Lab -7

PRML
AY 2020-21 Trimester - III

April 19 , 2021
Deadline: April 25 , 2021, 11:59

Neural Network and Clustering

Q1: The objective of this assignment is to learn to implement Multi Layer Perceptron (MLP) from scratch using python. For this a nice tutorial has been provided in Resource-1. After implementing MLP from scratch, you need to compare it with Sklearn's in-built implementation (resource-2). For this you are supposed to use wheat seeds dataset provided in resource 1. (25 points)
Resource:
1. Link

2.https://scikit-learn.org/stable/modules/generated/sklearn.neural_network.MLPClassifier.html

Q2: You may use the MNIST dataset or any dataset for Face Images or Flower Images or Iris dataset for this Question.
Implement k-means clustering. Analyse the clusters formed for various values of k. Display the centroids of the clusters. DO NOT USE IN_BUILT ROUTINE for k-means clustering. (25 points)
Resource:
https://www.analyticsvidhya.com/blog/2019/08/comprehensive-guide-k-means-clustering/

Q3: This is a optional question
Please go through the following blog to learn how to recognize handwritten digits using Neural Network. Here Neural Network is coded using PyTorch Library in Python.
Code Link:
Resource:
https://towardsdatascience.com/handwritten-digit-mnist-pytorch-977b5338e627

Use above code and report your observation based on the following:
(i) Change loss function,
(ii) Change in learning rate, and
(iii) Change in Number of hidden layers
Note: You can scikit learn libraries to implement this question.