Assignment#4(Predictive Modeling)
15 Points
Due Date: 24 March 2023

Instructions:

Answer all questions.

Q1. **(Points: 5)**

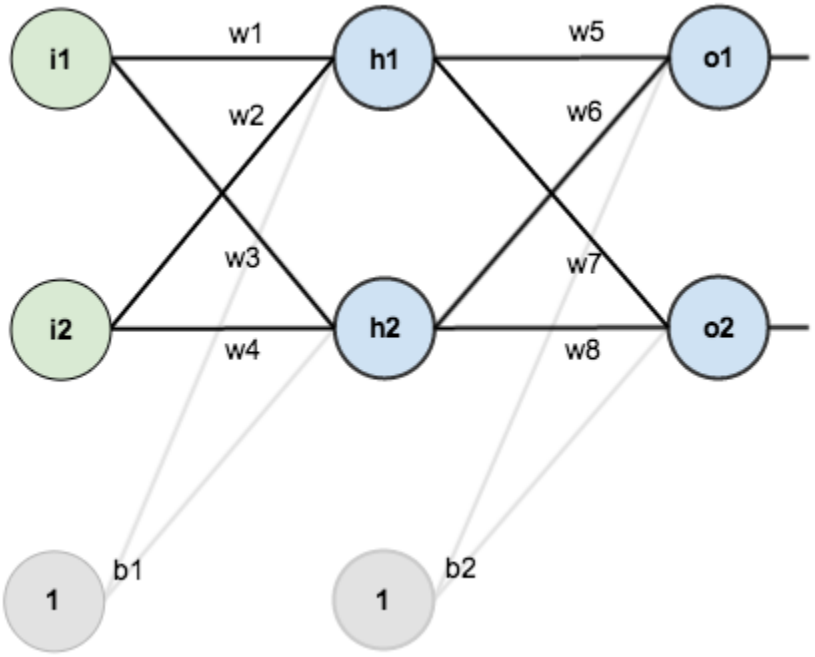

Figure 1: Neural Network

You are provided with a simple NN as shown in Figure 1. The inputs, target output and initial weights of the network are as below:

i1= .05
i2= .10
o1= .01
o2= .99
b1= .35
b2= .60
w1= .15
w2= .20

w3= .25
w4= .30
w5= .40
w6= .45
w7= .50
w8= .55

Find the updated weights of **w7 and w3** after the first iteration of your NN training.
Use the learning rate for gradient descent as 0.5.
Round all calculation to nine decimal digits.
Students should show detailed calculation for each step. Just the final results will not be accepted and will lead to a grade of zero.
Note: This exercise is a continuation of what we have seen in Week-7 class.
Please check the PPT(posted in Week-7 PPT folder) that was provided for the same before attempting the exercise. In the PPT you could see how I updated the weights for w5 and w1. You can reuse the forward propagation values from the PPT of week-7 and no need to redo the forward propagation.

Q2. **(Points:5)**
Build a neural network model using Keras for debates dataset. Instruction in the jupyter notebook file.

Q3. **(Points:5)**
Build a Hierarchical clustering for 'retail_customers.csv' dataset. Instruction in the jupyter notebook file.

Submission Format: In the DC Connect, post the following:

1. A word document with answers to question 1.
2. A ran jupyter notebook file for question 2 and 3. Use the markdown cell in jupyter notebook to explain your findings. Use the Code cell in jupyter notebook to write the python code.
   [Any submission other than the format of a notebook file(.ipynb) will be graded to zero.]

Assignment Rubric:

	Exceeds Expectations (9-10 points)	Meets Expectations (7–9 points)	Approaches Expectations (5–7 points)	Fails to meet Expectations (0-5 points)
Assignment Criteria	Assignment guidelines have been followed completely.	Assignment guidelines have been followed but 1 or 2 items missing.	Assignment guidelines have been followed more than two items.	Assignment guidelines have not been followed.
Organization of submitted documents	Assignment is exceptionally well organized.	Assignment is thoughtfully organized.	Some order/organization to submission but still some areas are unclear.	Assignment is disorganized and hard to follow.
Communication and Presentation of submitted documents	Superior communication	Reasonably understandable	Understandable with minor effort	Difficult to understand
Approach	The approach is well defined, clearly explained in detail and well formatted	The approach is well-defined, high-level explanation is given and well formatted	The approach has some flows, high level explanation is given and not well formatted	The approach has many flows, no explanation is given and not well formatted
Code	Code is run successfully, well documented, and complete	Code is run successfully but no documentation provided	Code has some flows and no documentation	Code is missing

Academic Integrity and Late submission:

Assignments are due by the due date announced in class and posted on DC Connect. At his or her own discretion, and depending on the nature of the assignment, each professor will provide a facility for the submission of late assignments up to a maximum of 72 hours after the assignment due date. All allowed late submissions will be assessed a penalty of 25% of the total possible grade for the assignment. Assignments should be submitted on time, on a regular basis, to enable you to stay on track within the class.

Any violation of academic integrity will not be accepted and will be given a grade of zero (0) and reported. Find more information on academic integrity here

https://durhamcollege.ca/mydc/learning-resources/academic-integrity