Course Introduction and Overview

Course:

INFO-6154 Machine Learning Optimization Strategies

Developed by:
Mohammad Noorchenarboo

May 2, 2025

Course Overview

In this course, the following key concepts will be covered:

- **Mathematical Techniques for Optimization:** Fundamental mathematical concepts essential for understanding optimization techniques will be introduced. These concepts form the basis for many machine learning algorithms.
- **Neural Networks and Deep Learning:** A comprehensive explanation of neural networks will be provided, including their architecture, training process, and practical applications. The process of learning from data using neural networks will be explored.
- **Hyperparameter Optimization Techniques:** Various approaches for hyperparameter optimization will be examined, including Grid Search, Random Search, and Bayesian Optimization.

Course Overview

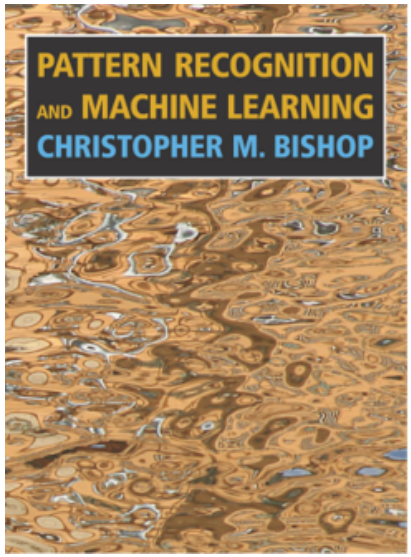
- **Advancements in AI:** Recent advancements in artificial intelligence will be introduced, highlighting state-of-the-art methods and their practical implications.
- **Practical Coding Sessions:** Coding exercises using Python will be integrated, allowing theoretical concepts to be implemented through hands-on practice.

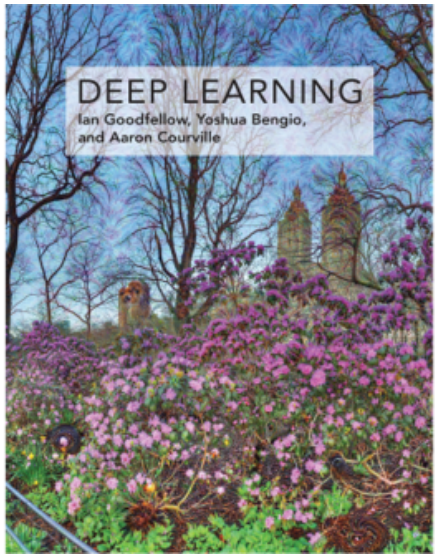
Marking Scheme

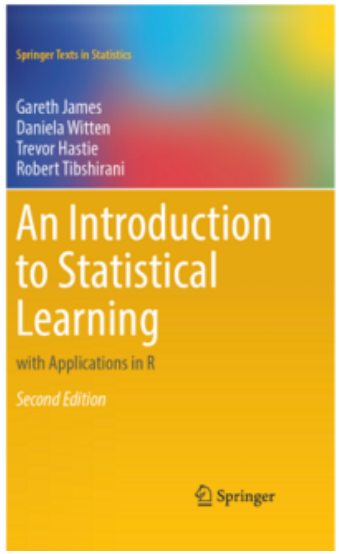
The marking scheme for this course is as follows:

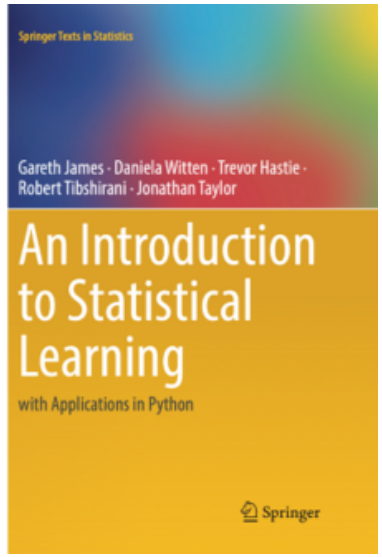
- **Final Project:** 30% of the total grade. Students are required to work independently on this project. This is not a team-based activity.
- **Assignments:** Two assignments, each worth 10%, totaling 20% of the final grade.
- **Final Exam:** 30% of the total grade.
- **In-Class Activity:** 20% of the total grade.

Sources


PATTERN RECOGNITION
AND MACHINE LEARNING
CHRISTOPHER M. BISHOP


DEEP LEARNING
Ian Goodfellow, Yoshua Bengio,
and Aaron Courville


Springer Texts in Statistics
Gareth James
Daniela Witten
Trevor Hastie
Robert Tibshirani
An Introduction to Statistical Learning
with Applications in R
Second Edition
Springer


Springer Texts in Statistics
Gareth James · Daniela Witten · Trevor Hastie ·
Robert Tibshirani · Jonathan Taylor
An Introduction to Statistical Learning
with Applications in Python
Springer

Class and Lab Schedule

- **Sessions:** Friday from 3:00 PM to 6:00 PM.