

Machine Learning Lab

Practical: 60 Lectures

For practical Labs for Machine Learning, students may use softwares like MABLAB/Octave or Python. For later exercises, students can create/use their own datasets or utilize datasets from online repositories like UCI Machine Learning Repository (<http://archive.ics.uci.edu/ml/>).

- ✓ 1. Perform elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation.
- ✓ 2. Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR).
- ✓ 3. Create, initialize and display simple variables and simple strings and use simple formatting for variable.
- ✓ 4. Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix.
- ✓ 5. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope.
- ✓ 6. Perform basic operations on matrices (like addition, subtraction, multiplication) and display specific rows or columns of the matrix.
- ✓ 7. Perform other matrix operations like converting matrix data to absolute values, taking the negative of matrix values, adding/removing rows/columns from a matrix, finding the maximum or minimum values in a matrix or in a row/column, and finding the sum of some/all elements in a matrix.
- ✓ 8. Create various type of plots/charts like histograms, plot based on sine/cosine function based on data from a matrix. Further label different axes in a plot and data in a plot.
- ✓ 9. Generate different subplots from a given plot and color plot data.
- ✓ 10. Use conditional statements and different type of loops based on simple example/s.
- ✓ 11. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.
- ✓ 12. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house.
- ✓ 13. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house.
- ✓ 14. Implement a classification/ logistic regression problem. For example based on different features of students data, classify, whether a student is suitable for a particular activity. Based on the available dataset, a student can also implement another classification problem like checking whether an email is spam or not.
- ✓ 15. Use some function for regularization of dataset based on problem 14.
- ✓ 16. Use some function for neural networks, like Stochastic Gradient Descent or backpropagation - algorithm to predict the value of a variable based on the dataset of problem 14.

3 (b) Introduction to Data Sciences

Total Marks: 150