CS 5691: Pattern Recognition and Machine Learning

July.-Nov Semester 2019
‘G’ Slot; CS-26 *

Slots are: Mon (12 – 12.50pm); Wed (4.50 – 5.40pm); Thu (10 – 10.50am); Fri (9 – 9:50 am);
Prof. Hema Murthy, Dr. Arun Rajkumar;
Email: hema@cse.iitm.ac.in, arunr@cse.iitm.ac.in

Updated on July 29, 2019

Note: Course related communications will be on IITM Moodle site (CS5691); please regularly check the email that is linked to your email account.

1 Learning Objectives

• Obtain a clear understanding of various paradigms of machine learning including supervised and unsupervised learning.

• Given a real world problem involving data, develop ability to pose it as a relevant machine learning problem.

• Implement machine learning algorithms from first principles, tune associated parameters and analyze their performance.

• Understand key differences and similarities, pros and cons of various algorithms

• Understand the theoretical/statistical underpinnings of what it means to learn from data.

2 Course prerequisite(s)

Ability to do basic programming. CS2800 – or equivalent. Linear algebra, Probability and calculus at an undergraduate level.

3 Classroom Mode

Traditional 50 minute classroom lectures.

*The course is offered by both Dr.Arun Rajkumar and Prof. Hema Murthy in separate classes. This handout is for Dr.Arun Rajkumar’s offering.

4 Textbooks


5 Course Requirements

You are required to attend all the lectures. If you miss any of them it is your responsibility to find out what went on during the classes and to collect any materials that may be handed out.

Class participation is strongly encouraged to demonstrate an appropriate level of understanding of the material being discussed in the class. Regular feedback from the class regarding the lectures will be very much appreciated.

6 Planned Syllabus

A selected subset of topics from the course webpage will be covered including the following but not necessarily in the order listed below:

1. Bayesian decision theory
2. Linear models for regression and classification
3. Support Vector Machines and kernel methods
4. Decision tree based methods
5. Expectation Maximization and associated algorithms
6. Unsupervised learning methods including various clustering algorithms
7. Maximum likelihood, Bayesian estimation
8. Selected advanced topics
7 Tentative Grading Policy

The following allocation of points is tentative. These may change during the semester with prior notice.

- In-class quizzes (4 (best 3 will be considered)): 20 (15) %
- Programming assignments (3 (4)): 30 (40)%
- Mid Semester Exam (Mon., Sep 30): 20%
- Final Exam (Mon., Nov 25): 30 (25)%

8 Academic Honesty

Academic honesty is expected from each student participating in the course. NO sharing (willing, unwilling, knowing, unknowing) of assignment code between students, submission of downloaded code (from the Internet, Campus LAN, or anywhere else) is allowed.

Academic violations will be handled by IITM Senate Discipline and Welfare (DISCO) Committee. Typically, the first violation instance will result in ZERO marks for the corresponding component of the Course Grade and a drop of one penalty in overall course grade. The second instance of code copying will result in a ‘U’ Course Grade and/or other penalties. The DISCO Committee can also impose additional penalties.

Please protect your Moodle account password. Do not share it with ANYONE. Do not share your academic disk drive space on the Campus LAN.