동국대학교
dongguk university

Machine Learning

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Overview

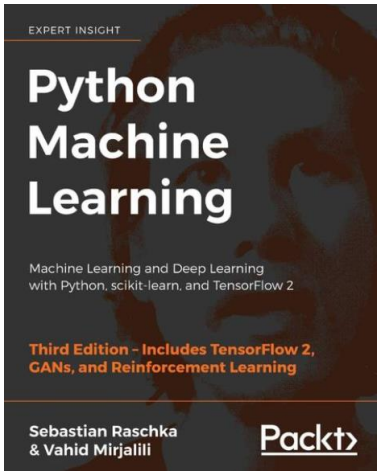
- Machine Learning (CSC4022)
  - Level: Undergraduate
  - Class type: Lecture + programming practice
  - Prerequisite: Calculus(미적분학I), Probability and Statistics(확률및통계학), Linear Algebra(선형대수학) (Recommended), Python programming (파이썬) (Recommended) Artificial Intelligence(인공지능) (Recommended)
- Course summary
  - **Machine learning** is the study of how to make computers learn from data and experience. This course introduces the basic concepts and principles of machine learning
  - Topics include *various algorithms* for supervised, unsupervised, and reinforcement learning such as perceptron, linear regression, decision trees, nearest neighbor, clustering algorithms, neural networks, deep learning models, as well as *concepts* of overfitting, regularization, dimensionality reduction, and ensemble. The classes consist of lectures on algorithms and theories, and *programming practices (Python)* for them

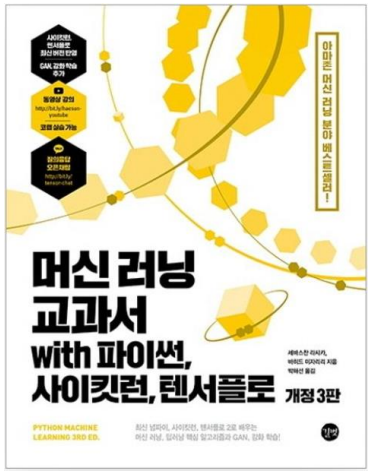
Overview

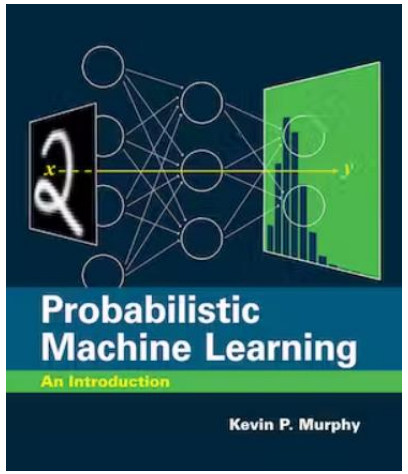
- Class schedule
  - Wednesday 3:30–5:20 pm(02), 5:30–7:15 pm(01), 6144 (lecture)
  - Thursday 3:00-4:50 pm(02), 5:00–6:50 pm(01), 6119 (practice)
- Professor/TA
  - Juntae Kim, new engineering building 10114, 2260-3712, jkim@dongguk.edu
  - Hiskias, new engineering building 5116, 2290-1421, hiskias.melke1@gmail.com
- Slides/codes/homeworks
  - All class materials including lecture slides, Jupyter notebook files, homework assignments, etc. will be available at the e-class for download
- Grading
  - Midterm 25%, final exam 25%, practice 25%, homework 25%

Overview

- Textbooks
  - “Python Machine Learning”, 3rd ed., Sebastian Raschka
    (머신러닝 교과서, 개정3판)
  - “Probabilistic Machine Learning”, Kevin Murphy
    (https://probml.github.io/pml-book/book1.html)







Course Schedule

주차	이론	실습	Homework
1 주차	Course overview, Python and Libraries	Programming Environment, Python Practice	
2 주차	Machine Learning Concepts	Numpy, Pandas, Matplotlib, Scikit-learn	
3 주차	Linear Regression, Gradient Descent	Linear Regression, Gradient Descent (ch02, ch10)	HW #1
4 주차	Logistic Regression	Logistic Regression (ch02, ch03)	
5 주차	Decision trees, K-Nearest Neighbor, SVM	Decision trees, K-Nearest Neighbor, SVM (ch03)	
6 주차	Data Preprocessing	Data Preprocessing (ch04), Feature Selection, PCA (ch05)	HW #2
7 주차	Performance Evaluation	Cross Validation, ROC (ch06), Bagging, Boosting (ch07)	
8 주차	Midterm (4/27 Sat.)		
9 주차	Learning form Text Data	Vectorization, Sentiment Analysis (ch08)	
10 주차	Unsupervised Learning	K-means, DBSCAN (ch11)	HW #3
11 주차	Artificial Neural Network	Multilayer Perceptron (ch02, ch12)	
12 주차	Tensorflow and Keras	Tensorflow, Image Classification (ch13, ch 14)	
13 주차	Deep learning models	CNN, RNN (ch15, ch16)	HW #4
14 주차	Reinforcement Learning	GAN, Q-Learning (ch18)	
15 주차	Final Exam (6/15 Sat.)		