Deep Learning Project 1

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MTech(CSA) - 15960

1 The Task

The task was to write the fizzbuzz program using the conventional logic based method, called the Software 1.0 and using deep learning method by creating a neural network, called the Software 2.0.

2 Software 1.0

This is the classical logic based approach. The problem is as follows:

- Output "Fizz" if input is divisible by 3.
- Output "Buzz" if input is divisible by 5.
- Output "FizzBuzz" if input is divisible by 3 and 5.
- Otherwise output the input number itself.

With this method we can easily write the logic based conventional computer program which will always output the correct answer. Hence, 100% accuracy.

3 Software 2.0

For this I created a neural network. The input was encoded as 16 bit binary. And the input was encoded as 4 classes (used one-hot encoding). I also tried giving the input as decimal 4 digit (i.e. 4 input units), but that didn't give good results.

The training data is generated for numbers from 101 to 1000. Labeled using the Software 1.0 logic.

I used Tensorflow 2 (GPU) for this task. Created a fully connected dense neural network with 1 hidden layer and 1000 units. I varied the hidden layers from 1 to 3, along with dropouts. Also tried different number of units in each layer. Here. I have reported the network that gave me the best results. I used relu in hidden layers and softmax in outer most layer. Ran the model for 10,000 epochs.

Train Accuracy: 97%

Test Accuracy (on set (1, 100)): 94%

4 Files

There is one main.py file which contains all the code. Run it as:

python main.py –test-input ⟨input_file_name⟩

This will load the model saved in models directory which is already trained. Two files are generated Software1.txt and Software2.txt, as described in the assignment description.