Course guides
230376 - DLV - Deep Learning for Vision

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.
Degree: MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Optional subject). MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019). (Optional subject).
Academic year: 2019
ECTS Credits: 3.0
Languages: English

LECTURER
Coordinating lecturer: Xavier Giró i Nieto
Others: Giró Nieto, Xavier
Sayrol Clols, Elisa
Ruiz Hidalgo, Javier

REQUIREMENTS
Deep Learning for Artificial Intelligence

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE1. Ability to apply information theory methods, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing to communication and audiovisual systems.

Transversal:
CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

CT5. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

TEACHING METHODOLOGY
- Lectures
- Group work
- Group work (distance)
LEARNING OBJECTIVES OF THE SUBJECT

The aim of this course is to train students in methods of deep learning for computer vision. Convolutional neural networks (convnets) will be presented and analyzed in detail to understand the potential of these state of the art tools in visual pattern recognition. Engineering tips and scalability issues will be addressed to solve tasks such as image classification, object detection or automatic textual captioning.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>12.0</td>
<td>16.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>12.0</td>
<td>16.00</td>
</tr>
<tr>
<td>Self study</td>
<td>51.0</td>
<td>68.00</td>
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</tbody>
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Total learning time: 75 h

CONTENTS

1. State of the Art in Computer Vision

Description:
- Still images: Object detection, image and instance segmentation, saliency prediction, visual search.
- 3D & volumes: 3D Analysis, 3D reconstruction, medical applications.

2. Industry Talks

Description:
Talks by industrial professionals who are applying deep learning to address their challenges.

ACTIVITIES

Exam

Description:
Written exam to evaluate the learning over the lecture contents.

Full-or-part-time: 10 h
Guided activities: 1h
Self study: 9h
Project

Description:
Development and training of a deep neural network that will solve a computer vision task.

Delivery:
Oral presentation in class.
Release of the source codes and trained models.

Full-or-part-time: 51 h
Theory classes: 2h
Guided activities: 12h
Self study: 37h

GRADING SYSTEM

Exam: 50%
Project: 50%
Attendance: -10 % penalty for each not completed day

BIBLIOGRAPHY

Basic:

RESOURCES

Hyperlink:
- Nom reCourse website.