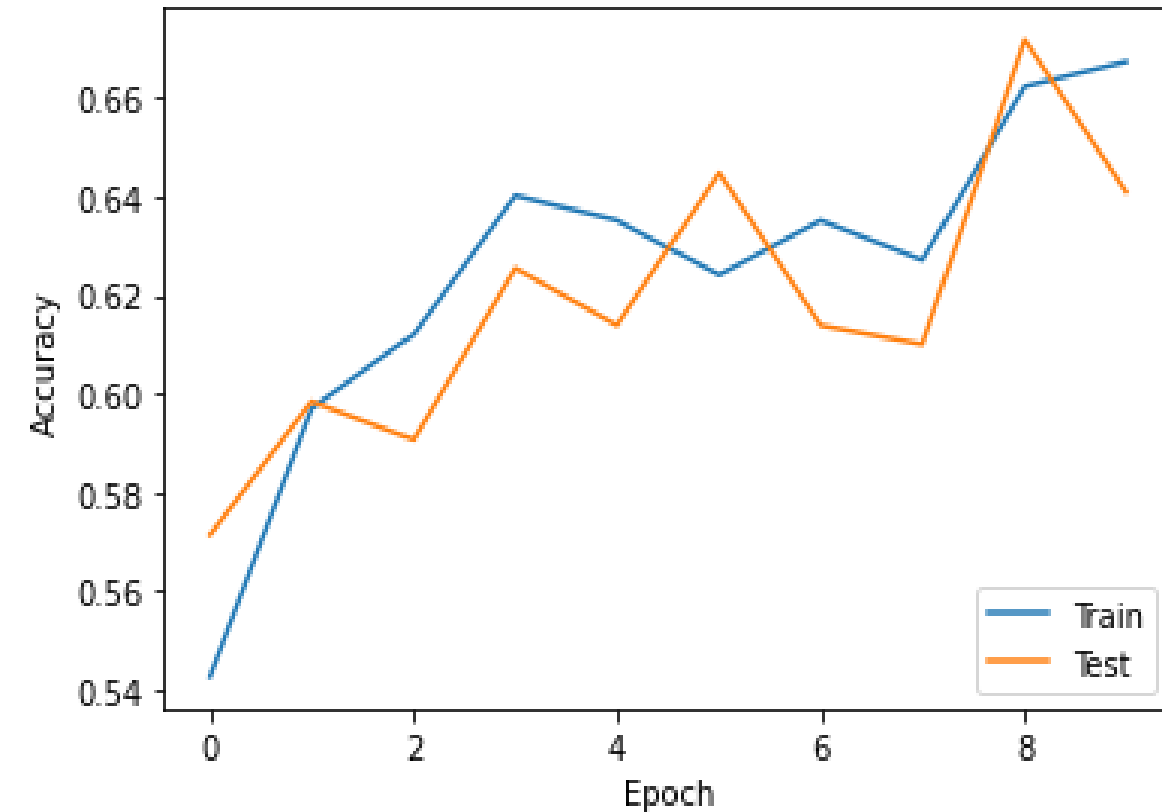
CNN Model loss values



Augmented dataset

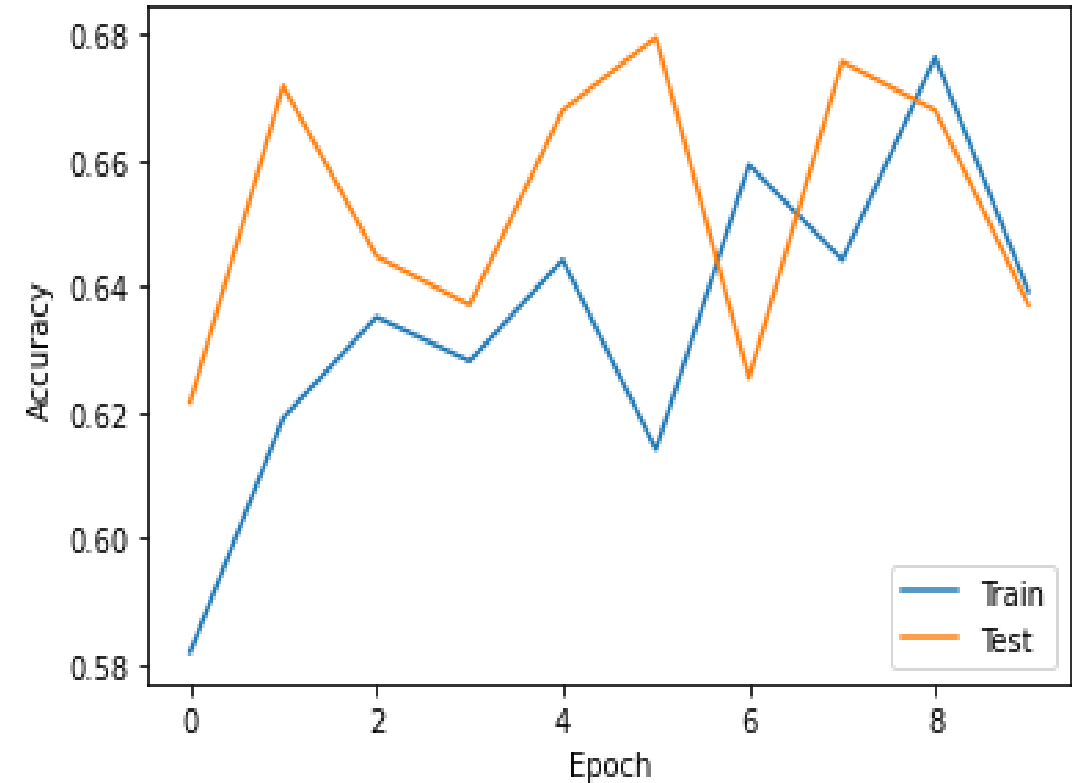
# Accuracy Plots

CNN Model accuracy values



Original dataset

CNN Model accuracy values



Augmented dataset

# VGG16 (Original and Augmented data)

## Original dataset

```
Epoch 5: val_loss improved from 1.21557 to 1.08849, saving model to /content/drive/MyDrive/vgg16_evaluation/mymodel.h5
32/32 - 29s - loss: 0.1194 - accuracy: 0.9990 - val_loss: 1.0885 - val_accuracy: 0.9421 - 29s/epoch - 916ms/step
Epoch 6/10

Epoch 6: val_loss did not improve from 1.08849
32/32 - 26s - loss: 0.1514 - accuracy: 0.9990 - val_loss: 1.1731 - val_accuracy: 0.9498 - 26s/epoch - 822ms/step
Epoch 7/10

Epoch 7: val_loss did not improve from 1.08849
32/32 - 25s - loss: 0.0861 - accuracy: 0.9970 - val_loss: 1.4554 - val_accuracy: 0.9228 - 25s/epoch - 772ms/step
Epoch 8/10

Epoch 8: val_loss did not improve from 1.08849
32/32 - 26s - loss: 0.1951 - accuracy: 0.9980 - val_loss: 1.7916 - val_accuracy: 0.9112 - 26s/epoch - 810ms/step
Epoch 9/10

Epoch 9: val_loss improved from 1.08849 to 1.00591, saving model to /content/drive/MyDrive/vgg16_evaluation/mymodel.h5
32/32 - 26s - loss: 0.1616 - accuracy: 0.9990 - val_loss: 1.0059 - val_accuracy: 0.9498 - 26s/epoch - 806ms/step
Epoch 10/10

Epoch 10: val_loss did not improve from 1.00591
32/32 - 25s - loss: 0.1018 - accuracy: 0.9990 - val_loss: 1.1080 - val_accuracy: 0.9459 - 25s/epoch - 766ms/step
Training completed in time: 0:05:29.508975
```

## Augmented dataset

```
Epoch 5: val_loss did not improve from 3.10146
30/30 - 16s - loss: 0.0014 - accuracy: 1.0000 - val_loss: 3.2312 - val_accuracy: 0.7692 - 16s/epoch - 543ms/step
Epoch 6/10

Epoch 6: val_loss did not improve from 3.10146
30/30 - 16s - loss: 0.0011 - accuracy: 1.0000 - val_loss: 3.2112 - val_accuracy: 0.7769 - 16s/epoch - 536ms/step
Epoch 7/10

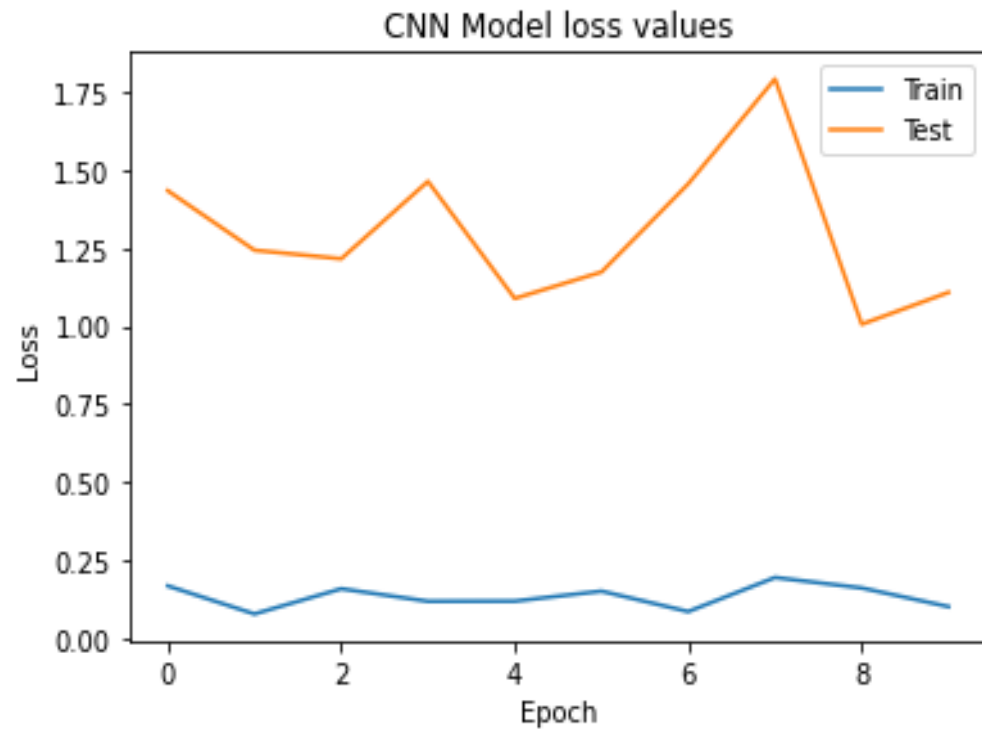
Epoch 7: val_loss did not improve from 3.10146
30/30 - 16s - loss: 6.0736e-05 - accuracy: 1.0000 - val_loss: 3.2032 - val_accuracy: 0.7731 - 16s/epoch - 537ms/step
Epoch 8/10

Epoch 8: val_loss did not improve from 3.10146
30/30 - 16s - loss: 4.8455e-05 - accuracy: 1.0000 - val_loss: 3.2020 - val_accuracy: 0.7731 - 16s/epoch - 535ms/step
Epoch 9/10

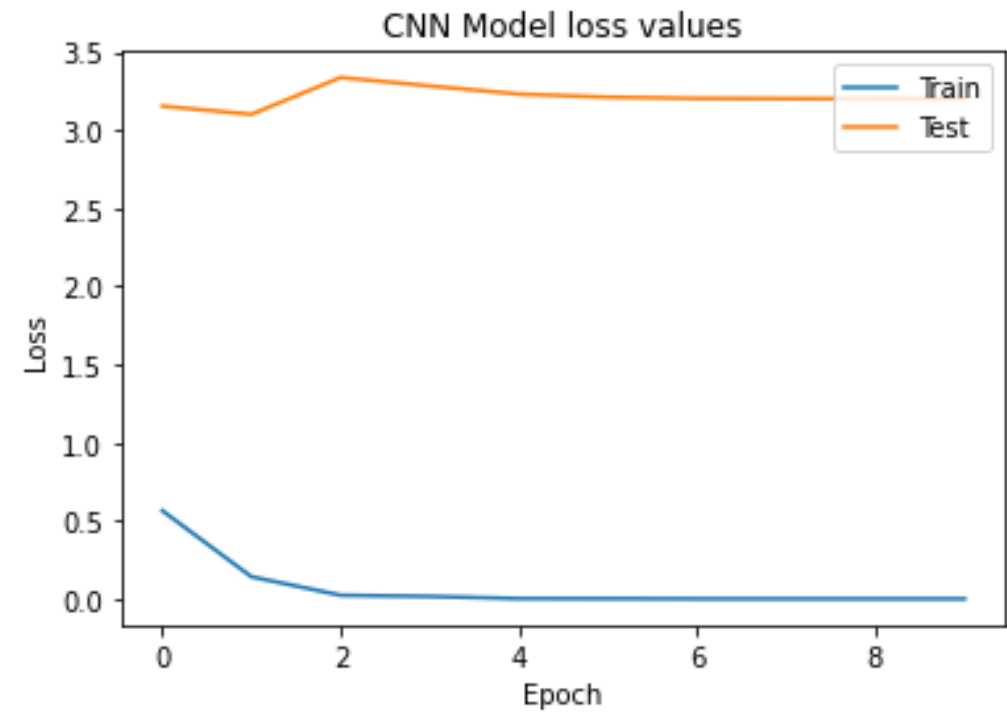
Epoch 9: val_loss did not improve from 3.10146
30/30 - 16s - loss: 4.1059e-05 - accuracy: 1.0000 - val_loss: 3.2013 - val_accuracy: 0.7731 - 16s/epoch - 538ms/step
Epoch 10/10

Epoch 10: val_loss did not improve from 3.10146
30/30 - 16s - loss: 3.6654e-05 - accuracy: 1.0000 - val_loss: 3.2008 - val_accuracy: 0.7731 - 16s/epoch - 534ms/step
```

# Loss Plots

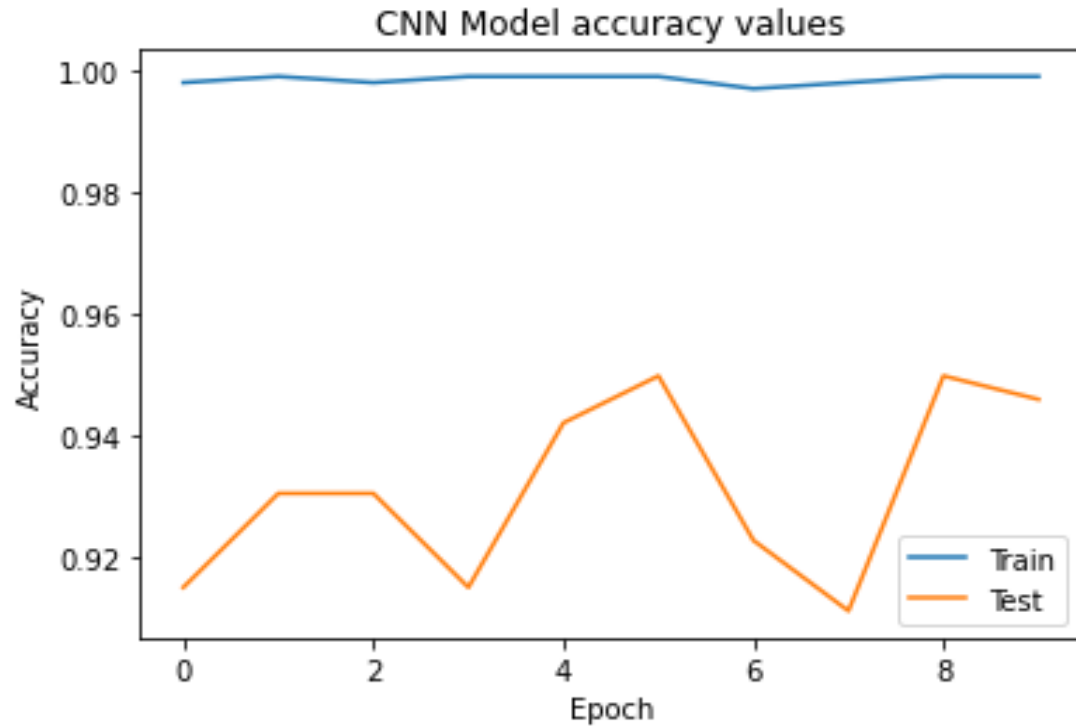


Original dataset

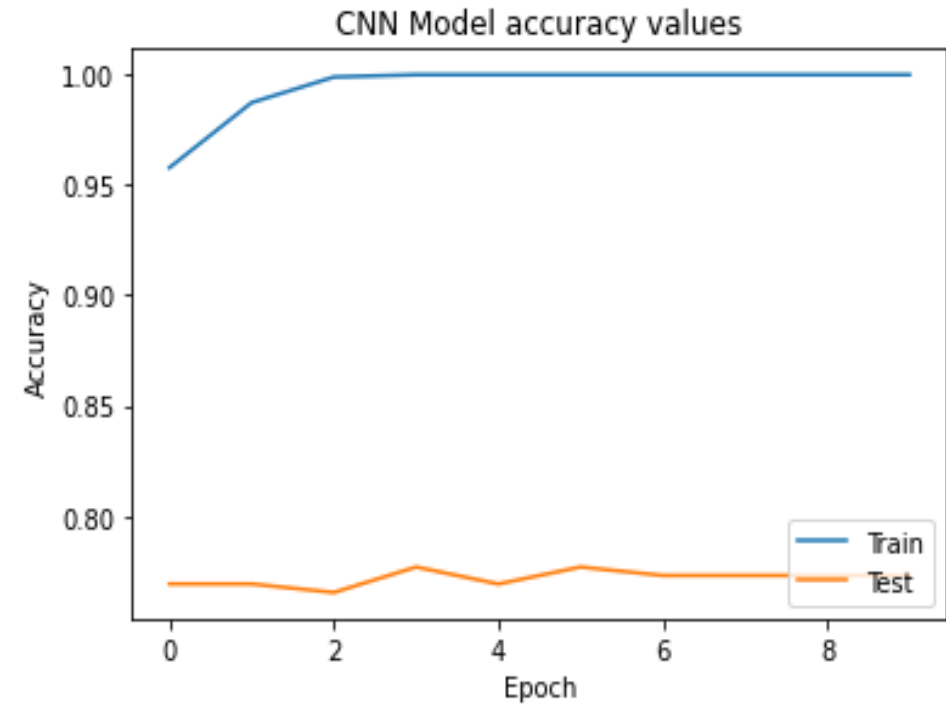


Augmented dataset

# Accuracy plot



Original dataset



Augmented dataset