



Syllabus

Connections between machine learning and model theory - 80660

Last update 01-05-2024

HU Credits: 3

Responsible Department: Mathematics

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Itay Kaplan

Coordinator Email: kaplan@math.huji.ac.il

Coordinator Office Hours: By appointment

*Teaching Staff:
Prof Itay Kaplan*

Course/Module description:

We will give an overview of some connections between certain concepts in the theory of machine learning and notions in model theory. These connections were discovered and studied by many people in recent years, and lead to ideas and surprising results going in both directions (from model theory to machine learning and vice-versa).

In the following link you may find a presentation on the subject. The aim of the course is to get into the details and more.

<https://lc2023.unimi.it/wp-content/uploads/2023/06/slides-Kaplan.pdf>

Course/Module aims:

To be familiar with the relevant classes in model theory and machine learning and their connections.

Learning outcomes - On successful completion of this module, students should be able to:

Understand the material of the course.

Attendance requirements(%):

0

Teaching arrangement and method of instruction: Frontal teaching

Course/Module Content:

Model theory:
Stability, NIP.
Machine learning:
PAC and online learning.

Required Reading:

none

Additional Reading Material:

Understanding Machine Learning
From Theory to Algorithms
Shai Shalev-Shwartz, Shai Ben-David

A guide to NIP theories
Pierre Simon

Grading Scheme:

Presentation / Poster Presentation / Lecture/ Seminar / Pro-seminar / Research proposal 95 %

Attendance / Participation in Field Excursion 5 %

Additional information: