Topics (1)

1. Introduction
   1.1 What is machine learning?
   1.2 Course overview
   1.3 Types of machine learning
   1.4 Basic concepts

2. Probability
   2.1 Probability theory refresher
   2.2 Bayesian inference primer

3. Logistic regression
   3.1 The logistic regression model
   3.2 Maximum likelihood estimation
   3.3 Maximum posteriori estimation
Topics (2)

4. Naive Bayes
   4.1 The Dirichlet-multinomial model
   4.2 Naive Bayes
   4.3 Naive Bayes for continuous inputs

5. Undirected Graphical Models
   5.1 Introduction
   5.2 Preliminaries
   5.3 Markov network graphs
   5.4 Markov networks
   5.5 Log-linear models
   5.6 Inference

6. Conditional Random Fields
   6.1 Conditional random fields
   6.2 Examples
   6.3 Linear-chain CRFs
   6.4 Training CRFs
Topics (3)

7. Neural Networks
   7.1 Introduction
   7.2 Feedforward neural networks & autoencoders
   7.3 Perceptrons
   7.4 Softmax regression
   7.5 Multi-layer FNNs
   7.6 The Neural Network Zoo
Exams

- Requirement: $\geq 3$ assignments passed
- Oral, 25 minutes, English, no auxiliary material
- We test *understanding*, not learning by heart
- All material relevant (lectures, exercises, assignments)
Ratings (lecture)

Generally well-received, learned a lot.
Points with average rating > 1.5:

1. “recommended literature helped” (mean 1.8, md 1.5)
2. “willingness to tailor lessons to student’s interests” (mean 1.6, md 1)
3. “I understood content” (mean 1.7, md 1)
4. “My previous knowledge was sufficient” (mean 2.0, md 2)
Suggestions and criticisms (lecture)

Disclaimer: I couldn’t decipher everything.

1. Don’t change slides so often
2. Make slides more detailed and comprehensive
3. Tape the course
4. Do a different course
   - Skip the basics (“should be known from the start”)
   - Less topics, but deeper
   - Or make two lectures: one intro to ML, one hot topics
   - Do a deep learning course
   - Focus more on the forefront of research
5. ... or rename lecture to “Explaining the Basics of ML”
6. Dim the room
Ratings (tutorial)

Points with average rating > 1.5:

1. “amount of homework manageable” (mean 1.7, md. 2)
2. “easier due to course material” (mean 1.8, md. 2)
3. “sufficient time available” (mean: 2.2, md. 2)
4. “difficulty appropriate” (mean: 2.7, md. 3)
5. “pace was appropriate” (mean: 1.7, md. 2)
6. “illustrated through examples” (mean: 1.6, md. 2)
7. “willingness to tailor to student’s interest” (mean: 1.8, md. 2)
8. “helped for assignments” (mean: 2.3, md. 2)
Suggestions and criticisms (tutorial)

1. Assignments
   - Do projects / more open-ended assignments instead
   - More practical problems in assignments
   - Assignments too easy (or exercises too hard?) vs. sometimes assignments difficult to solve
   - Earlier in semester
   - Discuss in tutorial (we started this after the evaluation)
   - Provide solutions to assignments
   - Python is inefficient, use C++

2. Exercise
   - Hard to derive solutions yourself
   - Make exercises more balanced (w.r.t. difficulty?)
   - Grade the exercises (so that I am forced to do it)
   - Also: Create incentive for completing exercises
   - Add exercise that repeats basics of last lecture

3. Reduce workload
4. Slow down slightly
5. Less math
Questions for you

1. Separation of lecture and tutorial vs. mixed 3h block?
2. Keep optional/starred exercises?
3. How to get the forum going? (E.g., for assignments)
Help us!

- If you find any bugs in the provided material, let us know
- If you have any other ideas on how to improve the course, let us know
- If you are looking for a student job, let me know
All the best for the exam!