Assignment 2: Experiment 1
Team 10

Experiment 1: Build the best network you can using Keras

Colab Link ,
Results of experiments

Building the model:

- To start with we used the model which was previously performed Cifar-10 dataset which has 4 convolution layers and 2 dense layers.
- To find out the best optimizer for the network different optimizers like SGD, Adadelta, Adagard, Adamax, Adam were used to compile the model. The results of the optimizer and it's testing accuracy are as follows.

```
[['SGD', 0.1036],
 ['Adagrad', 0.2138],
 ['Adadelta', 0.22385],
 ['Adam', 0.236],
 ['Adamax', 0.2711]]
```

- Keeping Adamax as the optimizer our next task was to find out the best activation function for the model. Different activation functions like Relu, Tanh, Elu were used in the model. The results of the Activation function and it's testing accuracy are as follows.

```
[['tanh', 0.1809], ['relu', 0.2227], ['elu', 0.1914]]
```

- The next step was to find the best number of epochs to train the model. The results of the Noof epochs and it's testing accuracy are as follows.

```
[[75, 0.2596], [100, 0.2711]]
```

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Model summary: The best model was built using the parameters which got the maximum accuracy in the above experiments. Summary of the model is as follows.

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_17 (Conv2D)           (None, 32, 32, 32)        896
_________________________________________________________________
activation_21 (Activation)   (None, 32, 32, 32)        0
_________________________________________________________________
conv2d_18 (Conv2D)           (None, 30, 30, 32)        9248
_________________________________________________________________
activation_22 (Activation)   (None, 30, 30, 32)        0
_________________________________________________________________
max_pooling2d_8 (MaxPooling2 (None, 15, 15, 32)        0
_________________________________________________________________
dropout_11 (Dropout)         (None, 15, 15, 32)        0
_________________________________________________________________
conv2d_19 (Conv2D)           (None, 15, 15, 64)        18496
_________________________________________________________________
activation_23 (Activation)   (None, 15, 15, 64)        0
_________________________________________________________________
conv2d_20 (Conv2D)           (None, 13, 13, 64)        36928
_________________________________________________________________
activation_24 (Activation)   (None, 13, 13, 64)        0
_________________________________________________________________
max_pooling2d_9 (MaxPooling2 (None, 6, 6, 64)          0
_________________________________________________________________
dropout_12 (Dropout)         (None, 6, 6, 64)          0
_________________________________________________________________
flatten_4 (Flatten)          (None, 2304)              0
_________________________________________________________________
dense_7 (Dense)              (None, 512)               1180160
_________________________________________________________________
activation_25 (Activation)   (None, 512)               0
_________________________________________________________________
dropout_13 (Dropout)         (None, 512)               0
_________________________________________________________________
dense_8 (Dense)              (None, 200)               102600
_________________________________________________________________
activation_26 (Activation)   (None, 200)               0
=================================================================
Total params: 1,348,328
```

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Results:

- Training accuracy was 23.9% with a loss of 3.3
- Testing accuracy was 27.1% with a loss of 3.2
- Time taken to compile: 1616.324007511139 seconds