***Assignment 2***

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**Assignment Report**

The steps taken in the data-preprocessing are as follows:

1. Division of Cifar dataset into training set and test set
2. Normalizing of the training and test data into values between 0 and 1. (for better accuracy in results)
3. Conversion of training and test labels into one-hot encoded values
4. Further breaking up of training dataset into training set and validation set (to be used in model training for checking accuracy in every epoch)

**CNN Model**

The CNN architecture is structured in the following manner

* Layer 1

Convolutional Layer:

Activation = RELU

Filter Size = 3x3

Number of filters = 128

Padding = same

Max pooling with filter size of 2x2 applied afterwards and then a dropout of 0.35 is applied to help reduce overfitting in model

* Layer 2

Convolutional Layer:

Filter size = 3x3

Number of filters = 256

Padding = same

Activation = RELU

Max pooling with filter size of 2x2 is applied and then a dropout of 0.35 is applied to help reduce overfitting in model

Afterwards, in succession, 3 convolutional layers each consisting of same padding, 512 filters, 3x3 filter size and RELU activation are applied.

After the 3 convolutional layers have been applied, max pooling with filter size of 2x2 is applied and then a dropout of 0.35

The feature maps are then flattened into a 1D vector and fed to a dense layer with 512 neurons and RELU activation. Dropout of 0.35 is then applied

The results are then fed to three more dense layers with the first one having filter size of 256, the second having a filter of 128 and the third one having filter size of 64 while RELU activation is applied in all of them and dropout of 0.35 is applied after each of the dense layers.

The results are then fed to the output layer of size 10 neurons (matching the total classes in the dataset) with Softmax activation function.

The model is compiled with Adam optimizer with a learning rate of 0.00025, categorical cross entropy and accuracy metric.

The training set is divided batches each of size 32 and ran for 100 epochs

References

[CIFAR10 CNN Model 85.97 Accuracy | Kaggle](https://www.kaggle.com/code/sid2412/cifar10-cnn-model-85-97-accuracy)