230204 - DRCAV - Description and Retrieval of Audiovisual Content

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications
701 - AC - Department of Computer Architecture

Academic year: 2019
Degree: BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)

ECTS credits: 6
Teaching languages: English

Teaching staff
Coordinator: RUBEN TOUS LIESA
Others: RUBEN TOUS LIESA
CLIMENT NADEU CAMPRUBI
JAVIER RUIZ HIDALGO

Prior skills
Basic knowledge of programming, along with processing and coding of audio and video signals.

Requirements
Second year.

Degree competences to which the subject contributes

Transversal:
1. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

Teaching methodology
Theory + application classes: Development of concepts from examples and problems.
Laboratory classes: Development of practices based on a case to solve, using existing resources. Analysis of specific problems.

Learning objectives of the subject
Provide the necessary tools to analyze and describe audiovisual content, and for developing systems for storage and retrieval of audiovisual content.
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<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>Percentage</th>
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<tbody>
<tr>
<td><strong>Total learning time:</strong> 150h</td>
<td>39h</td>
<td>26.00%</td>
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<tr>
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<td>13h</td>
<td>8.67%</td>
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<td>98h</td>
<td>65.33%</td>
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Total learning time: 150h
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<table>
<thead>
<tr>
<th>Content</th>
<th>Learning time: 16h</th>
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</table>
| **Audiovisual databases** | Theory classes: 6h 
Labotatory classes: 10h |

**Description:**
- Data and information retrieval: Structured vs. non-structured information; textual vs. audiovisual non-structured information.
- Data modelling, relational databases, XML and the Semantic Web.
- Non-SQL databases, scalable data storage and processing, big data.

<table>
<thead>
<tr>
<th><strong>High-level description of audiovisual content</strong></th>
<th>Learning time: 8h</th>
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<tbody>
<tr>
<td><strong>Learning time:</strong> 8h</td>
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| Theory classes: 6h 
Labotatory classes: 2h |

**Description:**
- Multimedia metadata, high-level vs. low-level description of audiovisual content.
- Multimedia metadata modeling, serialization and embedding (EXIF, MPEG-7, ontologies, etc.).

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<thead>
<tr>
<th><strong>Low-level description of audiovisual content</strong></th>
<th>Learning time: 8h</th>
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<tbody>
<tr>
<td><strong>Learning time:</strong> 8h</td>
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| Theory classes: 4h 
Labotatory classes: 4h |

**Description:**
- Low-level descriptors of audiovisual content. Standards: MPEG7 and other.
- Extraction of low-level audio descriptors (pitch, timbre, rhythm, etc.).
- Extraction of low-level descriptors of image (color, shape, texture, etc.) and video (motion, localization, etc.).

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<tr>
<th><strong>Retrieval and classification of audiovisual content</strong></th>
<th>Learning time: 16h</th>
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<tr>
<td><strong>Learning time:</strong> 16h</td>
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</tbody>
</table>
| Theory classes: 8h 
Labotatory classes: 8h |

**Description:**
- Application to music information retrieval: fingerprinting, melody extraction, chord recognition, genre classification, etc.
- Application to face detection, recognition, verification, video retrieval, etc.
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Qualification system

- Evaluation of part 1 (50%, topics 1 and 2):
  - Attendance and participation 10%
  - Laboratory assignments 20%
  - Project assignment 70%
- Evaluation of part 2:
  - Audio part (25%, topics 3 and 4):
    - Attendance and participation 10%
    - Laboratory assignments 20%
    - Project assignment 70%
  - Video part (25%, topics 3 and 4):
    - Attendance and participation 10%
    - Laboratory assignments 30%
    - Project assignment 60%

Regulations for carrying out activities

Bibliography

Basic:


