Assignment

Artificial Intelligence

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# Three different variations of CNNs

**The first variation of CNN consists of:**

-convolutional layer with 16 neurons

-maxpooling layer 2x2

-Dense layer with 256 neurons

-Output layer with neurons equal to number of classes

**The Second variation of CNN consists of:**

-convolutional layer with 16 neurons

-maxpooling layer 2x2

-convolutional layer with 32 neurons

-maxpooling layer 2x2

-Output layer with neurons equal to number of classes

**The third variation of CNN consists of:**

-convolutional layer with 16 neurons

-maxpooling layer 2x2

-convolutional layer with 32 neurons

-maxpooling layer 2x2

-convolutional layer with 64 neurons

-maxpooling layer 2x2

-Dense layer with 256 neurons

-Output layer with neurons equal to number of classes

# Plotting Accuracy and confusion matrix analysis and discussion of various CNNs you trained (all models).

**For Model 01:**

its accuracy was = 0.856907069683075

its loss was = 0.4014023244380951

A picture containing chart

Description automatically generated

**For Model 02:**

its accuracy was = 0.853580117225647

its loss was = 0.4027852416038513

A star in the background

Description automatically generated

**For Model 03:**

its accuracy was = 0.8532878160476685

its loss was = 0.398820161819458

A picture containing chart

Description automatically generated

# Discussion:

In all variations of the CNN there was very small difference between the accuracy of testing data. That is because I changed the number of layers in each variation of CNN. But did not changed the activation function in any variation of CNN, which is “Relu” in all variations.

The confusion matrix is printed in the heatmap given in above pictures, which is showing the accuracy and loss in each class. I implemented the confusion matrix in all the variations of CNN, the results were quite close to each other, because of the reason I mentioned above.

I did not used tensor-board because I was unable to properly resolve the issues with it. There was a problem of adjustment of number of classes of EMNIST dataset with tensor-board.

Further we can improve the accuracy by increasing the number of epochs also. I used only 10 epochs in every variation of CNN, but as we increase the number of epochs the accuracy will improve.