UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

Course guide
230204 - DRCAV - Description and Retrieval of Audiovisual Content

Last modified: 24/05/2024

Unit in charge:	Barcelona School of Telecommunications Engineering
Teaching unit:	739 - TSC - Department of Signal Theory and Communications.
	701 - DAC - Department of Computer Architecture.
Degree:	BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).
	BACHELOR'S DEGREE IN DATA SCIENCE AND ENGINEERING (Syllabus 2017). (Optional subject).

Academic year: 2024   **ECTS Credits:** 6.0   **Languages:** English

LECTURER

Coordinating lecturer:	RUBÉN TOUS LIESA
Others:	Segon quadrimestre:
	MONTSERRAT PARDAS FELIU - 11
	MARTA TOLOS RIGUEIRO - 11
	RUBÉN TOUS LIESA - 11

PRIOR SKILLS

Knowledge of processing of audio and video signals. Good programming skills.

REQUIREMENTS

PROCESSAMENT DE SENYAL AUDIOVISUAL I DE COMUNICACIONS - Precorequisit

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.

STUDY LOAD

Type	Hours	Percentage
Hours large group	39,0	26.00
Hours small group	13,0	8.67
Self study	98,0	65.33

Total learning time: 150 h

CONTENTS

Audiovisual databases

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.

Full-or-part-time: 16h
Theory classes: 6h
Laboratory classes: 10h

High-level description of audiovisual content

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

Full-or-part-time: 8h
Theory classes: 6h
Laboratory classes: 2h

Low-level description of audiovisual contentLow-level description of audiovisual content

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.).

Full-or-part-time: 8h
Theory classes: 4h
Laboratory classes: 4h

Retrieval and classification of audiovisual content

Description:
- Classification and retrieval using low-level descriptors. Performance evaluation. Commercial applications.
- Application to music information retrieval: fingerprinting, melody extraction, chord recognition, genre classification, etc.
- Application to face detection, recognition, verification, video retrieval, etc.

Full-or-part-time: 16h
Theory classes: 8h
Laboratory classes: 8h

GRADING 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%

EXAMINATION RULES.

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BIBLIOGRAPHY

Basic:
- Manjunath, B. S.; Salembier, P.; Sikora, T. Introduction to MPEG 7: Multimedia Content Description Language. John Wiley, 2002. ISBN 0471486787.
- Benois-Pineau, J.; Precioso,F.; Cord, M. Visual Indexing and Retrieval [on line]. New York [etc.]: Springer, 2012 [Consultation: 10/10/2022]. Available on: https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=971315. ISBN 9781461435884.
- Kim, H.G.; Moreau, N.; Sikora, T.. MPEG-7 audio and beyond: audio content indexing and retrieval. John Wiley, 2005. ISBN 047009334X.
- Baeza-Yates, Ricardo; Ribeiro-Neto, Berthier. Modern information retrieval : the concepts and technology behind search. 2nd ed. Harlow: Addison Wesley / Pearson, 2011. ISBN 9780321416919.
- Sistac, J. Bases de dades. Editorial UOC, S.L., 2005. ISBN 8497883349.