

Dataset used was CIFAR10 which has 10 classes. Data was divided into 5 batches with each batch having 10,000 images.

Classification using AlexNet -

AlexNet has 5 convolution layers and 3 fully connected layers. The optimizer chosen was SGD with a momentum of 0.9-

The accuracy with AlexNet over the test dataset(5000 images) was 80.6%

The time consumed was 122 seconds for 10 epochs.

Choosing The Architecture-

- 4 convolutional layers and 3 fully connected layers
Accuracy over the test dataset was 77.6% Time taken was 115 seconds for 10 epochs
- As the number of convolutional/ FC layers decreased the accuracy was either stagnant or decreased.
- Using 6 convolutional layers and 3 FC layers accuracy over the test dataset was 82.05% which was the best so far.
- The above code was run with **batch normalization** but upon running it **without batch normalization** it led to the accuracy dropping to 73%.

Now proceeding with this architecture of 6 cnv and 3 FC layers with batch normalization -

ReLu vs Tanh vs Sigmoid -

- ReLu performed the best with the best accuracy of 82.05%
- Tanh gave an accuracy of 76%
- Sigmoid did not do very well even after running for 30 epochs it gave an accuracy of 51%.

Adam vs SGD with momentum vs SGD with no momentum (6cnv and 3fc layers and 10 epochs)

- Adam optimizer–
Takes 136 seconds
With the best accuracy so far of 82%
- SGD without momentum–
Takes 132 seconds
Poor accuracy of 65.1%
- SGD with the momentum of 0.9 –
Takes 130 seconds to execute
accuracy of 79.7%

When momentum was decreasing the accuracy was also observed to be decreasing.

My recommended architecture –

6 convolutional layers 3 fully connected with Adam optimizer (also choosing relu over other activation functions and using batch normalization)– 82.05% accuracy execution time 133 seconds.

The plot of accuracy vs no of epochs in this case–

