

Assignment 1

Due Date: 23:59 Nov 2, 2024

Part 1 In the lecture we have introduced a simple artificial neural network called Perceptron (Chapter 2 Machine Learning Basics Pages 31-38). This question asks you to implement your own Perceptron module to predict two classes namely, 1 and -1 by using Python. You may refer to the following program skeleton:

```
#Task 1: import the necessary libraries

#Perceptron class
class Perceptron():

    #Constructor
    def __init__(self, eta=0.01, n_iter=50, random_state=1):
        #Task 2: initialization

    #Training
    def fit(self, X, y):
        #Task 3: train the perceptron

    #Net input
    def net_input(self, X):
        #Task 4: calculates the net input

    #Decision
    def predict(self, X):
        #Task 5: make the binary decision/prediction
```

Save your program as perceptron.py.

Part 2 Write a Python program to apply your Perceptron module to the Iris dataset in Google Colab. Firstly, upload your self-implemented Perceptron module by the following code:

```
from google.colab import files
uploaded = files.upload()
```

After uploading your Part 1 file. You can import the file and able to construct objects of the class Perceptron in your program. Next, you are required to import the data directly from the following link:

<https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data>

In this dataset, it contains the measurements of 150 Iris flowers from three different species: Setosa, Versicolor, and Virginica. Throw away the rows for Virginica. And only consider the sepal length and petal length in the dataset. Show your updated dataset in your code. Then, apply your binary Perceptron classifier to predict the two classes (Setosa and Versicolor). Show the accuracy of your method.

Submit 2 files to Assignment 1 (perceptron.py file for Part 1 and a Jupyter Notebook where programs in code cell and you may add some explanations in the text cell for Part 2). Please note that the ipynb file should already be run on Google Colab with clear output data. All the submissions via Moodle.