Report

Standard Logic Algorithm

- I have implemented algorithm by simply using if else conditions to classify numbers.
- It is giving 100 % accuracy as expected.

Machine Learning Algorithm,

- I have implemented four layer neural network with one input, two hidden layers and one output layer.
- I have used two hidden layer because number of epochs needed to train model for more than 99% training accuracy reduced drastically from 450 to 100 (batch size:25) with two layer compare to one hidden layer. I have tried with three hidden layer also but improvement in performance is not that much. I have used 150 perceptron in hidden layer as I already said I tried to make neural network more deeper rather than wider.
- I am using 'Relu' activation function for both hidden layer due to better performance and 'Softmax' for outer layer so out put will be probability distribution of classes for particular input.
- Model is taking input in binary form so function 'binary_encode' converts input in binary.
- 'fizz_buzz_encode' function is providing either of 4 classes to particular number to prepare training output label.
- For compilation of model I have tried different optimizers and loss method but 'Adam' optimizer and 'sparse_categorical_crossentropy' loss function is giving far better results. For other optimizers and loss functions accuracy remains at 53% or even below that even for large number of epoch. I am training model based on accuracy.
- 'Model.fit' is setting parameters of model according training input and output.
- I tried different variation of epoch and batch size to find optimal solution. Different test data are given below. Finally I have used 100 epochs with 20 batch size.
- I have trained this model with 101 to 1000 as input in binary form and corresponding output class. I have tested this model on 1 to 100 number it is giving 98% accuracy.

Epochs(Batch 25)	Training Accuracy	Test Accuracy
25	74.67	74
50	94.11	86
100	100	94
125	100	91
150	100	89
Epochs(Batch 30)	Training Accuracy	Test Accuracy
25	64.33	56
50	97.56	92
100	100	92
125	100	95
150	100	90
Epochs(Batch 20)	Training Accuracy	Test Accuracy
25	64.33	56
50	97.56	92
100	100	98
125	100	96
150	100	97