C-M-005: Machine Learning I Lab. '20-21

Class Hours: Th – 11:30 to 14:30

Instruction:	Dr. Ravi Kothari (`ravi.kothari@plaksha.org`)
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1 Introduction

This lab.is intended to be taken alongside CM-004 (Machine Learning I). While, CM–04 is designed to give you a strong foundation in the basics of Machine Learning, CM-005 takes each of the concepts covered in CM-004 and implements them to enable you to understand the concepts even better and to prepare you to be able to apply those concepts in constructing solutions to complex problems.

2 Prerequisites and Corequisites

Prerequisites: Computer Programming (C-M 001), Basic Probability, Calculus and Linear Algebra (C-M 002)

   Co-requisites: CM-004 Machine Learning I

3 Required Reading

- `https://numpy.org/doc/stable/user/quickstart.html`

- `https://docs.scipy.org/doc/scipy/reference/tutorial/`

- `https://matplotlib.org/tutorials/`

- `https://scikit-learn.org/stable/tutorial/index.html`

- Jupyter notebooks that will be provided from time to time

- A. Geron, "Hands-on Machine Learning with Scikit-Learn, Keras, & TensorFlow," O-Reilly, 2019

4 Topics and Schedule

Date	Topic	Deadline/Remarks
Oct. 15	Basics, Loss Functions, Taylor Series	
Oct. 22	Regression (Linear, Logistic, Ridge, Lasso, ...) and Classification	
Oct. 29	Multi-Layered Perceptrons	
Nov. 5	Embeddings	
Nov. 12	Decision Trees	Project given
Nov. 19	Project due (No extensions)	

5 Grading

Each Lab. will begin with an illustration of the concept to be covered in that session. This will typically extend to somewhere between an hour and an hour and a half. In the remainder of the time, you will given an assignment that you must turn in by midnight of that day (there are no extensions so you must turn in the assignment in whatever form it is in).

- **Each of the 5 assignments contribute** 15% **to the overall grade**.

- The project will be given to you on Nov. 12 and will consist of a complex problem that you will need to solve (could even be a Kaggle competition). You need to turn in your projects by midnight of Nov. 19. The marks you get will be based on the performance of your solution. The highest grade will be given to those who achieve the best performance (assuming that it is above a threshold performance), the next grade to the ones who achieve the next highest performance and so on. **The project will contribute** 25% **to the overall grade**.

- No makeups or extensions. The time allocated has pre-factored and allows a generous buffer to be able to submit in the presence of temperamental internet connections etc. Exceptions need to be supported

by documentary evidence and the bar for something to qualify as an exceptional circumstance is very high!

- You are encouraged to discuss concepts with colleagues but you must construct and write solutions and program independently. Copying and the use of any unfair means will result in an F grade for the course for everyone involved (the individual(s) who copied and the individual(s) who allowed the copying to occur). Please do not do it.