

Postgraduate Course Application Projects (MSc)

Instructor Information

Luis A. Hernández Gómez

E-mail: luisalfonso.hernandez@upm.es

Work Phone: +34 91 549 57 00 Ext: 4082

Course Information

Course Description

In this course students can choose among a list of both research and industrial projects proposals covering a broad range of application areas where the aim is extracting knowledge from data and signals. Several projects will be offered among which students will choose to have the opportunity to work integrated in research or development teams of research groups in our Department or associated Companies and Organizations through internships.

This course will also propose Kaggle-style competitions (www.kaggle.com) where students will have to form teams, so they can learn to develop or improve their teamwork skills.

Working on each application project will require students to rely on their acquired knowledge from fundamental statistical or optimization courses to more advanced topics as signal processing integrated with different machine learning techniques and models.

Prerequisites

Fundamental courses in Statistical Modelling, Time Series and Optimization

Fundamental Signal Processing

Machine Learning courses and Lab activities

Summary of intended course outcomes

The main outcome of the course will be to reinforce the students' learning experience working on several practical and real-life application projects.

The course also provides hands on experience on real application projects having the opportunity to work in research or industrial teams so students will gain better insights to develop their future professional carrier.

Working in competitions will also help students to improve their skills to develop their technical and scientific activities in collaborative settings.

Syllabus

Activities will be proposed for several research and industrial projects in application areas such as:

- Design and development of multimedia analytics (image, video, speech, music and audio)
- Deep Learning architectures and models for signals and media applications
- Design and development of media content recommendation systems
- Design and distributed processing for sensor networks
- Human activity recognition from smartphone sensors
- Visual human action recognition via sparse dictionaries
- Visual tracking in the compressed domain
- Biometrics and forensic analytics
- Financial time series processing for high-frequency trading and analytics
- Signal processing and Machine Learning for environmental monitoring
- Signal processing and Machine Learning in Robotics systems

Student Assessment Criteria

Personal presentations	20%
Group projects	80%