```
38 int Move(string& board, int dir){
39   int row, col;
40   LocBlank(board, row, col);
41   if ((dir==1 || dir == -3) && row > 0){
42     Swap(board, row, col, row-1, col);
43   }
44   else if ((dir == 2 || dir == -4) && col < MAXDIM-1
45     Swap(board, row, col, row, col+1);
46   }
47   else if ((dir == 3 || dir == -1) && row < MAXDIM-1
48     Swap(board, row, col, row+1, col);
49   }
50   else if ((dir == 4 || dir == -2) && col > 0 ){
51     Swap(board, row, col, row, col-1);
52   }
53   else {
54     return -1;
55   }
56   return 0;
```

david ruby

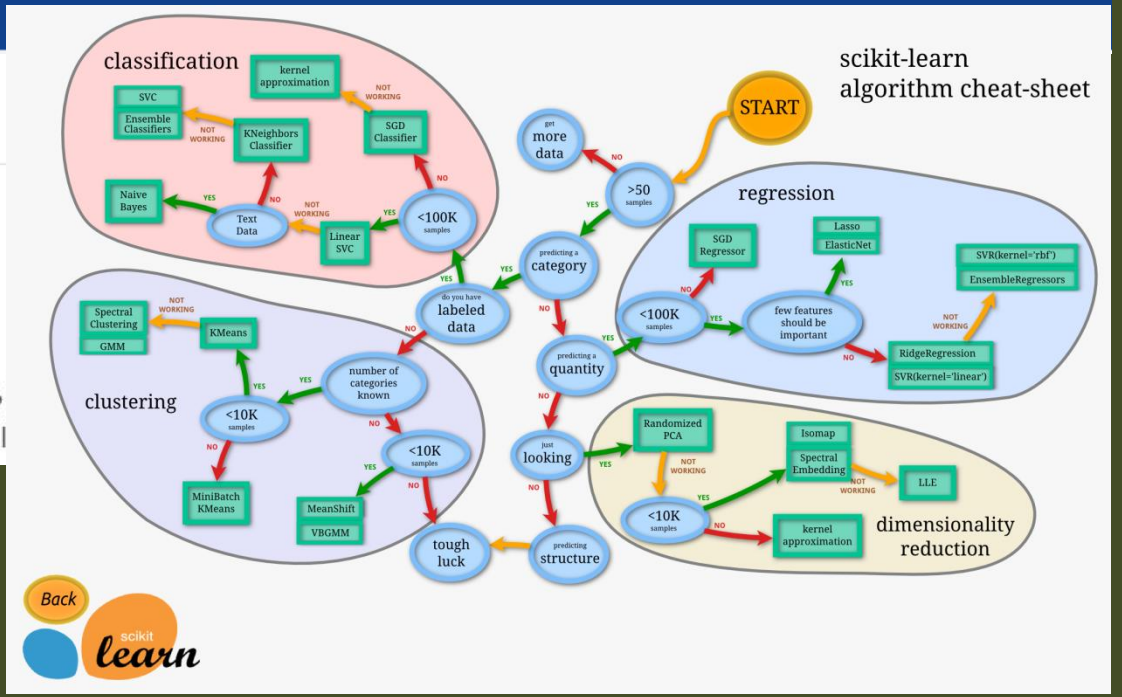
Lecturer at California State University,

California State University, Fresno • UC I

FRESNO STATE | Discovery. Diversity. Distinction.

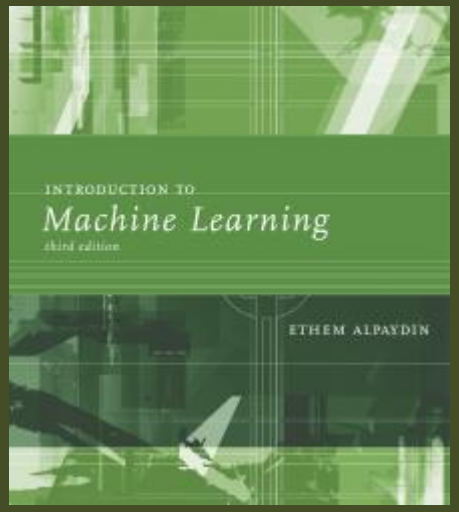
Department of Computer Science

COLLEGE OF SCIENCE AND MATHEMATICS



WELCOME: MACHINE LEARNING

Spring, 2018



Primary Textbook:

INTRODUCTION TO MACHINE LEARNING

3RD EDITION

ETHEM ALPAYDIN

alpaydin@boun.edu.tr
http://www.cmpe.boun.edu.tr/~ethem/i2ml3e

Textbook Author: Ethem Alpaydin

Ethem ALPAYDIN

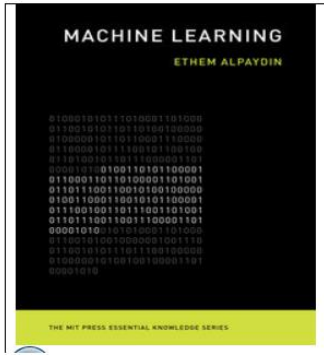
Türkçe

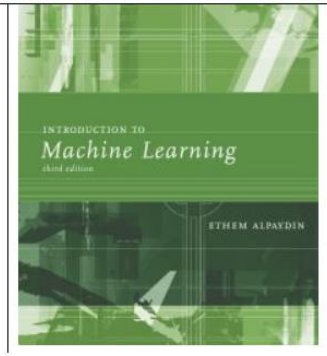
Professor in the
Department of Computer Engineering
Bogazici University

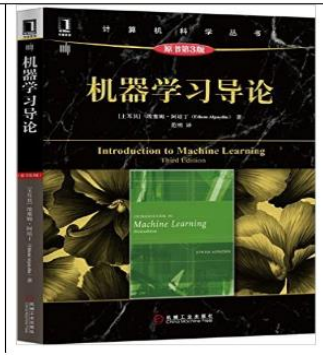
Member of The Science Academy, Turkey

Google Scholar, Semantic Scholar, DBLP, MS Academic Search, ACM Digital Library, Academia.edu, ResearchGate, LinkedIn.

Publications, Talks, Other Writing, Courses, Short Biography, Details







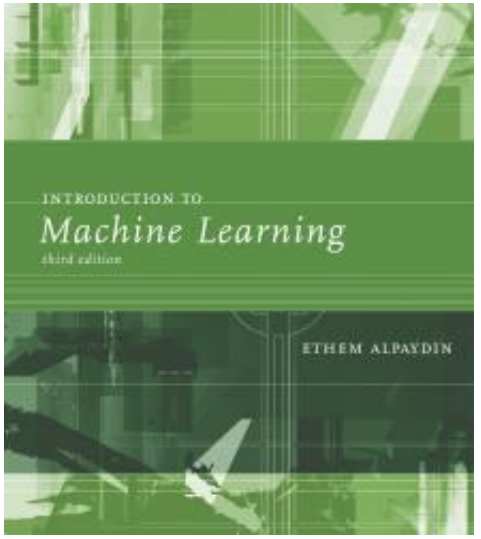
Ethem Alpaydin

+ Follow

Ethem ALPAYDIN is Professor in the Department of Computer Engineering, Bogazici University, Istanbul Turkey and is a member of the Science Academy, Istanbul. He received his PhD from the Ecole Polytechnique Fédérale de Lausanne, Switzerland in 1990 and was a postdoc at the International Computer Science Institute, Berkeley in 1991. He was a Fulbright scholar in 1997. He was a visiting researcher at MIT, USA in 1994, IDIAP, Switzerland in 1998 and TU Delft, The Netherlands in 2014

Textbook:
Introduction To Machine Learning

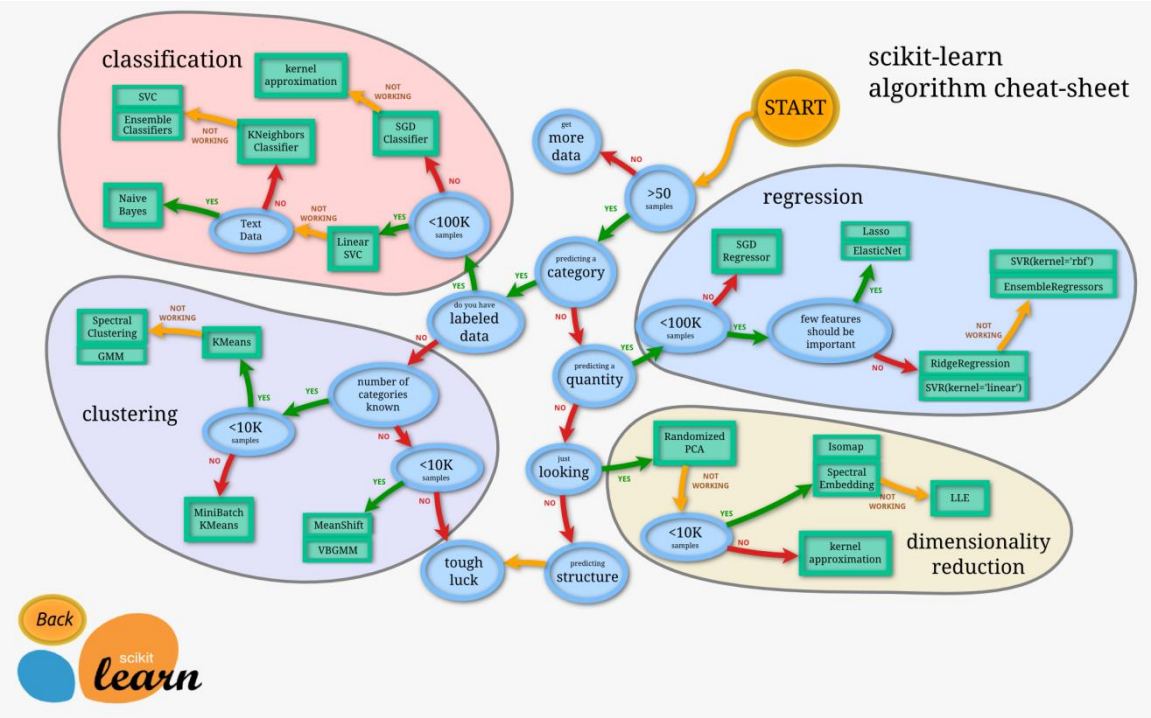
- Need an Academic Roadmap
  - What do Researchers in Field currently view component keys.
- Need References to Key Underlying Concepts
  - How are these key components derived.
- Need to avoid being swamped.
  - Too much technical details prevents progress.



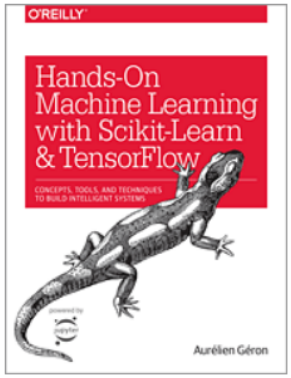
Machine Learning: Getting Going

- Theory alone is difficult to engage.
- New practioners need access routes.
- Gaining Intuition needs algorithm exploration.

Machine Learning Libraries



- Need to combine theory with practice.
- Will be using Scikit-Learn w/ Python
- Need Help Here…!



Hands-On Machine Learning with Scikit-Learn and TensorFlow

Concepts, Tools, and Techniques to Build Intelligent Systems

By Aurélien Géron

Publisher: O'Reilly Media
Release Date: March 2017
Pages: 576

Graphics in this book are printed in black and white.

Through a series of recent breakthroughs, deep learning has boosted the entire field of machine learning. Now, even programmers who know close to nothing about this technology can use simple, efficient tools to implement programs capable of learning from data. This practical book shows you how.

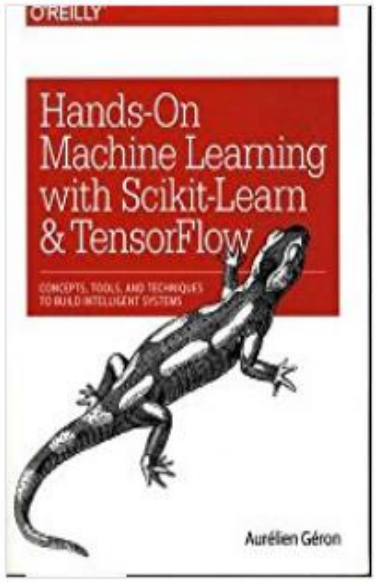
By using concrete examples, minimal theory, and two production-ready Python frameworks—scikit-learn and TensorFlow—author Aurélien Géron helps you gain an intuitive understanding of the concepts and tools for building intelligent systems. You'll learn a range of techniques, starting with simple linear regression and progressing to deep neural networks. With exercises in each chapter to help you apply what you've learned, all you need is programming experience to get started.

- Explore the machine learning landscape, particularly neural nets
- Use scikit-learn to track an example machine-learning project end-to-end
- Explore several training models, including support vector machines, decision trees, random forests, and ensemble methods
- Use the TensorFlow library to build and train neural nets
- Dive into neural net architectures, including convolutional nets, recurrent nets, and deep reinforcement learning
- Learn techniques for training and scaling deep neural nets
- Apply practical code examples without acquiring excessive machine learning theory or algorithm details

SECOND BOOK

Practical Handbook

Second Book: Author: Aurélien Geron



Aurélien Geron

ageron

Machine Learning consultant, former PM of YouTube video classification and founder & CTO of telco operator

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Aurélien Géron

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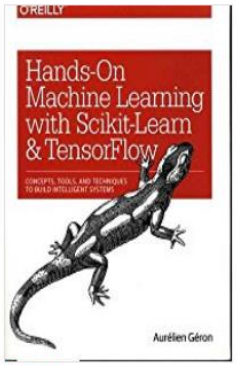

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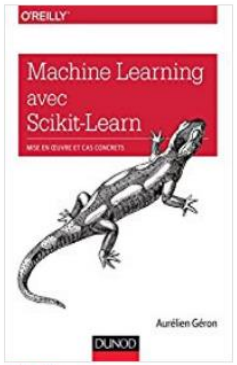

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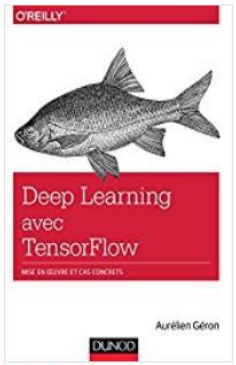

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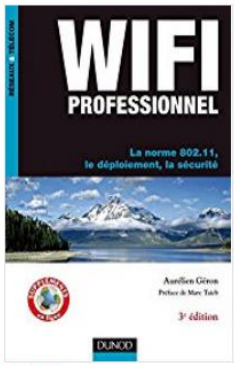

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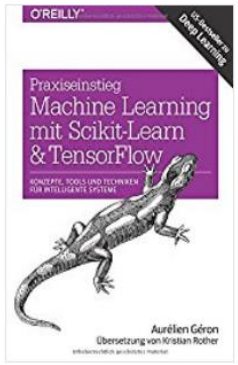


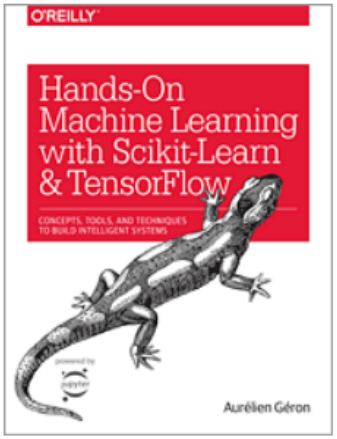
Paperback

Hands-On Machine Learning…

- We'll walk through second book along with theory material from Textbook.

Machine Learning Notebooks

This project aims at teaching you the fundamentals of Machine Learning in python. It contains the example code and solutions to the exercises in my O'Reilly book Hands-on Machine Learning with Scikit-Learn and TensorFlow:

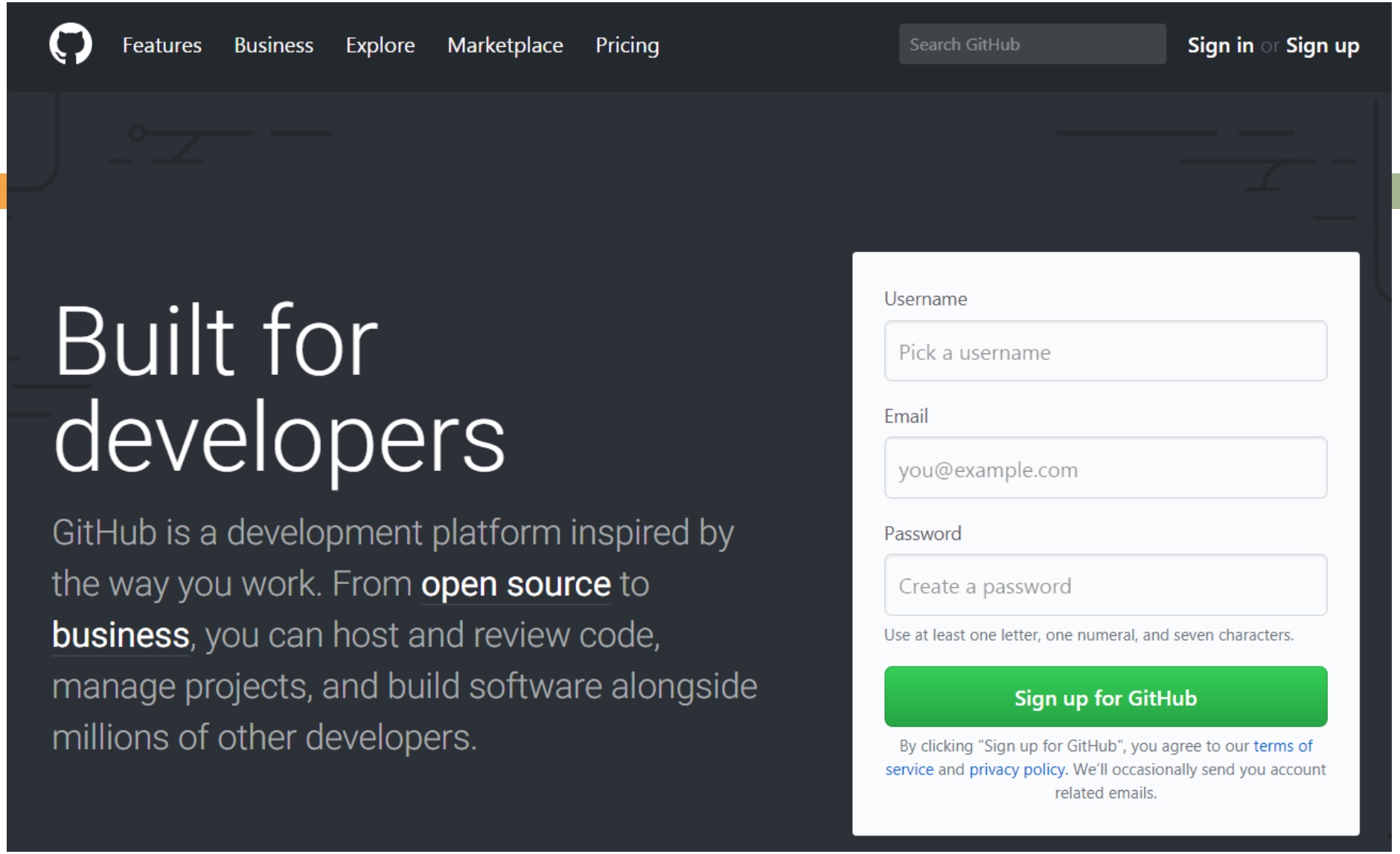


Simply open the Jupyter notebooks you are interested in:

- Using jupyter.org's notebook viewer
  - note: github.com's notebook viewer also works but it is slower and the math formulas are not displayed correctly,
- or by cloning this repository and running Jupyter locally. This option lets you play around with the code. In this case, follow the installation instructions below.

Machine Learning Practice

- Utilize Teams!
- Classes require computer
  - Computers used for quizzes and tests.
- Follow second book Python Configuration
- Explore Machine Learning with Python in Jupyter Notebooks on GitHub.


Features
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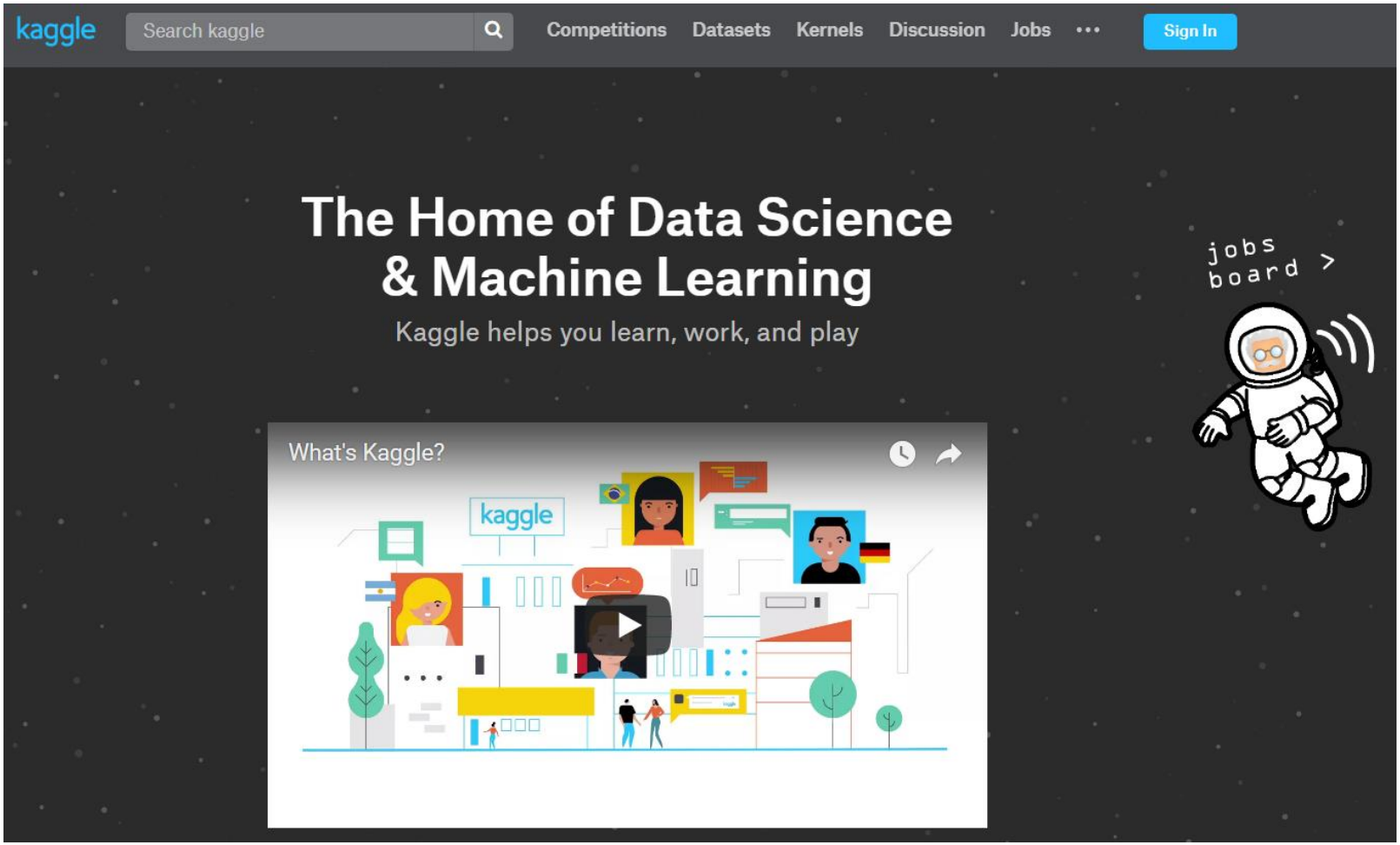
Sign in or Sign up
Built for developers
GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside millions of other developers.
Username
Pick a username
Email
you@example.com
Password
Create a password
Use at least one letter, one numeral, and seven characters.
Sign up for GitHub
By clicking "Sign up for GitHub", you agree to our terms of service and privacy policy. We'll occasionally send you account related emails.

GitHub

- Everyone will use/create GitHub accounts.
- Teams will create Jupyter Notebooks to illustrate Machine Learning in Action.
- Datasets with Scikit Learn
- Datasets with Kaggle

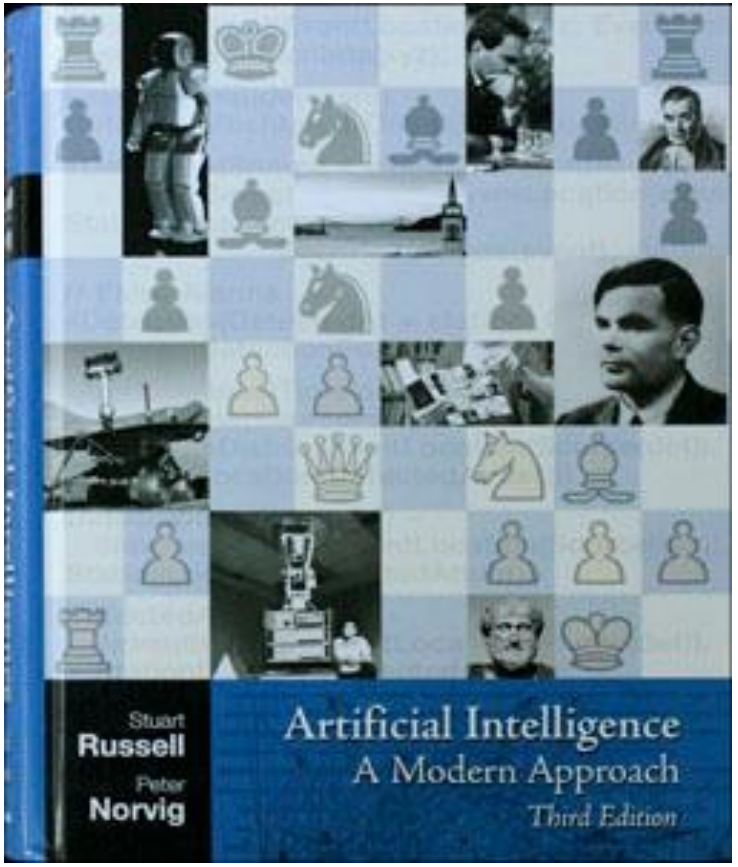
Kaggle

- Great resource for data science community



Additional Textbook:

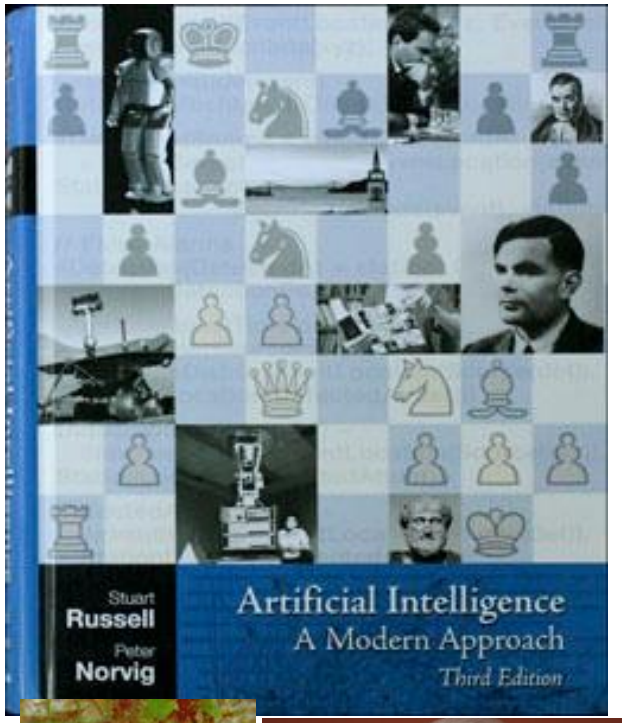
- Artificial Intelligence: A Modern Approach
  - Stuart Russell & Peter Norvig

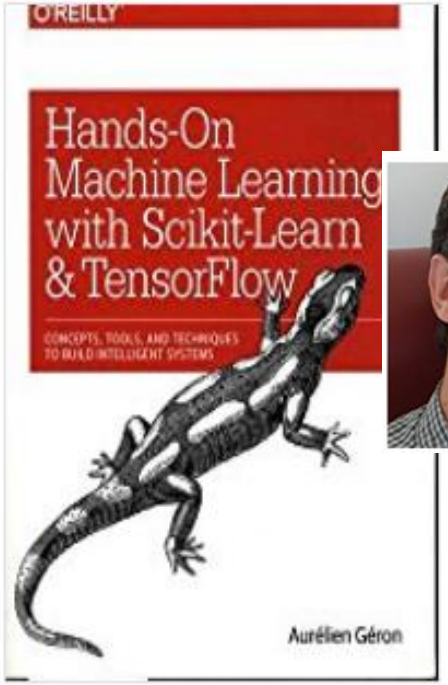


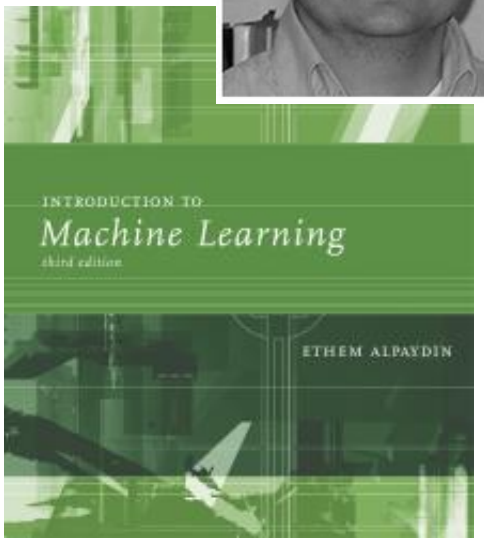
Artificial Intelligence: A Modern Approach

- Everyone should have a copy from 164
- Chapter 18: Machine Learning
- Chapter 20: Learning Probabilistic Models
- Chapter 21: Reinforcement Learning

3 Sources --- 3 Perspectives

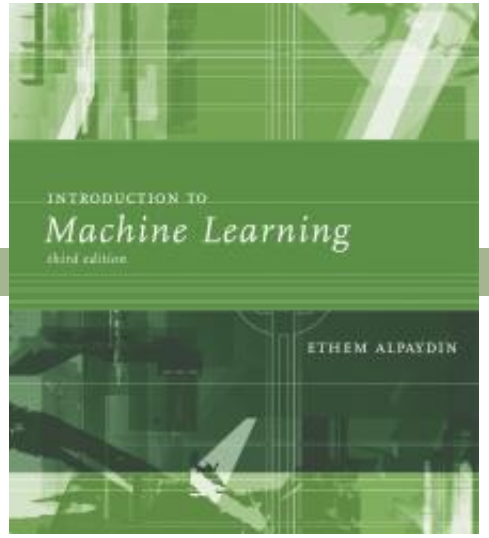


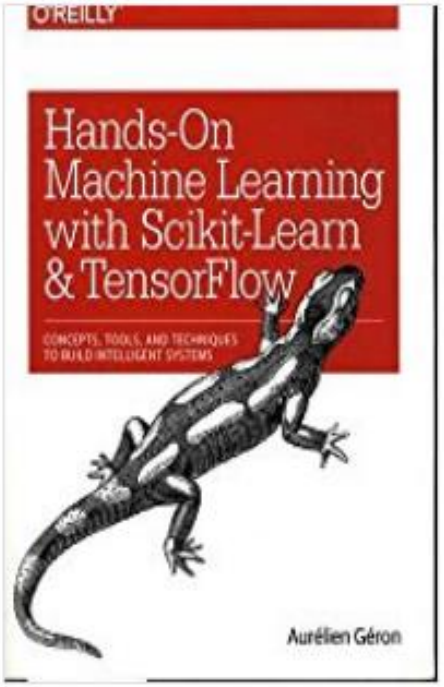




Grading:

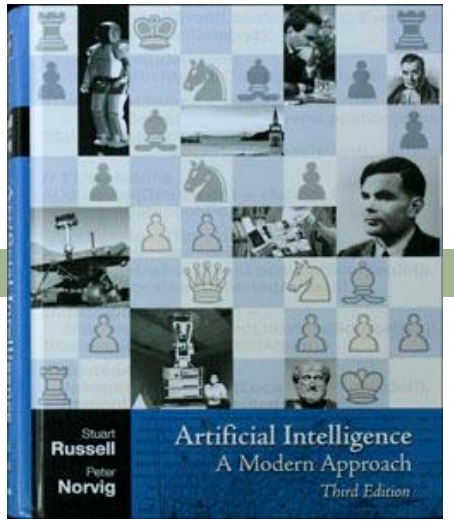
- Particpation
  - Teams Formed
  - 1 team member must attend each class
  - Team reports in class
- Assignments
  - Juptyer Notebooks
  - Peer Reviews
- Quizzes
  - In Class – Computer Based
- Midterm
  - In Class – Computer Based
- Final
  - In Class – Computer Based





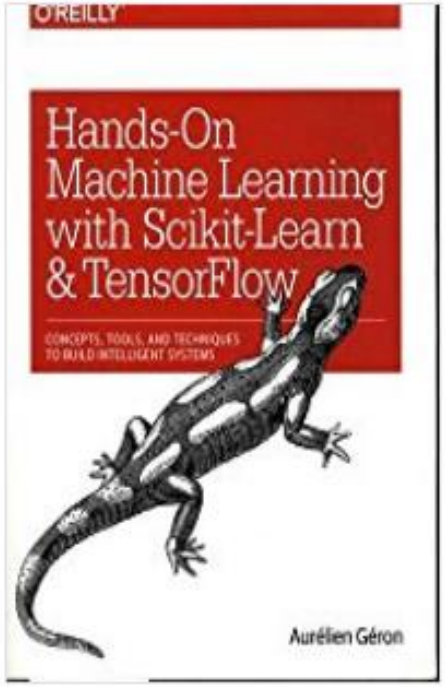
1. The Machine Learning Landscape

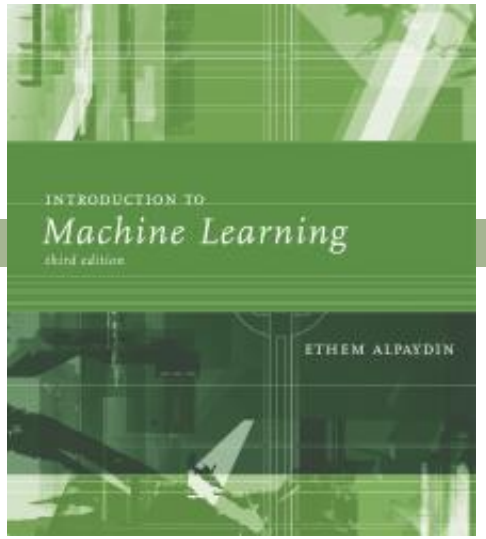
- What Is Machine Learning?
- Why Use Machine Learning?
- Types of Machine Learning Systems
  - Supervised/Unsupervised Learning
  - Batch and Online Learning
  - Instance-Based Versus Model-Based Learning
- Main Challenges of Machine Learning
  - Insufficient Quantity of Training Data
  - Nonrepresentative Training Data
  - Poor-Quality Data
  - Irrelevant Features
  - Overfitting the Training Data
  - Underfitting the Training Data
  - Stepping Back
- Testing and Validating
- Exercises



2. End-to-End Machine Learning Project

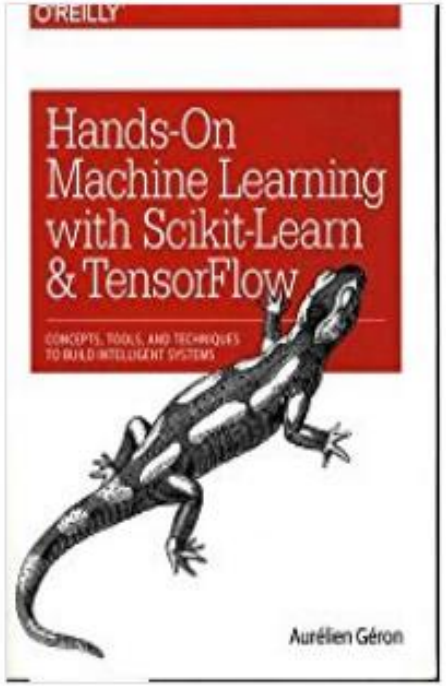
- Working with Real Data
- Look at the Big Picture
  - Frame the Problem
  - Select a Performance Measure
  - Check the Assumptions
- Get the Data
  - Create the Workspace
  - Download the Data
  - Take a Quick Look at the Data Structure
  - Create a Test Set
- Discover and Visualize the Data to Gain Insights
  - Visualizing Geographical Data
  - Looking for Correlations
  - Experimenting with Attribute Combinations
- Prepare the Data for Machine Learning Algorithms
  - Data Cleaning
  - Handling Text and Categorical Attributes
  - Custom Transformers
  - Feature Scaling
  - Transformation Pipelines





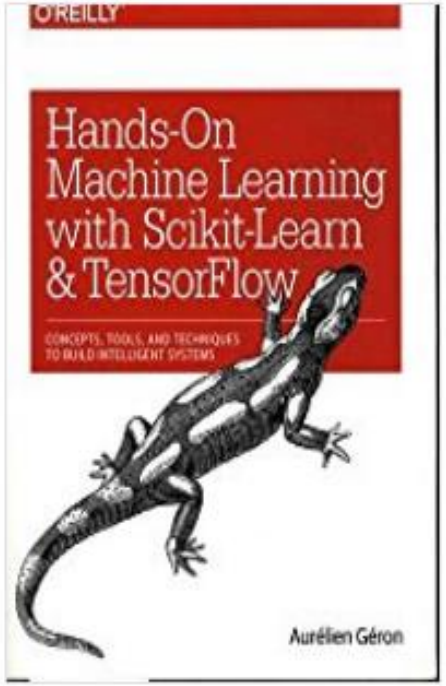
3. Classification

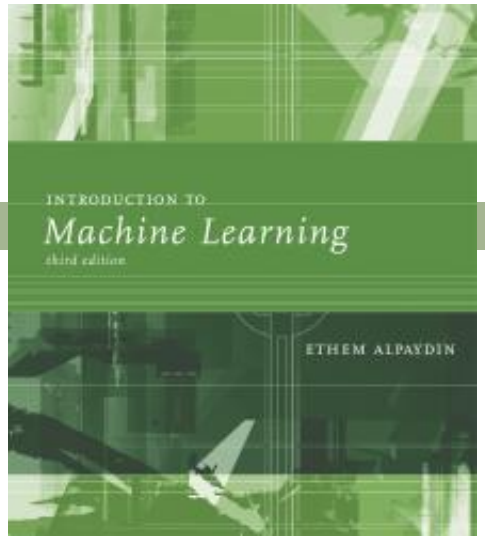
- MNIST
- Training a Binary Classifier
- Performance Measures
  - Measuring Accuracy Using Cross-Validation
  - Confusion Matrix
  - Precision and Recall
  - Precision/Recall Tradeoff
  - The ROC Curve
- Multiclass Classification
- Error Analysis
- Multilabel Classification
- Multioutput Classification
- Exercises

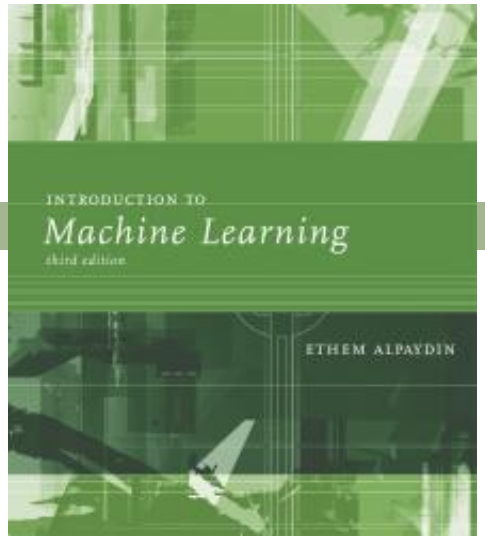


4. Training Models

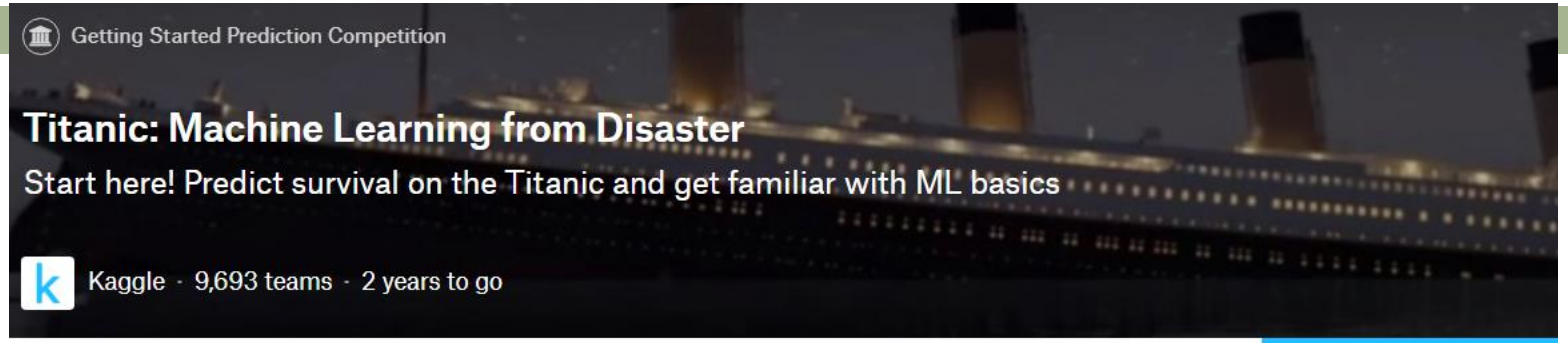
- Linear Regression
  - The Normal Equation
  - Computational Complexity
- Gradient Descent
  - Batch Gradient Descent
  - Stochastic Gradient Descent
  - Mini-batch Gradient Descent
- Polynomial Regression
- Learning Curves
- Regularized Linear Models
  - Ridge Regression
  - Lasso Regression
  - Elastic Net
  - Early Stopping
- Logistic Regression
  - Estimating Probabilities
  - Training and Cost Function







Titanic



Overview Data Kernels Discussion Leaderboard Rules Team My Submissions **Submit Predictions**

Overview

- Description
- Evaluation
- Frequently Asked Questions
- Tutorials

Start here if...

You're new to data science and machine learning, or looking for a simple intro to the Kaggle prediction competitions.

Competition Description

The sinking of the RMS Titanic is one of the most infamous shipwrecks in history. On April 15, 1912, during her maiden voyage, the Titanic sank after colliding with an iceberg, killing 1502 out of 2224 passengers and crew. This sensational tragedy shocked the international community and led to better safety regulations for ships.

One of the reasons that the shipwreck led to such loss of life was that there were not enough lifeboats for the passengers and crew. Although there was some element of luck involved in surviving the sinking, some groups of people were more likely to survive than others, such as women, children, and the upper-class.