**ASSIGNMENT-5**

**CIFAR10 DATASET**

**(BLAZER ID : VCHALLA3)**

The Following Pictures of the Grid and Random Search Pictures will help in describing the plot between the training and validation data. Based On which we will be able to notice that there is any chance of overfitting for the data or not.

Loss Plot can also help in determining the Overfitting of the data.

**Grid Search Parameters.**

For the Grid Search Parameters, Hyper Parameters which I have chosen are number of neurons (32, 64 and 96) present in the dense layer and batch size (32, 64 and128) from the compiling params. Possible Cartesian Combinations are 9.

Number Of Neurons = 32, Batch Size = 32, loss: 0.6031 - accuracy: 0.7965

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Number Of Neurons = 32, Batch Size = 64, loss: 0.5826 - accuracy: 0.7995

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Number Of Neurons = 32, Batch Size = 128, loss: 0.5906 - accuracy: 0.7980

A graph with a line and a line

Description automatically generated

A graph with red and blue lines

Description automatically generated

Number Of Neurons = 64, Batch Size = 32, loss: 0.5986 - accuracy: 0.7962

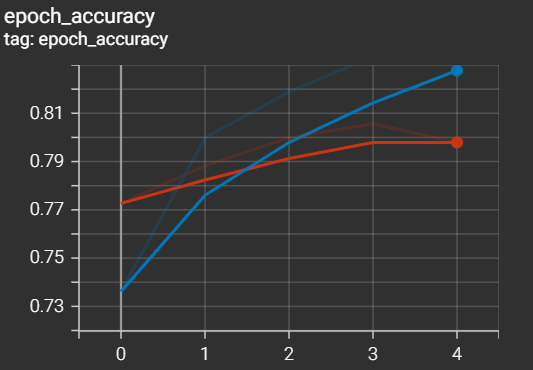
A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Number Of Neurons = 64, Batch Size = 64, loss: 0.5805 - accuracy: 0.7996



A graph with a red line and blue line

Description automatically generated

Number Of Neurons = 64, Batch Size = 128, loss: 0.5677 - accuracy: 0.8061

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Number Of Neurons = 96, Batch Size = 32, loss: 0.6010 - accuracy: 0.8019

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Number Of Neurons = 96, Batch Size = 64, loss: 0.5903 - accuracy: 0.8023

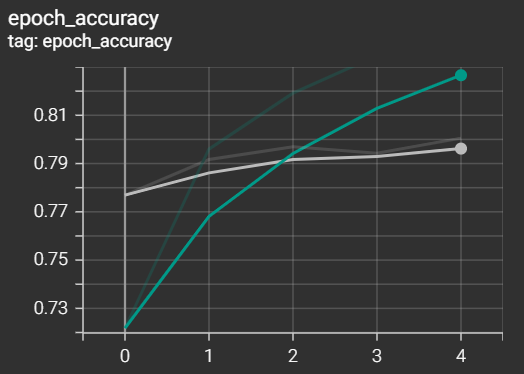
A graph with a line and a point

Description automatically generated

A graph with a line and a line

Description automatically generated

Number Of Neurons = 96, Batch Size = 128, loss: 0.5956 - accuracy: 0.7992



A graph with a line

Description automatically generated

Complete Graph for the Grid Search.

A graph with colorful lines

Description automatically generated

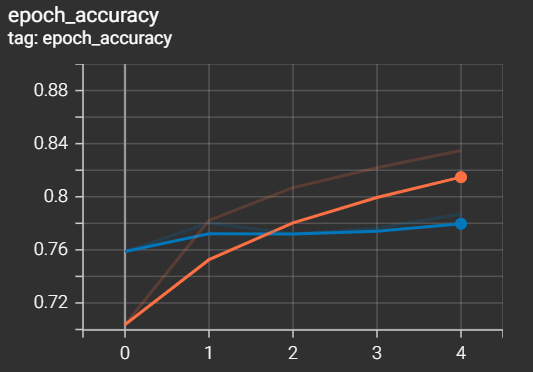
**A graph of different colored lines

Description automatically generated**

**Random Search Parameters.**

I have considered the best outputs as the constant parameters(number of neurons:64,Batch Size:128) for the random search and made the Optimizer (Adam, RMSprop), Activation Function (relu, tanh) and Epochs (5, 10, 15). I have Given the iterations also as a random variable. For the Testing now it considered 6 iterations.

Epochs-5, Activation Function- ReLU, Optimizer- RMSprop, loss: 0.6252 - accuracy: 0.7879



A graph with lines and numbers

Description automatically generated

Epochs-10, Activation Function- tanh, Optimizer- RMSprop, loss: 0.6204 - accuracy: 0.7979

A graph with a line and a line

Description automatically generated

A graph with lines and numbers

Description automatically generated

Epochs-15, Activation Function- relu, Optimizer- Adam, loss: 0.6603 - accuracy: 0.8031

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Epochs-10, Activation Function- tanh, Optimizer- Adam, loss: 0.6044 - accuracy: 0.8049

A graph with lines and numbers

Description automatically generated

A graph with a line and numbers

Description automatically generated

Epochs-10, Activation Function- tanh, Optimizer- RMSprop, loss: 0.6276 - accuracy: 0.7976

A graph with lines and numbers

Description automatically generated

A graph with a line and numbers

Description automatically generated

Epochs-10, Activation Function- relu, Optimizer- RMSprop, loss: 0.6390 - accuracy: 0.7935

A graph with lines and numbers

Description automatically generated

A graph with lines and numbers

Description automatically generated

Overall Pictures For the Random Search

A graph of different colored lines

Description automatically generated

A graph with different colored lines

Description automatically generated

In the Grid Search We are going to validate each and every possible outcome whereas in the Random Search we are picking the Hyperparameters also in the randomized manner. In Random Search case we may miss the few cases of testing that might have the effect of losing the efficient data.

Grid search is suitable when the search space is relatively small and the relationships between hyperparameters are well understood. It's also a good choice when computational resources are not a major constraint.

Random search is more suitable for high-dimensional spaces or when computational resources are limited. It may be preferred when the interactions between hyperparameters are complex and not well-defined.