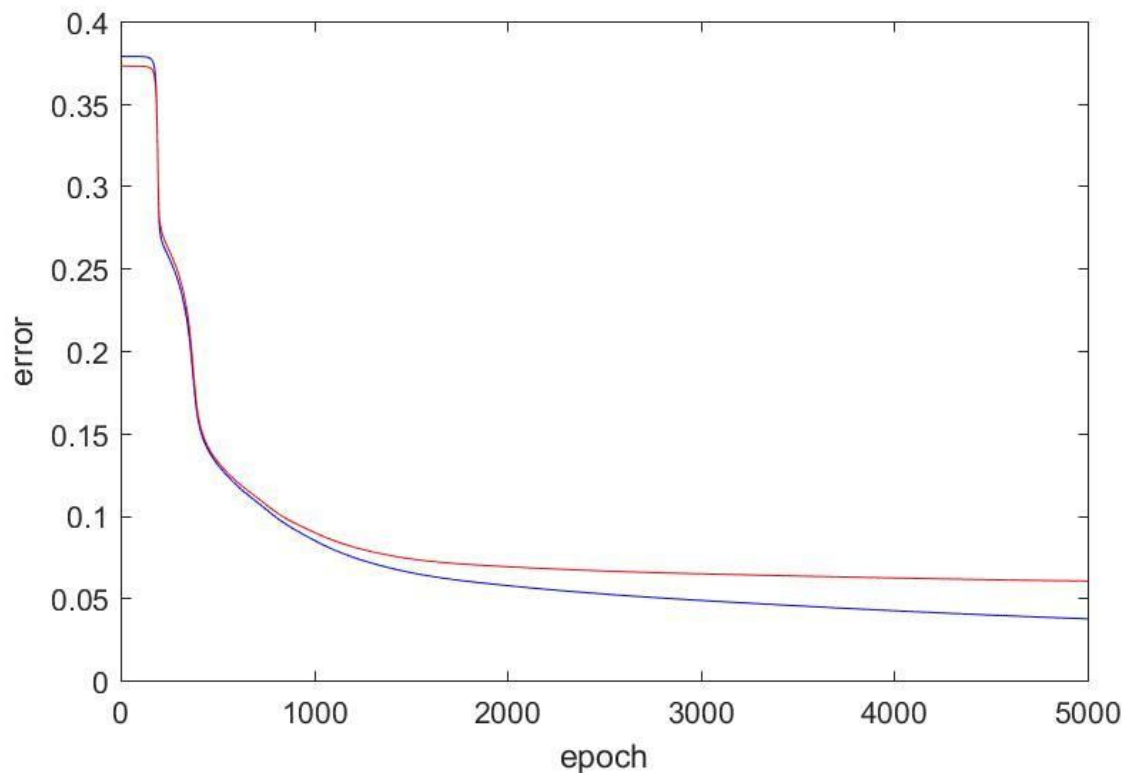


# SELF DRIVING CAR

Here are few observations regarding my project

a)

The below plot is a graph of our train and validation errors per instance versus the epoch.



## Some Info regarding graph :-

Red line : Test Error

Blue line : Validation Error

Dropout : 0

Mini Batch Size : 64

Architecture : 1024-512-64-1

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Alpha : 0.01

**Observations :**

In this graph we can clearly see that initially our test error was lower than the train error. As we started training our model, both train errors and test errors were nearly constant with a small decrease in them. The train and test error took a huge dip at nearly 100 epochs. This dip means that our model learned more during epochs 100-200. This implies that a Artificial Neural Network needs to be trained again and again on the same data for better results. At around 800 epochs our model overfits resulting into higher test error and a lower training error.

**b)** The plots of this part depict sum of squares Errors versus the epochs for different mini batch sizes.

**Some Info regarding graphs**

Red line : Test Error

Blue line : Validation Error

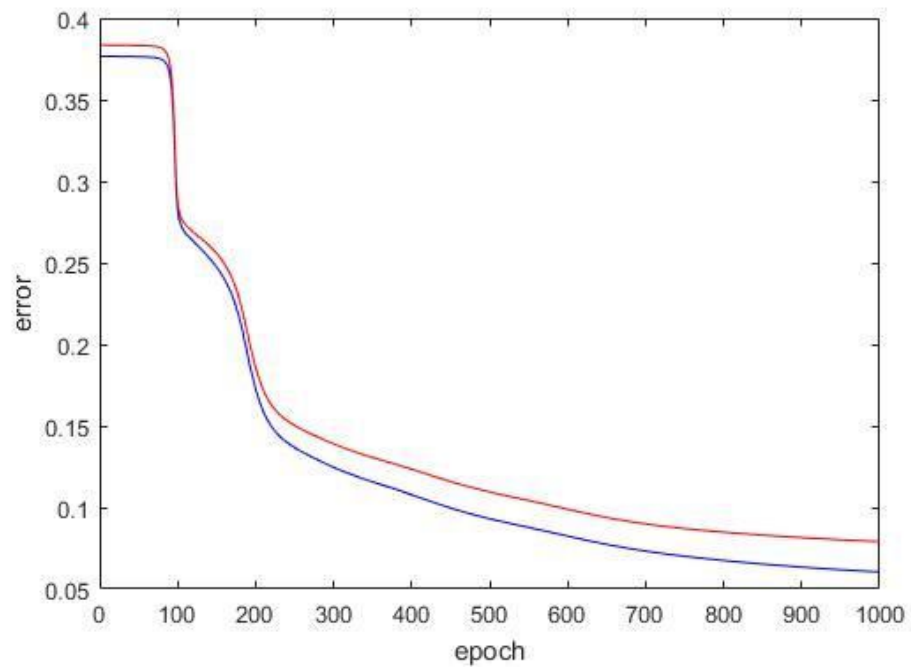
Dropout : 0

Architecture : 1024-512-64-1

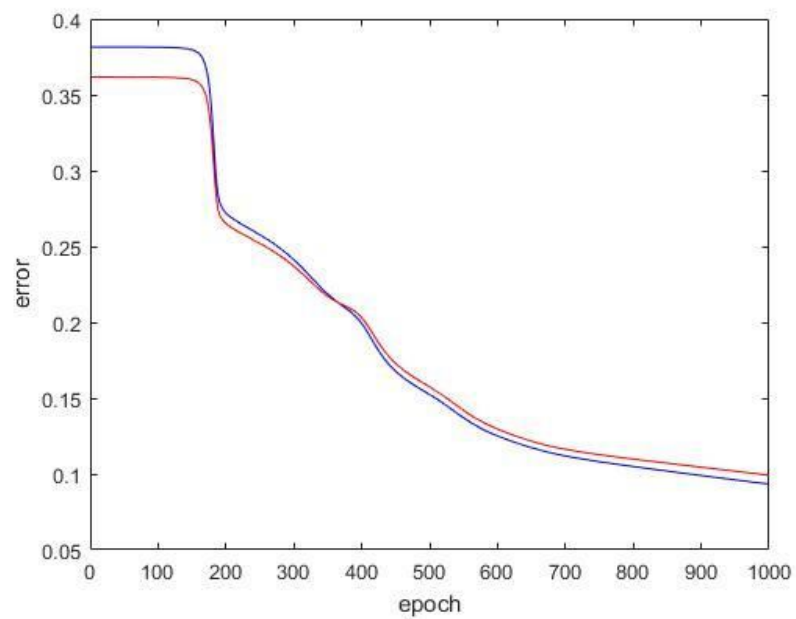
Alpha : 0.01

---

### MINI\_BATCH\_SIZE : 32

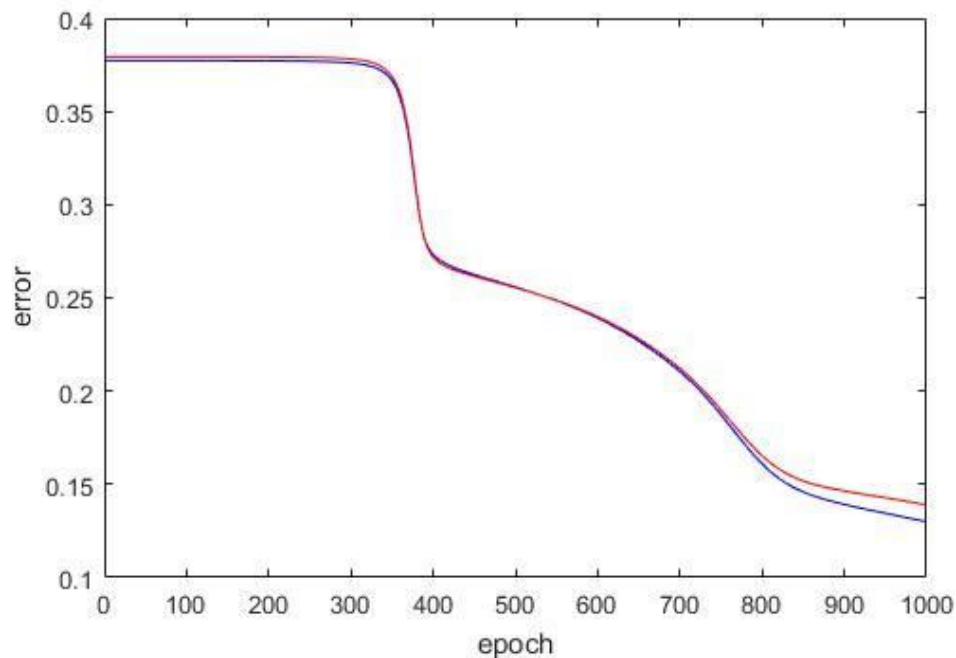


### MINI\_BATCH\_SIZE : 64



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### MINI\_BATCH\_SIZE : 128



Above graphs are showing that model is showing dip earlier with smaller mini batch sizes and as the mini batch size increases our learning takes higher number of epochs. This is because with the smaller number of batch sizes, our weight updates more as compared to the larger batch size. This indicate that we should use small batch size when our number of training examples are very low for a faster convergence.

c)

#### Some Info about the graph:

Red line : Test Error

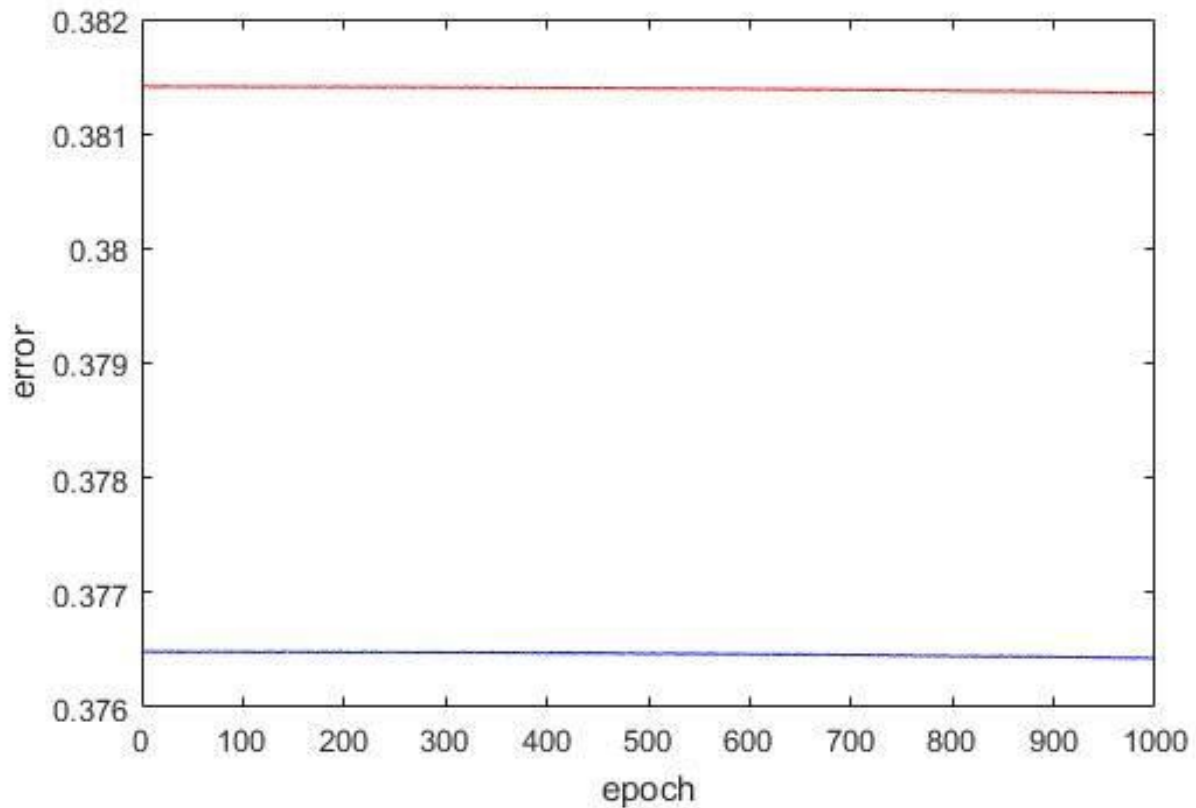
Blue line : Validation Error

Dropout : 0.5

Architecture : 1024-512-64-1

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Alpha : 0.001



As we can see that train error is lower than the validation error so there might be overfitting even after implementing dropout. But we also see that the difference between test and validation is very low so our model is not overfitted. We also see that our model is not learning much. This could be attributed to a lower learning rate alpha and dropout percentage being 0.5. It is appearing constant but on a closer look we see that it is decreasing with the more epochs.

**d) Some Info about the graph:**

Red line : Test Error

Blue line : Validation Error

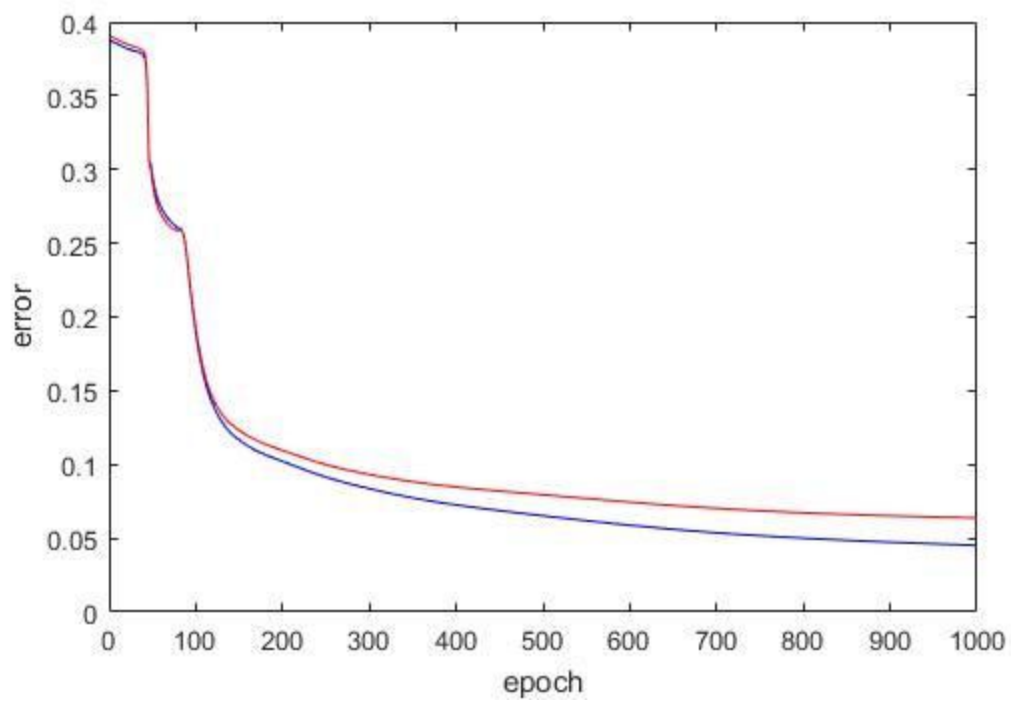
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Dropout : 0

Architecture : 1024-512-64-1

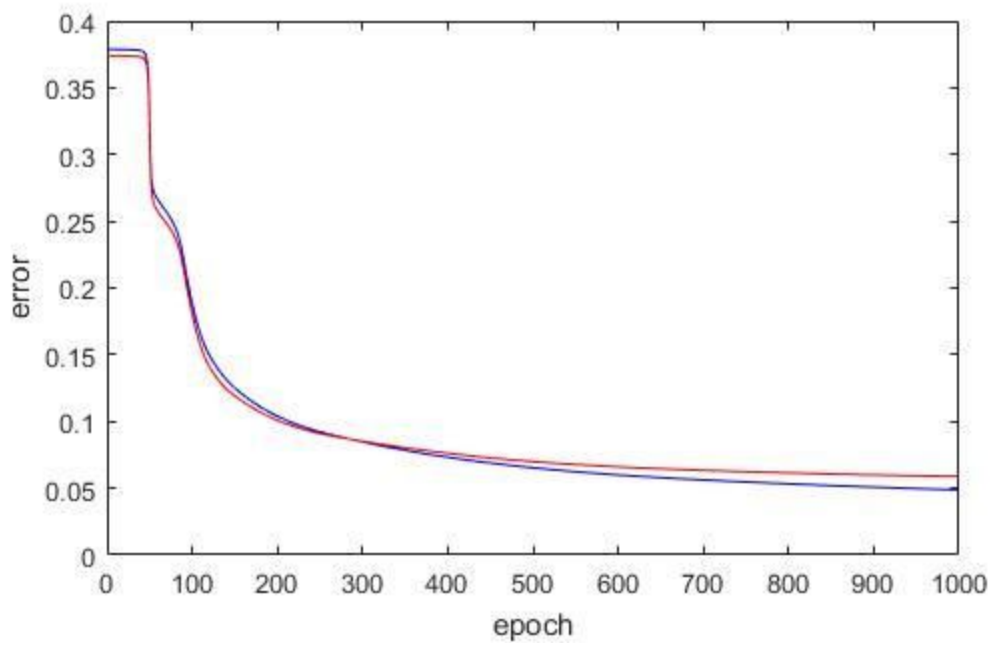
MiniBatch Size :64

**Learning rate: 0.05**

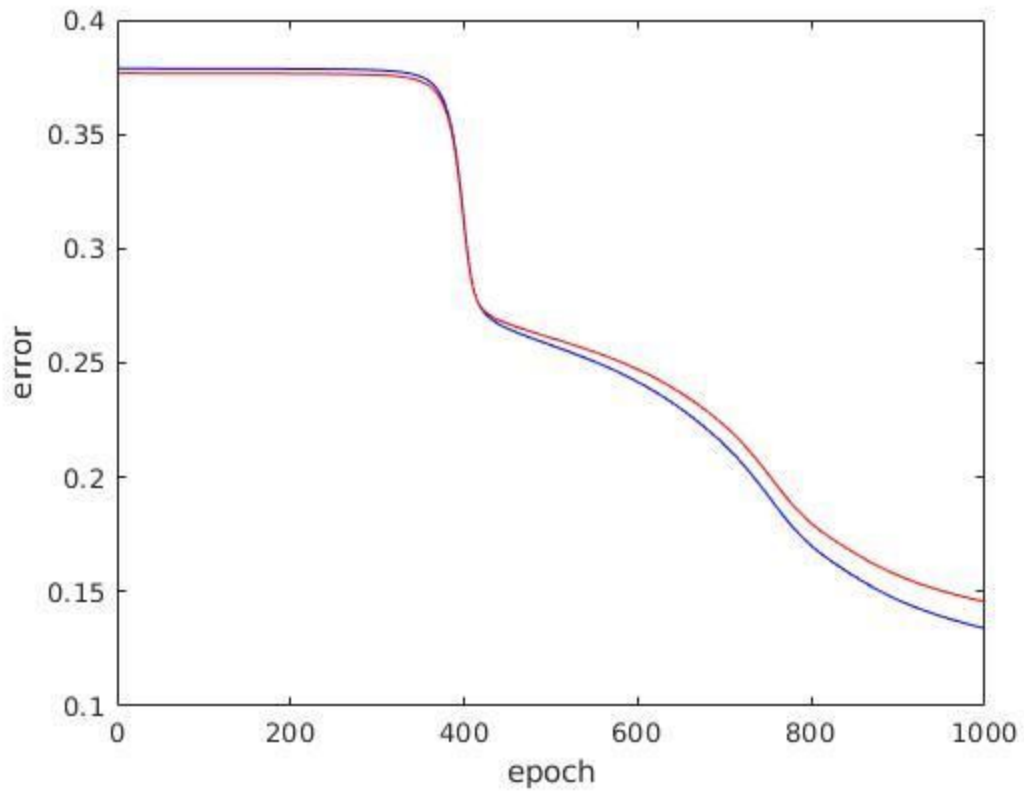


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**Learning rate: 0.01**



**Learning rate :0.001**



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These plots indicate that with the decrease in learning rate our model is learning slowly and it is not converging to a point.