COURSE DETAIL

LEARNING-BASED CONTROL
Country Sweden
Host Institution Lund University
Program(s) Lund University
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Computer Science
UCEAP Course Number 154
UCEAP Course Suffix
UCEAP Official Title LEARNING-BASED CONTROL
UCEAP Transcript Title LEARNING-BASED CTRL
UCEAP Quarter Units 6.00
UCEAP Semester Units 4.00

Course Description

The development of suitable models for describing dynamical systems is a central problem within automatic control, and it is critical for the development of robust and high-performance control laws. When relationships between physical quantities are not fully known, then models and the control laws may instead be generated by measurement data, through system identification, machine learning, or adaptive control. The purpose of the course is to teach the basic principles of how this is done. The first part of the course is devoted to adaptive control and system identification for systems with several input and output signals. The focus is on state-space models and methods for generating these, including grey-box identification. The course describes iterative methods for learning, as well as model reduction for the purpose of reducing the dimension of the state space. The second part of the course is devoted to reinforcement learning. This includes the theory of dynamic programming and various approximate methods thereof. Policy iteration is explained, as well as discrete and continuous path planning. The third part of the course deals with the usage of complete components for the purpose of control, for instance, sensors that have been developed using machine learning.

Language(s) of Instruction
English

Host Institution Course Number
FRTN75

Host Institution Course Title
LEARNING-BASED CONTROL

Host Institution Course Details
http://www.control.lth.se/course/FRTN75

Host Institution Campus
Lund

Host Institution Faculty

Engineering
Host Institution Degree
Host Institution Department
Course Last Reviewed 2022-2023

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