Deep Learning Report 1

Shubham Sharma (Sr.No. - 16013)
M.tech, CSA

January 27, 2020

Objective and Task

The aim of the project is to solve the problem of "FizzBuzz" by two kinds of implementation one is software based or logic based approach(Software 1.0) and other one is machine learning based approach with the help of neural network(Software 2.0).

In the task of FizzBuzz if a number is divisible by 3 then it is represented by fizz, if number is divisible by 5 then it is represented by Buzz and if it is divisible by 3 5 both it is represented by FizzBuzz. Program is being trained on numbers ranges from 101 to 1000 and tested on numbers 1 to 100.

Approaches

Logic Based Approach(Software 1.0)

In this problem,we wrote a simple python code that will print:

```
if(i%3==0 and i%5==0):
print("fizzbuzz")
elif(i%3==0):
print("fizz")
elif(i%5==0):
print("buzz")
```

Machine Learning Approach(Software 2.0)

Model Architecture :
For this task we are using a training data from number 101 to 1000 which paired with corresponding labels of 0 for fizz,1 for buzz and 2 for fizbuzz and 3 otherwise).

In this approach we are using a simple three layer neural network model with input size of 10 (as our training data is ranges upto 1000 so for binary representation 10 bits are used which we are going to use as input in our network)

Input Size : 10
First Hidden Layer dimension : 128 neurons
Second Hidden Layer dimension : 128 neurons
Third Hidden Layer dimension : 128 neurons
Output Size : 4
Activation Functions : Relu at hidden layers and softmax at output layer.
Loss function: Cross Entropy Loss
Optimization: SGD

Results and Accuracy

Results and Accuracy are calculated based on test input which contains the numbers from 1 to 100.

Logic Based Approach(Software 1.0)

Accuracy:: 100 %

Machine Learning Approach(Software 2.0)

Train Accuracy:: 100%(approx.)
Test Accuracy:: 97 %

Test Accuracy for Fizz:: 100 %(27/27)
Test Accuracy for Buzz:: 92.85 %(13/14)
Test Accuracy for FizzBuzz:: 100 %(6/6)
Test Accuracy for others:: 96.22 %(51/53)