Natural Language Processing

Academic Year: (2019 / 2020)   Review date: 15-05-2020

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: MARTÍNEZ OLMOS, PABLO

Type: Electives ECTS Credits : 3.0

Year :   Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The students are expected to have basic knowledge of
- Calculus
- Programming skills
- Statistics

OBJECTIVES
- Know the basic techniques of text pre-processing.
- Use software tools for pre-processing text.
- Know the techniques of topic modeling.
- Use topic modeling software tools in corpus of documents.
- Use topic models for information retrieval in corpus of documents.
- Learn how to train models of semantic representation in a vector space.
- Learn to train language models using recursive neural networks.
- Know basic translation structures based on recursive neural networks.
- Use optimization tools to build language models with recursive neural networks.

DESCRIPTION OF CONTENTS: PROGRAMME
- Document preprocessing techniques
- Topic Modeling
- Recurrent Neural Networks
- Language Models with RNNs
- Sequence to Sequence for Machine Translation
- Attention Models

LEARNING ACTIVITIES AND METHODOLOGY

Lectures (1.5 ECTS):
Contents: basic theory and methods of natural language processing systems.
Methodology: classical lecture with use of slides, videos and white/blackboard.

Lab projects (1.5 ECTS):
Contents: implementation of algorithms in for the simulation and assessment of natural language processing systems.
Methodology: use of numerical software packages (matlab/octave) to study the performance of algorithms and systems.

ASSESSMENT SYSTEM

The continuous evaluation (80%) is based on programming projects to implement the tools seen in class and a presentation of recent articles in the field.

There will be a final exam that will count 20%.

% end-of-term-examination: 20

% of continuous assessment (assigments, laboratory, practicals…):   80

BASIC BIBLIOGRAPHY
 - Cristopher Bishop Pattern Recognition and Machine Learning, Springer, 2006

- Ian Goodfellow and Yoshua Bengio and Aaron Courville Deep Learning, MIT Press, 2017

- Steven Bird, Ewan Klein, Edward Loper Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit, O'Reilly, 2009