האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

The Hebrew University of Jerusalem

Syllabus

DEEP LEARNING FOR NATURAL LANGUAGE PROCESSING - 67583

Last update 30-01-2020

HU Credits: *1*

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

Responsible Department: *Computer Sciences*

Academic year: *0*

Semester: *2nd Semester*

Teaching Languages: *English*

Campus: *E. Safra*

Course/Module Coordinator: *Dr. Omri Abend*

Coordinator Email: *omri.abend@mail.huji.ac.il*

Coordinator Office Hours:

Teaching Staff:
Ms. Anna Rumshisky

Course/Module description:
Deep neural network models have become the go-to choice for many natural language processing problems, improving the state-of-the-art on a variety tasks from machine translation and question answering to inference and dialogue generation. This course will provide a basic introduction to deep learning methods for natural language processing. Covered topics will include vector space lexical embedding models, recurrent neural networks and their use for language modeling, encoder/decoder sequence-to-sequence and attention-based architectures. We will discuss how these methods are used for representation learning and language generation, and consider some practical applications such as question answering and conversational agents.

Course/Module aims:
Course aims to provide an introduction to the modern deep learning techniques for natural language processing.

Learning outcomes - On successful completion of this module, students should be able to:
Understand the computational models used to process natural language. Build, train and deploy neural network computational models for text processing tasks such as text generation or classification.

Attendance requirements(%):
100

Teaching arrangement and method of instruction: The course will include a combination of lectures, hands-on tutorials and programming assignments.

Programming assignments and tutorials will be in Python, using PyTorch deep learning library. We will use Jupyter notebooks for coding assignments.

Course/Module Content:
Review of neural networks models. Lexical embedding models: count-based vs. predicted word vectors. Building a word embedding model.
Recurrent neural networks. Training with backpropagation. Common loss functions.

Dropout and other regularization methods. Gated cell memory architectures (LSTMs/GRUs). Neural language models. Conditional language models. Sequence-to-sequence encoder/decoder architectures. Building a sequence-to-sequence encoder/decoder model. Seq2seq models with attention. Neural attention models for machine translation. Attention-only encoder/decoder architectures. Transformers.
Contextualized lexical embedding models. ELMo, BERT.

Required Reading:
There is no required textbook. Readings will be distributed by instructor.

Additional Reading Material:
J. Eisenstein. Natural Language Processing. MIT Press.

Course/Module evaluation:
End of year written/oral examination 0 %
Presentation 0 %
Participation in Tutorials 50 %
Project work 0 %
Assignments 50 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information: