COURSE DETAIL

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING
Country Sweden
Host Institution Lund University
Program(s) Lund University
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Physics
UCEAP Course Number 102
UCEAP Course Suffix
UCEAP Official Title INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING
UCEAP Transcript Title ARTFCL NEURL NETWRK
UCEAP Quarter Units 6.00
UCEAP Semester Units

4.00

Course Description
The course covers the most common models in artificial neural networks with a focus on the multi-layer perceptron. The course also provides an introduction to deep learning. The first topic covered in the course is feed-forward neural networks: simple perceptron and the multi-layer perceptron, choice of suitable error functions and techniques to minimize them, how to detect and avoid overtraining, ensembles of neural networks and techniques to create them, Bayesian training of multi-layer perceptrons. The course then moves to recurrent neural networks: simple recurrent networks and their use in time series analysis, fully recurrent for both time series analysis and associative memories (Hopfield model), the simulated annealing optimization technique. This is followed by self-organizing neural networks: networks that can extract principal components, networks for data clustering, learning vector quantization (LVQ), self-organizing feature maps (SOFM). The final topic covered is deep learning: overview of deep learning, convolutional neural networks for classification of images, different techniques to pre-train neural networks.

Language(s) of Instruction
English

Host Institution Course Number
FYTN14

Host Institution Course Title
INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING

Host Institution Campus
Science

Host Institution Faculty

Host Institution Degree

Host Institution Department
Astronomy and Theoretical Physics

Print