Last update: 28-09-2018

205077 - DMMLE - Data Mining and Machine Learning for Engineers

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

Teaching unit: 723 - CS - Department of Computer Science

Academic year: 2018

Degree: MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Teaching unit Optional)

ECTS credits: 3 Teaching languages: English

Teaching staff

Coordinator: Alfredo Vellido

Teaching methodology

The course will develop as a mix of general lectures (theory sessions) imparted with the aid of powerpoint presentations and interactive tasks in which the whole class will debate on specific issues triggered by the reading of a limited number of key studies on the different topics of the course.

Learning objectives of the subject

Networked computer environments are permeating all fields of human activity. This context is a continuous source of data and the use of this data for knowledge generation is the main aim of Data Mining (DM). The world of engineering is part of this paradigm shift towards data-based methods and can benefit from the integration of DM methodologies. The main general learning objective of this course is to serve as a gentle introduction to the concept of DM as a methodology for knowledge discovery. From there, we aim to provide students with the foundations to explore the many possible applications of DM to engineering problems.

Study load

Total learning time: 75h	Hours large group:	16h 30m	22.00%
	Hours medium group:	0h	0.00%
	Hours small group:	10h 30m	14.00%
	Guided activities:	0h	0.00%
	Self study:	48h	64.00%

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Content

Module 1: Introduction to Data Mining

Learning time: 8h
Theory classes: 2h
Self study : 6h

Description:
Data Mining as an Umbrella concept. Defining the boundaries of the field

Module 2: Data Mining as a Methodology

Learning time: 14h
Theory classes: 6h
Self study : 8h

Description:
Linking the concepts of Data Mining and Knowledge Discovery in Databases (KDD)
Data Mining as a structured methodology: CRISP DM

Module 3: Topics in Data Mining

Learning time: 22h
Theory classes: 8h
Self study : 14h

Description:
Machine Learning for Data Mining.
Information visualization.
Interpretability and Ethics in Data Mining

Related activities:
Brief essay

Module 4: Data Mining General Case Studies

Learning time: 12h
Theory classes: 4h
Self study : 8h

Description:
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Module 5: Data Mining Case Studies in Engineering	Learning time: 19h Theory classes: 7h Self study : 12h

Description:
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Related activities:
Essay/experimental study

Qualification system

This course will be evaluated through individual essays written by students on different proposed topics. The essays could be either theoretical, experimental, or mixtures of both.

Bibliography

Basic:

Bishop, Christopher M. Pattern recognition and machine learning. New York: Springer, 2006. ISBN 9780387310732.

Aggarwal, Charu C. Data mining: the textbook. New York: Springer, 2015. ISBN 9783319141411.

Complementary:

Raschka, S.; Mirjalili, V. Python machine learning: machine learning and deep learning with Python, scikit-learn and TensorFlow. 2nd ed. Birmingham, UK: Packt Publishing, 2017. ISBN 9781787125933.