Foundations of Machine Learning (CS725)

Instructor: Saketh

1 Goals, Scope and Syllabus

This is an introductory course on Machine Learning. The focus is on foundations and fundamentals rather than giving a bird's eye-view of machine learning algorithms. Hence the development is technical, with enough motivation provided wherever necessary. Knowledge of probability theory and statistics is very essential. Additionally, it will be helpful if the student is familiar with basic engg. maths including Linear Algebra, Multi-variate Calculus and Optimization thoery.

The syllabus is as displayed on asc and there are mainly two textbooks for this course:

- Foundations of Machine Learning by M. Mohri, A. Rostamizadeh, and A. Tahwalkar. Published by MIT Press, 2012. This will mainly be used for Kernel methods related topics.

- Machine Learning: A Probabilistic Perpective by Kevin Murphy. Published by MIT Press 2012. This will mainly be used for topics related to probabilistic models.

After crediting this course the student should be capable of pursuing research problems in the field of machine learning or its applications. He will be familiar with some well-celebrated and basic models/algorithms for learning.

2 Evaluation Scheme

The course will have two quizes and one midsem and one endsem. The quizes will have simple questions that can be answered if lectures, lecture-notes, references are carefully studied. The midsem and endsem will however involve thought-oriented questions that test the understanding of the important concepts taught. There will be periodical computer simulation assignments that will teach pragmatic aspects of applying machine learning on simple applications.

The final grade will be an "average" of those obtained in Midsem and Endsem alone. In particular, if a student misses any one of these, he will be awarded an FR. Performance in quizes and assignments will act as barriers to get higher

grades. For e.g. a score below 10/30 in quiz1 may simply bar the student from getting any grade higher than BC etc. Such barrier rules will be announced as and when required.

3 Contact

The course page is at http://www.cse.iitb.ac.in/saketh/teaching/cs725.html. Instructor's office: No. 306, Kanwal Rekhi Building. The instructor can also be contacted via phone: x7903 or email: saketh at cse anytime or using moodle interface. All communications to the students will be sent through moodle. All lecture notes will be posted on the course page, while the assignments will be posted through moodle.