Report – Deep Learning – Project 1

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Software1 Implementation

The problem statement is to find whether a number is divisible by 3 (fizz) or by 5 (buzz) or by both (fizzbuzz) else if it is indivisible. Code related to software 1 is implemented by using the modulo operator. Given a number 'a' is divisible by 'b' when the remainder is zero when division operation is done between 'a' and 'b'. Operation to find the remainder between 2 numbers is done by modulo operator('%'). Given a number 'n'

'fizz'	if n%3 == 0
'buzz'	if n%5 == 0
'fizzbuzz'	if n%3 == 0 and n%5 == 0
'n'	if n%3 != 0 and n%5 != 0

Output 'Software1.txt' is generated using the above mentioned algorithm.

 Software2 Implementation

In the machine learning implementation a neural network architecture is implemented using Tensorflow librarie. Numbers form 101 to 1000 are used for training the network while numbers 1 to 100 are used for testing. The given numbers are converted into their binary format each of size 10 bits (since at least 10 bits are required for numbers between 511 and 1024). These 10 bits are fed to neural network with input size of (10 X 1) vector. Also Software1 algorithm is used to mark output class of the algorithm (Note: 4 classes are used to represent 'fizz', 'buzz', 'fizzbuzz') for training purposes. A categorical cross-entropy loss function along with Softmax activation in output layer is used to identify the correct class using this network.

Network architecture: A single hidden layer with is used in the network. Different types of optimizers with different learning rates and activation are used to train the network. Relu activation is used in the submitted program (But other activation functions like softmax, sigmoid etc has the same effect on training/testing accuracy). The most important factor that determined the accuracy of the network is the size of hidden layer. When the hidden layer size is small, testing accuracy was stuck to 53%. When the size of the network is increased to 1000, both test and training accuracy settled to 100%.

This trained model is saved in bin fizzbuzz.h5.