

# Project 3 Report

## Network Description

The network model is broken up into 3 distinct sections:

1. In the first section we run two convolutional layers using the relu activation method. Both convolutional layers generate 32 output filters. The first convolutional layer uses a kernel size of 5x5 and the second convolutional layer uses a smaller kernel size of 3x3. After the two convolutional layers have run we apply maxpooling on the filters generated. After the maxpooling, we drop 25% of input units by setting them to 0; this helps to prevent overfitting.
2. The second section is nearly identical to the first section. The only difference is that both convolutional layers generate 64 output filters instead of 32.
3. The last section starts by flattening the model. Next, we condense the model down to 512 nodes using the relu activation method before we perform another layer of dropout, this time dropping 50%. The last thing we do is condense the model one more time down to 10 nodes this time using the softmax activation method.

This network model is compiled and trained on the cfar10 dataset with a batch size of 48 and 5 epochs.

## Results

The results from testing after training are as follows:

Accuracy: 73.42%      Loss: 0.7704

Screenshot of training and testing:

```
Epoch 1/5
50000/50000 [=====] - 80s 2ms/sample - loss: 1.5898 - acc: 0.4176
Epoch 2/5
50000/50000 [=====] - 80s 2ms/sample - loss: 1.1400 - acc: 0.5954
Epoch 3/5
50000/50000 [=====] - 79s 2ms/sample - loss: 0.9790 - acc: 0.6551
Epoch 4/5
50000/50000 [=====] - 79s 2ms/sample - loss: 0.8695 - acc: 0.6950
Epoch 5/5
50000/50000 [=====] - 79s 2ms/sample - loss: 0.7963 - acc: 0.7205
Preprocess Testing Data:
Testing:
10000/10000 [=====] - 5s 470us/sample - loss: 0.7704 - acc: 0.7342
Test accuracy:0.734200000763, Test Loss:0.77039397192
```

## Screenshot of results:

