SYLLABUS FOR CS 767, FALL 2018

Summary

Theories and methods for automating and representing knowledge with an emphasis on learning from input/output data. The course covers a wide variety of approaches, including Supervised Learning, Neural Nets and Deep Learning, Reinforcement Learning, Expert Systems, Bayesian Learning, Fuzzy Rules, and Genetic Algorithms. Each student focuses on two of these approaches and creates a term project.

Prerequisites

MET CS 566 or instructor's consent.

Learning Objectives

Students will accomplish the following.

(1) Understand the goals of Machine Learning and Expert Systems

(2) Understand the main ML technologies

(3) Implement more than one of these techniques in a significant manner

Syllabus

The order of the following topics is 90% certain. They are subject to change according to student background and rapidly emerging technology.

1. September 5: Introduction I (The Introduction will enable you to pick a tentative term topic)

2. September 12: Introduction II

3. (NOTE) September 26: Learning from Data; Unsupervised Learning; k-means; Learning with Neural Nets I

4. October 3: Introduction to TensorFlow

5. October 10: Learning with Neural Nets II

6. October 17: Deep Learning

7. October 24: Creating Rules

8. October 31: Learning and Applying Fuzzy Rules

9. November 7: Genetic Algorithms I

10. November 14: Genetic Algorithms II; Decision Trees

11. November 28: Bayesian Learning; Dealing with Uncertainty

12. December 5: tbd

13. December 12: Project presentations

Readings

1. ========

Introduction I: Textbook Chapter 3 pp 39-43 and Chapter 8 p169

2. ========

Introduction II: Textbook Chapter 1 and Chapter 10 pp 211-214

3. and 4. ===

Unsupervised Learning: 281

k-means: pp 282-287
Learning with Neural Nets I : pp 15-20, 43-49

5. ========

TensorFlow: https://www.tensorflow.org/get_started/get_started_for_beginners

Neural Nets: pp 73-85

9,10. =====

Primary: Chapters 10.1 and 10.2

Secondary: Chapter 10.3

11 ========

Chapters 2.3 and 16.1

Textbook and Other Source Book

We'll use parts of "Machine Learning" by Marsland (2nd edition) ISBN-13: 978-1466583283.

A good book on deep learning is “Fundamentals of Deep Learning” by Buduma (O’Reilly). This is recommended if you select a deep learning project, and especially if you use Tensorflow.

Contacting Me and our Course TA

e-mail ==========>ebraude@bu.edu

In person ==========>

Wednesdays
3:45 pm - 4:45 pm in my office

4:45 pm - 5:45 pm in Starbucks, Questrom School of Business 595 Commonwealth Ave (i.e., near class)

Phone ==========>Feel free to contact me by phone at (978)806-5724 any time except Friday nights through Saturdays.
Teaching Assistant ==>

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Assignments and Evaluation

Attendance at class: Class discussions and in-class group work is an important part of learning. The percentages below are predicated on virtually full attendance.

Labs: 10%

Project Proposal: 15%

Project Design: 30%

Project Implementation: 45%

There is also the possibility of a joint research project with the instructor. Ask about this option if you are interested in research.

Evaluation of Student Work

Work will be evaluated according to an evaluation matrix. Unless a matrix particular to an assignment is given, the default matrix here will be used. Make sure that your work conforms well to each of the criteria.
The main goal of grading for the course is for each student to improve via feedback.
The average grade of MET graduate students is expected to be very good--B+.
The project phases are graded according to the attached evaluation matrix. These are averaged using A+=97, A=95, A-=93, B+=87, B=85 etc.

To get an A grade for the course, your weighted average should be

>93 for an A

>=90 for an A-
>=87 for a B+
>83 for a B

>=80 for a B- etc.

The lab grades are: Acceptably on track (1), Not yet acceptably on track (0), and Neither (0.5).

Late homework or lab will not be accepted unless there is cause why it was not reasonably possible to perform the work in the time. Extraordinary workloads, illness and emergency conditions will be accepted and documentation will be required. If the reason is acceptable, missing work may be graded on a pass/fail basis.