**TutLab-2**

**CS 403/ CS 603, Machine Learning Lab**

**Linear Regression**

**Ques 1:**

For the given dataset

|  |  |  |
| --- | --- | --- |
| x1 | x2 | y |
| 2104 | 5 | 460 |
| 1416 | 3 | 232 |
| 1534 | 3 | 315 |

**Numerical Part:**

a) Design matrix X.

b) Find the parameter of “Theta”.

c) What is the time complexity of closed form solution.

**Programming Part:**

a) Write the code for closed form solution.

b) Write the code for Gradient descent solution.

**Ques 2:**

For the given dataset

|  |  |  |  |
| --- | --- | --- | --- |
| x1 | x2 | x3 | y |
| 2104 | 5 | 10 | 460 |
| 1416 | 3 | 6 | 232 |
| 1534 | 3 | 6 | 315 |

**Numerical Part:**

a) Design matrix X.

b) Find the parameter of “Theta” if possible.

**Programming Part:**

a) Write the code for closed form solution (if matrix inverse is not possible then use pseudo inverse).

b) Write the code for Gradient descent solution.

**Ques 3:**

For the given datasetFor the given dataset

|  |  |  |
| --- | --- | --- |
| x1 | x2 | y |
| 2104 | 5 | 460 |
| 1416 | 3 | 232 |
| 1534 | 3 | 315 |

**Numerical Part:**

Apply any one way of feature scaling for the above problem.

**Programming Part:**

a) Apply feature scaling and write the code for closed form solution.

b) Apply feature scaling and write the code for Gradient descent solution. Compare the convergence with question 1(b).

**Ques 4:** For the questions 1 and 3, use large available database (such as database available in UCI machine learning repository), and check the working of your code.