Deep Learning Report 1

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1 Problem Statement

In this project we have to develop a software for divisibility of number by given set of numbers in our case we have to develop for divisibility of number by 3 or 5. For that we have to tasks , one by conventional programming method and other one is using deep learning based method.For that we are going to use neural network to train and learn basics of deep learning.

2 Approach

2.1 Task 1 :

In task one we develop a hard code software which check if a number is divisible by 3 and 5 than output fizzbuzz,and else if it is divisible by 3 or 5 than output fizz and buzz respectively. We have written a straightforward if else python code for task1.

2.2 Task 2 :

In task two we have developed a model using neural network to return the output to our problem. In this part we have trained a neural network on different hyper-parameters on input and output data for numbers between 101 and 1000. And it should we generalized to work well on all other number.We have used multiclass classification to develop our software based on neural network.

2.2.1 Model Architecture:

Input Layer : 10
Hidden layer : 1 (increased number of hidden layer but haven't got consistent improvement.)
Hidden layer one with 200 input and 4 output neurons. Used Relu as activation function in hidden layer
Output Layer Size : 4

2.3 Data PreProcessing and training :

Converted decimal data into binary of ten bits and used input layer of size 10. On directly using numbers as input it's not learning with iterations.
And than labeling for output data is being done as 0,1,2,3 for number,'fizz','buzz','fizzbuzz' respectively.
SGD (stochastic gradient descent) is used as optimizer with learning rate of 0.05 (used various learning rate on using low learning rates learning becomes slow and on using 0.05 it's improving in decent time so used it as learning rate).Loss criterion used is cross entropy.
Trained for 1000 iterations with batch size = 32

3 Results :

For software one it's 100 percentage as it's logic based and it might lack in terms of time for computation it's accuracy is of no question.
    for Software 2 training accuracy : 0998 in 1000 iteration
test accuracy is 0.98
test accuracy for fizz 1.0
test accuracy for buzz 0.9285714285714286
test accuracy for fizzbuzz 1.0
test accuracy for others is 1.