

APPLIED MACHINE LEARNING

LOGISTICS

ROBERT UTTERBACK, (HEAVILY) BASED ON SLIDES BY
ANDREAS MULLER

08/22/18

1

2.1

SYLLABUS

- Course website:
<https://robertutterback.github.io/courses/comp350ml/>

SYLLABUS

2.2

2.2

SYLLABUS

- Course website:
<https://robertutterback.github.io/courses/comp350ml/>
- As usual, everything is there

2 . 2

SYLLABUS

- Course website:
<https://robertutterback.github.io/courses/comp350ml/>
- As usual, everything is there
- Read the policies, look at the schedule, etc.

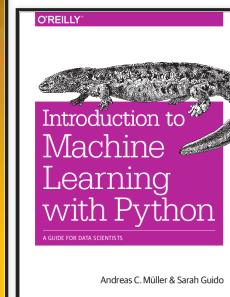
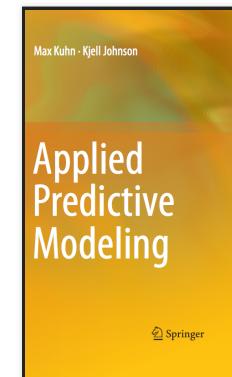
2 . 2

GRADING

- 1 midterm, 20%, 1 final, 20%
- participation: 10% (Socrative)
- 5–7 homework assignments, 50% of total grade
- Most (all?) will involve programming in Python
- 5 late days to apply to assignments (at most 2 for any individual assignment)

2 . 3

BOOKS

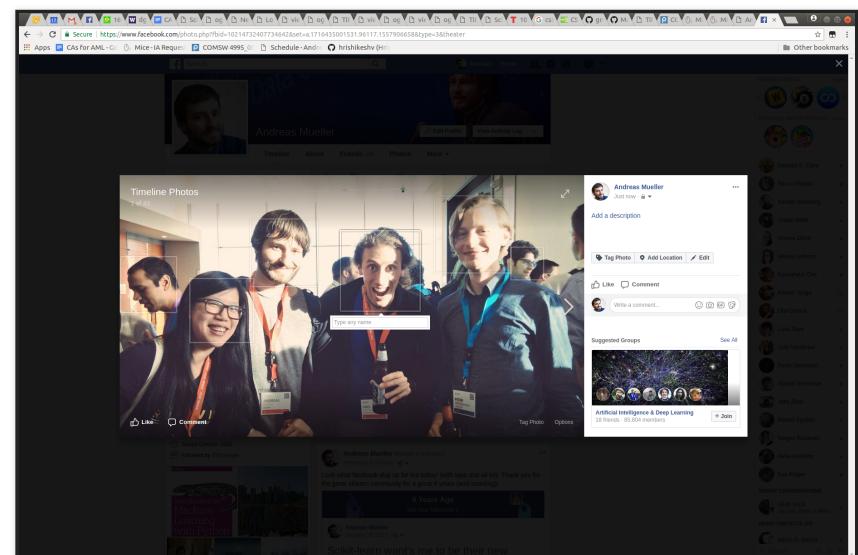
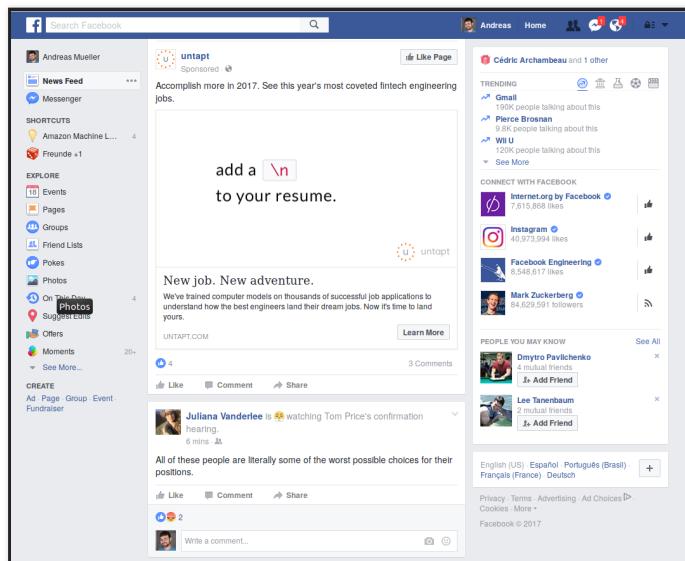


2 . 4

WHAT AND WHY OF MACHINE LEARNING

WHAT IS MACHINE LEARNING?

3.1

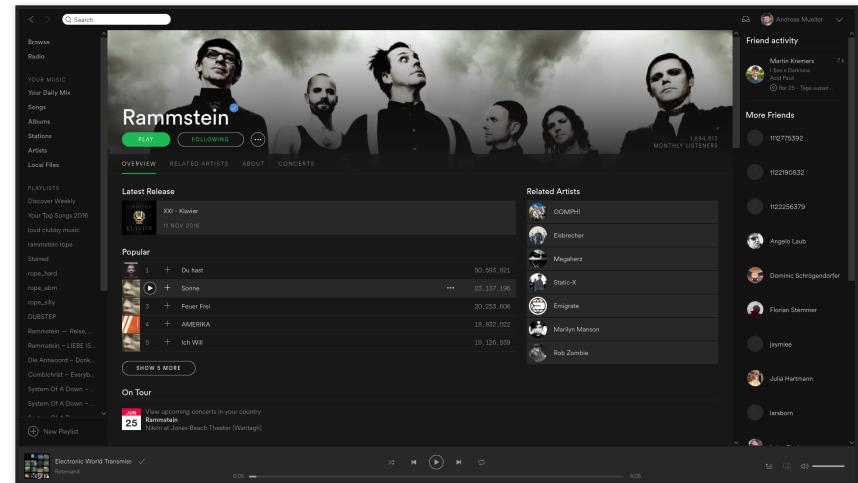


3.2

3.2

3.3

3.4



3.5

3.6

3.7

Introduction to Machine Learning with Python: A Guide for Data Scientists 1st Edition

by Andreas C. Müller (Author), Sarah Guido (Author)

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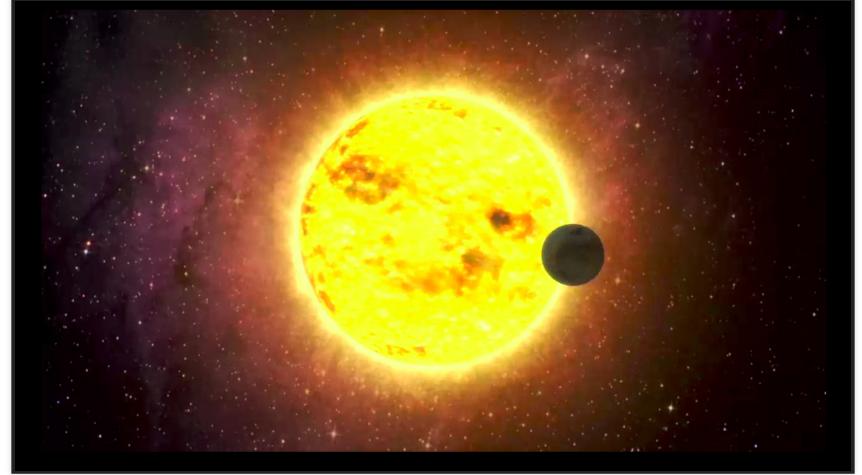
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TYPES OF MACHINE LEARNING

TYPES OF MACHINE LEARNING

- Supervised
- Unsupervised
- Reinforcement



3 . 8

3 . 9

4 . 1

4 . 2

SUPERVISED LEARNING

$(x_i, y_i) \propto p(x, y)$ i.i.d

$$x_i \in \mathbb{R}^p$$

$$y_i \in \mathbb{R}$$

$$f(x_i) \approx y_i$$

EXAMPLES OF SUPERVISED LEARNING

- Testing for diabetes
- Classifying terrain of satellite image
- Automate manual labor

4 . 3

4 . 4

UNSUPERVISED LEARNING

$x_i \propto p(x)$ i.i.d

Learn about p .

REINFORCEMENT LEARNING



4 . 5

4 . 6

REINFORCEMENT LEARNING

- Working with an environment, not a dataset
- Action influence the environment
- Can't look at all possible situation
- no separate data collection and learning

OTHER KINDS OF LEARNING

- Semi-supervised
- Active Learning
- Forecasting
- ...

4 . 7

4 . 8

SUPERVISED LEARNING

CLASSIFICATION AND REGRESSION

Classification

- target y discrete
- Will you pass the class?

Regression

- Target y continuous
- How many points will you get on the final?

5 . 1

5 . 2

GENERALIZATION

Not only $f(x_i) \approx y_i$,
also for new data: $f(x) \approx y$

RELATIONSHIP TO STATISTICS

Statistics	Machine Learning
• model first	• data first
• inference emphasis	• prediction emphasis

5 . 3

5 . 4

OVERVIEW OF THE COURSE

- Infrastructure and basic tools
- Basics of Supervised Learning
- Data Preparation
- Non-linear ML
- Model evaluation
- Decomposition Methods
- Clustering
- Outlier Detection
- Text Data
- Neural Networks
- Time Series Data

QUESTIONS?

6 . 1

7 . 1