Course guide  
270732 - OR - Object Recognition

Unit in charge: Barcelona School of Informatics  
Teaching unit: 1004 - UB - (ENG)Universitat de Barcelona.

Degree: MASTER'S DEGREE IN ARTIFICIAL INTELLIGENCE (Syllabus 2017). (Optional subject).

Academic year: 2021  
ECTS Credits: 4.0  
Languages: English

LECTURER

Coordinating lecturer: SERGIO ESCALERA GUERRERO

Others: Segon quadrimestre: SERGIO ESCALERA GUERRERO - 10

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEA13. Capability to understand advanced techniques of Modeling, Reasoning and Problem Solving, and to know how to design, implement and apply these techniques in the development of intelligent applications, services or systems.
CEA14. Capability to understand the advanced techniques of Vision, Perception and Robotics, and to know how to design, implement and apply these techniques in the development of intelligent applications, services or systems.
CEA3. Capability to understand the basic operation principles of Machine Learning main techniques, and to know how to use in the environment of an intelligent system or service.
CEA4. Capability to understand the basic operation principles of Computational Intelligence main techniques, and to know how to use in the environment of an intelligent system or service.
CEA6. Capability to understand the basic operation principles of Computational Vision main techniques, and to know how to use in the environment of an intelligent system or service.
CEA8. Capability to research in new techniques, methodologies, architectures, services or systems in the area of Artificial Intelligence.
CEP3. Capacity for applying Artificial Intelligence techniques in technological and industrial environments to improve quality and productivity.
CEP6. Capability to assimilate and integrate the changing economic, social and technological environment to the objectives and procedures of informatic work in intelligent systems.
CEP8. Capability to respect the surrounding environment and design and develop sustainable intelligent systems.

Generic:
CG2. Capability to lead, plan and supervise multidisciplinary teams.

Transversal:
CT5. APPROPRIATE ATTITUDE TOWARDS WORK: Capability to be motivated for professional development, to meet new challenges and for continuous improvement. Capability to work in situations with lack of information.

Basic:
CB7. Ability to integrate knowledges and handle the complexity of making judgments based on information which, being incomplete or limited, includes considerations on social and ethical responsibilities linked to the application of their knowledge and judgments.

TEACHING METHODOLOGY

T - Each week it will be a 1.5h theoretical topic exposition class.
P - Each week it will be a 1h practical session.
The rest of the course are devoted to autonomous lectures, programming, and studying.
LEARNING OBJECTIVES OF THE SUBJECT

1. Introduction to object and human recognition
   Multi-modal object recognition
   Multi-part object recognition
   Multi-scale object recognition
   Multi-view object recognition
   Multi-class object recognition
   Multi-label object recognition
   Multi-ple data: deep-learning for large scale object recognition
   Object Recognition in context: scene understanding and grammars
   Human Pose Recovery
   Human Behavior Analysis

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Theory classes</td>
<td>12,0</td>
<td>12.00</td>
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<tr>
<td>Self study</td>
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<tr>
<td>Practical classes</td>
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<tr>
<td>Guided activities</td>
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<td>4.00</td>
</tr>
<tr>
<td>Laboratory classes</td>
<td>8,0</td>
<td>8.00</td>
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</tbody>
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Total learning time: 100 h

CONTENTS

- Introduction to object and human recognition
- Multi-modal object recognition
- Multi-part object recognition
- Multi-scale object recognition
- Multi-view object recognition
- Multi-class object recognition
- Multi-label object recognition
| Multi-ple data: deep-learning for large scale object recognition |
| Object Recognition in context: scene understanding and grammars |
| Human Pose Recovery |
| Human Behavior Analysis |

**ACTIVITIES**

<table>
<thead>
<tr>
<th>Paper presentation</th>
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<tbody>
<tr>
<td><strong>Full-or-part-time:</strong> 6h 30m</td>
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<tr>
<td>Guided activities: 1h 30m</td>
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<tr>
<td>Self study: 5h</td>
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<table>
<thead>
<tr>
<th>Paper presentation 2</th>
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<tbody>
<tr>
<td><strong>Full-or-part-time:</strong> 6h 30m</td>
</tr>
<tr>
<td>Guided activities: 1h 30m</td>
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<tr>
<td>Self study: 5h</td>
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<table>
<thead>
<tr>
<th>Exam</th>
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<tbody>
<tr>
<td><strong>Full-or-part-time:</strong> 33h</td>
</tr>
<tr>
<td>Guided activities: 3h</td>
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<td>Self study: 30h</td>
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<tr>
<th>Laboratory 1</th>
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<tbody>
<tr>
<td><strong>Full-or-part-time:</strong> 7h</td>
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<tr>
<td>Guided activities: 3h</td>
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<td>Self study: 4h</td>
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<table>
<thead>
<tr>
<th>Laboratory 2</th>
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</thead>
<tbody>
<tr>
<td><strong>Full-or-part-time:</strong> 7h</td>
</tr>
<tr>
<td>Guided activities: 3h</td>
</tr>
<tr>
<td>Self study: 4h</td>
</tr>
</tbody>
</table>
Laboratory 3

Full-or-part-time: 7h
Guided activities: 3h
Self study: 4h

Laboratory 4

Full-or-part-time: 7h
Guided activities: 3h
Self study: 4h

Theoretical class

Full-or-part-time: 22h 30m
Theory classes: 22h 30m

Practical sessions

Full-or-part-time: 15h
Laboratory classes: 15h

GRADING SYSTEM

The course will follow a continuous evaluation consisting in four practical reports (PR) and two in-class presentations (PS). At the end of the course a test exam will be performed (TS). The final score (FS) will be computed as follows:
FS = 0.5 * PR + 0.3 * PS + 0.2 * TS
A minimum score of 3 over 10 points is required for each part PR, PS, and TS in order to compute the final score FS.

BIBLIOGRAPHY

Basic:

Complementary:
- Proceedings of the IEEE.