האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

Syllabus

Machine Learning for Economists - 57750

Last update 01-10-2023

HU Credits: *3*

Responsible Department: *Economics*

Academic year: *0*

Semester: *2nd Semester*

Teaching Languages: *Hebrew*

Campus: *Mt. Scopus*

Course/Module Coordinator: *Itamar Caspi*

Coordinator Email: [*itamar.caspi@mail.huji.ac.il*](mailto:itamar.caspi@mail.huji.ac.il)

Coordinator Office Hours: *Upon advanced coordination*

Teaching Staff:
Dr. caspi itamar

Course/Module description:
The course will cover topics that range between machine learning (ML) and

econometrics. In particular, we will discuss concepts from the world of ML that can potentially contribute to empirical economics. The course will cover leading machine learning (supervised and unsupervised) methods, with an emphasis on the challenges and opportunities of integrating these methods in empirical economics, and the relevance of ML to policy analysis and causal inference. The various topics are illustrated through applications, reading empirical articles, and doing applied work.

Course/Module aims:
(1) To develop an in-depth and practical knowledge of the challenges and opportunities that arise in applied empirical work involve high dimensional data; (2) To explore whether techniques and insights from the world of ML can be integrated into applied empirical research in economics, and so, how?

Learning outcomes - On successful completion of this module, students should be able to:
(1) Understand the technical and econometric challenges associated with the use of high dimensional data.
(2) Distinguish between the objectives of machine learning and econometrics and the difference between prediction and explanation.
(3) Harness the power of ML methods into applied empirical research in economics.

Attendance requirements(%):
80

Teaching arrangement and method of instruction: Lectures, final project, empirical problem sets.

Course/Module Content:
(Note: The list is tentative and subject to change)

1. Introduction to R, RStudio and the Tidyverse
2. Version control and Git(Hub)
3. Linear regression and classification
4. Regularization and Model selection
5. Nonparametric Methods
6. Factorization
7. Text as Data
8. Prediction in Aid of Estimation
9. Prediction Policy
10. Reinforcemnt learning

11. The Economics of AI

<u>*Required Reading:*</u>
Articles as detailed in class. See the Moodle site for a tentative reference list and links.

<u>*Additional Reading Material:*</u>

Grading Scheme:
Essay / Project / Final Assignment / Home Exam / Referat 40 %
Submission assignments during the semester: Exercises / Essays / Audits / Reports / Forum / Simulation / others 40 %
Other 20 %

<u>*Additional information:*</u>
The components of the final grade as appearing above are subject to change.