

Course overview

Jong-Han Kim

EE787 Fundamentals of machine learning
Kyung Hee University

Course description

This course is about:

- ▶ fundamental concepts and theories in machine learning
- ▶ supervised and unsupervised learning, regression and classification
- ▶ loss function selection and its effect on learning
- ▶ regularization and robustness to outliers
- ▶ numerical experiments on data from a wide variety of engineering and other disciplines

This course is NOT about:

- ▶ deep learning applications and tools such as CNN, TensorFlow, etc.
- ▶ optimization solver development for machine learning problems

Course info.

Instructor:

- ▶ Jong-Han Kim (jonghank@khu.ac.kr)

Lectures:

- ▶ Tue/Thr 13:30-14:45 at Rm.211-1

Office hours:

- ▶ Tue/Thr 15:00-16:00 at Rm.516, or by appointments if you cannot meet them

Prerequisites:

- ▶ previous exposure to linear algebra, probability, and programming
- ▶ working knowledge on optimization will be a plus

Course info.

Course material:

- ▶ complete notes will be provided
- ▶ the course material is reproduced from the *EE104: Introduction to machine learning* by Sanjay Lall and Stephen Boyd at Stanford university, under their kind permission

Reference textbooks:

- ▶ there are no required textbooks
- ▶ *Introduction to applied linear algebra - vectors, matrices, and least squares* by Boyd and Vandenberghe will be a useful reference

Course requirements

Homeworks:

- ▶ several sets of occasional homeworks
- ▶ problems may include: various regressor/predictor design problems, outlier detection, power demand prediction, speech data classification, recommendation systems design, and more...
- ▶ we will be using the Julia programming language
- ▶ you are encouraged to work in groups, however everyone should turn in his/her own works

Grading policy:

- ▶ no exams
- ▶ you will be evaluated by your homework assignments

Julia

Julia language:

- ▶ we will be using Julia, which excels in high performance technical computing, for homework assignments
- ▶ you are not expected to have a strong background in programming (with Julia or otherwise), because the program you will write will use only a tiny subset of Julia's (many and powerful) features

Reference webpages:

- ▶ the official Julia webpage: <http://julialang.org>
- ▶ an easy-to-use online platform of Julia: <http://juliabox.com>
- ▶ a variety of Julia product packages: <http://juliacomputing.com>
- ▶ a short Julia tutorial: <http://web.stanford.edu/class/ee103/julia.html>

Homework #0

Julia language:

- ▶ go to `http://juliabox.com` and register for your own account
- ▶ get familiar with Julia
- ▶ write a simple code that can be used for your research, and check the result with the one obtained from your favorite programming language
- ▶ no need to turn in