Deep Learning Report 1

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Objective and Task

The project is a simple task that is to be solved using two approaches to software development: the logic-based approach (Software 1.0) and the machine learning approach (Software 2.0). It is also designed to quickly gain familiarity with neural network basics, Python and machine learning frameworks

We consider the task of FizzBuzz. In this task an integer divisible by 3 is printed as Fizz, and integer divisible by 5 is printed as Buzz. An integer divisible by both 3 and 5 is printed as FizzBuzz. Your programs will be tested on how well they perform in converting integers from 1 to 100 to the FizzBuzz labels

Approach

Software 1.0

In this problem, write a simple python code that will print:
Fizz if number is divisible by 3
Buzz if number is divisible by 5
FizzBuzz if number is divisible by both 3 and 5

Software 2.0

Training Data : Integer value from 101 to 1000 and corresponding label i.e Fizz, Buzz, FizzBuzz or integer value.

Model Architecture :
Input layer Size : 16
Hidden Layer : 3 layer with 150 neuron in each layer
Output Layer Size : 4
Activation Functions : Relu in hidden layers and softmax at output layer.

Data Preprocessing::
Input features has been encoded into 16 bit binary value.
Label has been processed as follows ::
0 if label is Fizz
1 if label is Buzz
2 if label is FizzBuzz
3 otherwise

Optimizer: Adam with learning rate=0.05
Loss function: Cross Entropy

I tried different learning rate for model training and came to conclusion that If your learning rate is set too low, training will progress very slowly as you are making very tiny updates to the weights in your network. However, if your learning rate is set too high, it can cause undesirable divergent behavior in your loss function.

Results

Software 1.0

Accuracy:: 100 %

Software 2.0

Train Accuracy:: 100 %
Test Accuracy:: 99 %

Test Accuracy for Fizz:: 100 %
Test Accuracy for Buzz:: 100 %
Test Accuracy for FizzBuzz:: 100 %
Test Accuracy for others:: 99 %