PGP in AI/ML

Regression - Assignment 1

Submission Date: 2359hrs on 22-06-2019

Total Marks: 12

1. The following questions are to enhance your understanding of basic concepts and definitions. You are expected to answer these questions on your own without referring to internet. [3 Marks]

a. Give three business applications of Machine Learning and three business applications where there is no Machine Learning or it cannot be applied.

b. Give three examples of unsupervised learning.

c. What are the differences between classification and regression problems? Give three examples of classification and regression.

2. Suppose there is a learning problem that predicts money generated through sales given the money that is spent on advertisement. Suppose you are given four data points. [3 Marks]

S.No.	Advt (in lakhs)	Sales (in lakhs)
1	40	920
2	30	790
3	25	700
4	18	580

Find the error function that is used in simple linear regression for this example?

3. The objective of this assignment is to harness your python programming skills. It also helps to improve your understanding of solving the system of simultaneous equations using matrices. [6 Marks]

Suppose there are three simultaneous equations in three variables.

$a_{11} x_1 + a_{12} x_2 + a_{13} x_3 = b_1$

$a_{21} x_1 + a_{22} x_2 + a_{23} x_3 = b_2$

$a_{31} x_1 + a_{32} x_2 + a_{33} x_3 = b_3$

Find the matrix equivalent equation of the simultaneous equations (matrix equivalent equation is Ax= b).

Write Python program to find the determinant of the matrix, A. Discuss consequences of the two cases - determinant of the matrix being zero and non-zero while solving equations.

If determinant is non-zero then find the solution of the system of equations by finding A^{-1} (No API of python should be used to find the inverse of A).

Input:

Read from a file “input.txt” having 3 rows and 4 columns.

The content in the input file should be as follows:

a_{11} a_{12} a_{13} b_1

a_{21} a_{22} a_{23} b_2

a_{31} a_{32} a_{33} b_3

Output:

Solution of the system of equations to be written in a file “output.txt” if determinant is non-zero.

Submissions:

Solutions or answers to all questions (excepting programming problems) should be submitted in a word document named “Id No.doc” (Id No is your identity number of this programme).

All python code should be submitted in the file named "Id No.py".