Deep Learning Project - I Report by Abhishek Kumar (Sr. no. 15648)

1. Problem Statement:

FizzBuzz Task. 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.

Solution

2) **Method 1 (Software1 method)** : Implemented the below fizzbuzz algorithm in python using if-else statements.

Result: fizzbuzz labelled integer
Initialization : low = 1, high = 100 ;
while $low \leq high$ **do**
if low % 15 = 0: print("fizzbuzz");
elif low % 3 = 0: print("fizz");
elif low % 5 = 0: print("buzz");
else: print(low);
low − ;
end

Algorithm 1: FizzBuzz Algorithm

3) **Method 2 (Software2 method)** : Use a neural network to learn fizzbuzz algorithm.
3.1) **Data Pre-Processing**
Training data : binary data from 101 to 1000.
Test data : binary data from 1 to 100.

3.2) **Model Architecture**

Model_1(
(Layer_1): Linear(in_features=10, out_features=100, bias=True, activation = ReLU)
(Classifier Layer): Linear(in_features=100, out_features=4, bias=True, activation = ReLU)
)

Model_2(
(Layer_1): Linear(in_features=10, out_features=100, bias=True, activation = ReLU)
(Layer_2): Linear(in_features=100, out_features=10, bias=True, activation = ReLU)
(Classifier Layer): Linear(in_features=10, out_features=4, bias=True, activation = ReLU)
)

Model_3(
(Layer_1): Linear(in_features=10, out_features=128, bias=True, activation = ReLU)
(Layer_2): Linear(in_features=128, out_features=64, bias=True, activation = ReLU)
(Layer_2): Linear(in_features=64, out_features=32, bias=True, activation = ReLU)
(Layer_2): Linear(in_features=32, out_features=16, bias=True, activation = ReLU)
(Classifier Layer): Linear(in_features=16, out_features=4, bias=True, activation = ReLU)
)

Loss Function : Cross-Entropy Loss

3.3) **Model hyperparameters (1) :**

Optimizer	Adam
Learning Rate	0.01
Adam β_1	0.90
Adam β_1	0.98
Seed	100

Result

Model 1 result		
Batch Size	Epochs	Accuracy
32	200	94.00
32	**300**	**97.00 (Best Model)**

Model 2 result		
Batch Size	Epochs	Accuracy
32	200	90.00
32	500	95.00

Model 3 result		
Batch Size	Epochs	Accuracy
32	200	79.00
32	500	81.00
32	1000	86.00

Model hyperparameter (2)

Optimizer	SGD
Learning Rate	0.01
Momentum β_1	0.90
Seed	42

Result

Model 1 result		
Batch Size	Epochs	Accuracy
32	200	88.47

For other model types similar results is observed.

The accuracy of the best model is **97.00**. It was able to identify every buzz integer except 1 (integer 20) , similarly for fizz it was able to identify every intger except 2.