האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

Machine Learning for Economists - 57750

Last update 21-08-2018

HU Credits: *3*

Degree/Cycle: *2nd degree (Master)*

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*

Coordinator Office Hours: *Upon advanced coordination*

Teaching Staff:

Mr.
Mr.

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)

Methods:
Linear regression and classification
Regularization and Model selection
Tree-Based Methods

Artificial Neural Networks
Unsupervised Learning
Economic Applications:
Prediction in Aid of Estimation
Heterogeneous Treatment Effects
Prediction Policy

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

Additional Reading Material:
Hastie, T., Tibshirani, R., & Friedman, J. (2009). The Elements of Statistical Learning: Data Mining, Inference, and Prediction. Springer Science & Business Media.

Gareth, J., Witten, D., Hastie, T., & Robert, T. (2013). An Introduction to Statistical Learning: with Applications in R. Springer Science & Business Media.

Course/Module evaluation:
End of year written/oral examination 40 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 40 %
Assignments 20 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
The components of the final grade as appearing above are subject to change.