IT416: Topics in Deep Learning

Assignment 1 : Working with Tensorflow 2.0

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29th August 2020

1 Learning Outcome

At the end of this assignment you will learn how to apply basic mathematical operations using Tensorflow 2.0

2 Problem Description

Before starting to implement projects in Deep Learning, working with Tensorflow 2.0 to get the basic essence of the library is a must. In this assignment, we will learn how to implement a numeric series in tensorflow and cross checking the results. Also, try to use as much as tensorflow 2.0 functions possible rather than mathematical functions which are available in python.

3 Implementation

3.1 Exercise

We will implement some number series as given below:

- The following series needs to be implemented taking n upto 20,50,100 terms (3 separate observations). In the function $f(x)$, the variable x varies between 0 and π

$$f(x) = \frac{2}{\pi}\left[1 - \sum_{n=2}^{\infty}\left\{\frac{1 + (-1)^n}{n^2 + 1}\cos(nx)\right\}\right]$$

- Implement the maclaurin series for the following function as given below by taking n upto 2,5 and 10 (3 separate observations)

$$f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n}}{(2n)!}$$

- Same for the series below, take n upto 2, 5 and 10.

$$f(x) = \sum_{n=0}^{\infty} \frac{(2n)!}{4^n (n!)^2 (2n+1)} x^{2n+1}$$

3.2 Instructions

- You need to implement the above 3 number series in Tensorflow 2.0

- For the 1st one take x in the interval mentioned and print the $f(x)$ value for terms upto 20, 50 and 100.

- For the 2nd and 3rd series you can take any fixed value of x and print the $f(x)$ value for terms upto 2, 5 and 10.

- Therefore, there should be 3 outputs for each series

4 REFERENCES

- https://www.tensorflow.org/api_docs/python/tf/math

- https://towardsdatascience.com/tensorflow-a-hands-on-approach-8614372f021f

5 SUBMISSION

- You have to submit your assignment in Google Colab notebook (.ipynb file) with proper comments and explanation of your approach.

- Your filename should be named as **LabAssignment1_StudentId** . If your id is 202011001 then filename will be **LabAssignment1_202011001.ipynb**

- The submission deadline for this assignment is **29th August 2020 11 pm**