

W4995 Applied Machine Learning

Introduction

01/23/19

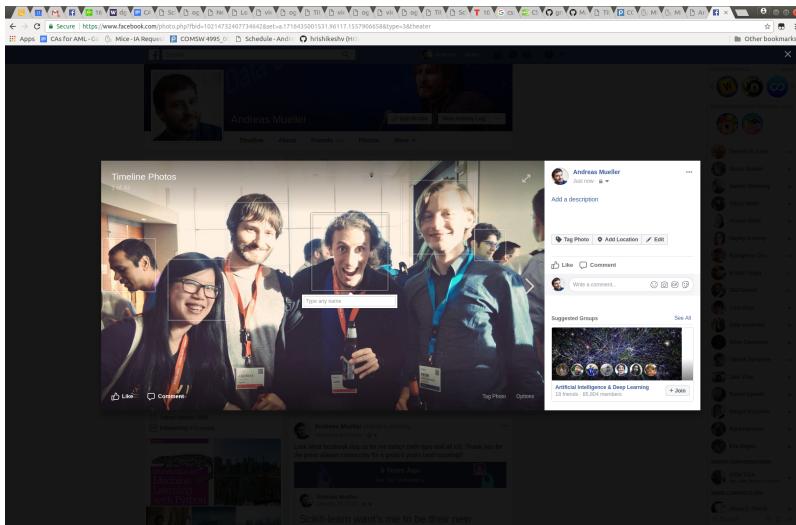
Andreas C. Müller

(Adapted and modified for CC 6021236 @ PCC/Ciencias/UCV by
Eugenio Scalise, July 2019)

What is machine learning?

- Machine learning is about extracting knowledge from data.
- It is a research field at the intersection of statistics, artificial intelligence, and computer science and is also known as predictive analytics or statistical learning.
- The application of machine learning methods has in recent years become ubiquitous in everyday life.

The screenshot shows a Facebook news feed for user Andreas Mueller. At the top, there is a sponsored post from 'untapt' with the headline: "Accomplish more in 2017. See this year's most coveted fintech engineering jobs." Below this, there is a post from Juliana Vanderlee stating: "Juliana Vanderlee is 😊 watching Tom Price's confirmation hearing." The feed also includes a section titled "TRENDING" with links to "Gmail", "Pierce Brosnan", and "Wii U". On the right side, there is a sidebar for "Cédric Archambeau" and a "CONNECT WITH FACEBOOK" section featuring links to "Internet.org by Facebook", "Instagram", "Facebook Engineering", and "Mark Zuckerberg".



Andreas Mueller added 8 new photos.

June 6 at 5:07pm

Bye bye hong kong

Like · Comment · Share

Laura Kastell Looks like such a vibrant city! I bet it was awesome 😊

June 6 at 7:39pm · Like

Write a comment...

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Da ist Abwechslung drin! franziskaner-weissbier.de

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The screenshot shows the Amazon search results for the query "machine learning". The results are filtered to show 1-10 of 21,049 items. The top result is "Practical Machine Learning: Innovations in Recommendation" by Ted Dunning and Ellen Friedman, published on April 17, 2014. The second result is "Machine Learning: The Art and Science of Algorithms that Make Sense of Data" by Peter Flach, published on Nov 12, 2012. The third result is "Understanding Machine Learning: From Theory to Algorithms" by Shai Shalev-Shwartz and Shai Ben-David, published on May 19, 2014. The fourth result is "Learning From Data" by Yaser S. Abu-Mostafa, Malik Magdon-Ismail, and Hsuan-Tien Lin, published on Mar 27, 2012. The sidebar on the left provides various filtering options such as Department (e.g., Books, Kindle Store), Book Series (e.g., Addison Wesley Professional, Morgan Kaufmann), Book Language (e.g., English, French, German, Spanish), and Book Format (e.g., Paperback, Kindle Edition, HTML). The top right corner features a Father's Day banner.

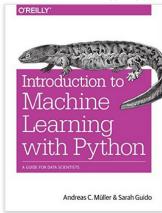
Introduction to Machine Learning with Python: A Guide for Data Scientists 1st Edition

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

★☆☆☆☆

9 customer reviews

Look inside



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Why is ISBN important?

Have one to sell?

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Add to List

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36 New from \$26.53 15 Used from \$29.09

Machine learning has become an integral part of many commercial applications and research projects, but this field is not exclusive to large companies with extensive research teams. If you use Python, even as a beginner, this book will teach you practical ways to build your own machine learning solutions. With all the data available today, machine learning applications are limited only by your imagination.

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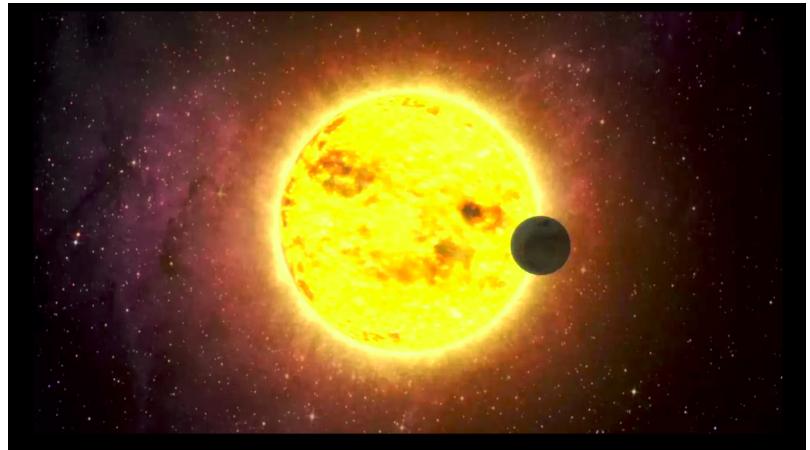


Total price: \$108.29

Add all three to Cart

Add all three to List

Science!



Types of Machine Learning

Types of Machine Learning

- Supervised
- Unsupervised
- Reinforcement

Supervised Learning

$(x_i, y_i) \propto p(x, y)$ independent identically distributed

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

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

$$f(x_i) \approx y_i$$

Generalization

Not only

also for new data:

$$f(x_i) \approx y_i,$$

$$f(x) \approx y$$

Examples of Supervised Learning

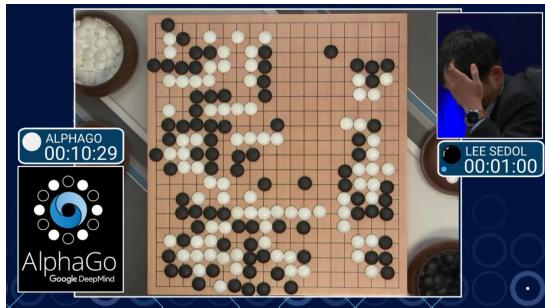
- spam detection
- medical diagnosis
- adp click prediction

Unsupervised Learning

$$x_i \propto p(x) \text{ i.i.d.}$$

Learn about p .

Reinforcement Learning



Classification and Regression

Classification

- target y discrete
- Will you pass?

Regression

- target y continuous
- How many points will you get in the exam?

Relationship to Statistics

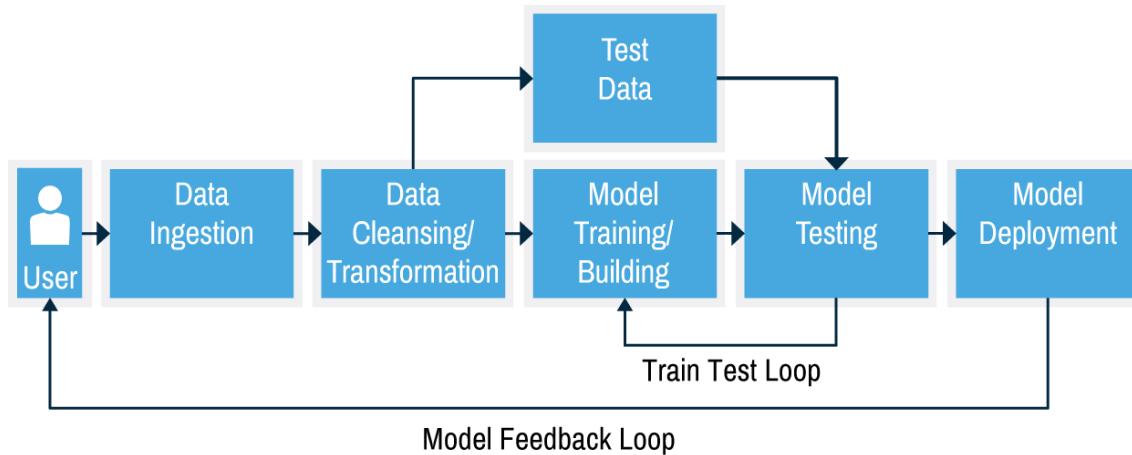
Statistics

- model first
- inference emphasis

Machine learning

- data first
- prediction emphasis

The Machine Learning Work-Flow



Python basics

Why Python?

- General purpose language
- Great libraries
- Easy to learn / use
- Contenders: R (Scala? Julia?)

The two language problem

Python is sloooow...

- Numpy: C
- Scipy: C, fortran
- Pandas: Cython, Python
- Scikit-learn: Cython, Python
- CPython: C

Python 2 vs Python 3

- “current” : (2.7), 3.6, 3.7
- Don't use Python 2

Python ...

Package management:

- don't use system python!
- use Virtual environments
- understand pip (and wheels)
- probably use Conda (and anaconda or conda-forge)

Pip and conda and upgrades

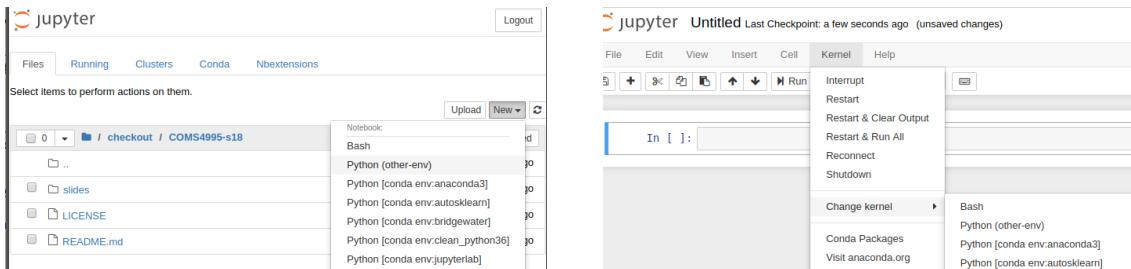
- Pip upgrade works on dependencies (unless you do -no-dep)
- pip has no dependency resolution!
- conda has dependency resolution
- Use conda environments!
- upgrading a conda package with pip (or vice versa) will break stuff!

Environments and Jupyter Kernels

- Environment != kernels
- Use nb_conda_kernels or add environment kernels manually:

```
source activate myenv
python -m ipykernel install --user --name myenv --display-name "Python (myenv)"
source activate other-env
python -m ipykernel install --user --name other-env --display-name "Python (other-env)"
```

- <https://jakevdp.github.io/blog/2017/12/05/installing-python-packages-from-jupyter/>



Dynamically typed, interpreted

- Invalid syntax lying around
- Code is less self-documenting

Editors

- Flake8 / pyflake
- Scripted / weak typing: Have a syntax checker!
- write pep8 (according to the standard, not the tool)
- use autopep8 if you have code lying around

Questions ?