

# ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) refers a kind of intelligence that enables machines to emulate intelligent behavior or to do things that people mostly do better. AI technologies have an important impact on our daily activities in business, as individuals, and as a society. During this course, apart from learning about AI fundamentals and applications, you will use specific techniques about different areas of AI such as knowledge representation and machine learning.

➤ **Course duration: 10 contact hours**

➤ **Dates: 17, 18 & 21 July 2023**

Meet Our

## INSTRUCTORS



**Prof. Asunción Gómez-Pérez** is full professor of Artificial Intelligence. She is Fellow of the European Academy of Science (2018). She received the ARITMEL Award - National Prize of Computer Science 2015, the UPM Annual Research Award (2015) and the 2nd National Ada Byron Prize for Woman in Technology (2015). She leads the Ontology Engineering Group. She is Vice-Rector for Research, Innovation and Doctoral Studies at Universidad Politécnica de Madrid. Her research areas include: Ontological Engineering, Semantic Web, Linked Data, and Multilingualism in Information and Knowledge Management.



**Dr. María Poveda-Villalón** is an Assistant Professor at the Universidad Politécnica de Madrid Ontology Engineering Group. Her research areas include Ontological Engineering, Knowledge Representation and the Semantic Web. She has worked in the context of more than ten Spanish and European research projects. She has co-organized a number of events like the Linked Data in Architecture and Construction Workshop since 2015 and workshops and tutorials in the Semantic Web field. She designed and developed OOPSI, an on-line system for evaluating ontologies that has been adopted world-wide and has been used from more than 60 countries and more than 6000 times.



**Emilio Serrano** is an associate professor at the Department of Artificial Intelligence at the Universidad Politécnica de Madrid, lecturing in Deep Learning and Data Mining. He holds an MSc in Computer Science and a PhD in Artificial Intelligence, both from the University of Murcia. He was a visiting researcher at the University of Edinburgh, University of Oxford, and National Institute of Informatics in Tokyo. He was principal investigator in two educational innovation projects in Data Science and has also participated in several European and nationally funded programs including the FP7 research projects (smartopendata, eurosentiment, and omelette) and H2020 research projects (slidewiki and AI4EU).

## LEARNING GOALS

### Acquire

Theoretical bases  
Scientific, methodological and technological practices



Development of machine learning systems and the Semantic Web

### Understand

Concepts



Machine learning systems

Semantic Web

Web of Data

Open data

Ontology representation languages on the Web

## SYLLABUS

## MODULES

01

- Introduction to Artificial Intelligence, including the industrial and legal, social and ethics impact of Artificial Intelligence
- Fundamentals of Machine Learning
- Current technologies and trends In Ontological Engineering
- Linked Data

02

Laboratory: practical assignment

03

Industry talk: Intelligent Enterprise Unleashed

# DATA SCIENCE FUNDAMENTALS

Extracting the value that can be hidden in data to support decision-making processes. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy. The course will review the different phases of the project to extract knowledge from databases with special emphasis on the extraction of predictive models.

➤ **Course duration: 10 contact hours**

➤ **Dates: 19, 20 & 21 July 2023**

■ **Recommended background knowledge for students:**

- Data Bases
- Basics of Programming

## Meet Our INSTRUCTORS



**Dr. Ernestina Menasalvas** is full professor of data mining at the Department of Computer Systems Languages and Software Engineering, School of Computer Science, Universidad Politécnica de Madrid (UPM). She holds a PhD in Computer Science. She is currently a member of the MIDAS Data Mining and Group at the Center for Biotechnology and databases and data mining professor at UPM. Her research interests include data mining project development, recently focusing on data mining in the medical field.



**Dr. Alejandro Rodríguez-González** is associate professor at the Department of Computer Languages and Systems and Software Engineering at the Universidad Politécnica de Madrid and he holds a PhD in Computer Science. His main research interests are Semantic Web, Artificial Intelligence and the Biomedical informatics field, especially the development medical diagnosis systems, medical knowledge representation, the extraction of knowledge from different sources (text, social media, etc.) and the analysis of social media impact on e-Health, and he has participated in competitive projects in related fields.

## LEARNING GOALS

■ **Learn**

Project development methodologies



Transform data into knowledge

■ **Understand**

Basic AI methods



Supervised and unsupervised modelling, data preparation and comprehension, validation



■ **Gain**

Insight

Practical applications of the technology in the real world

## SYLLABUS

# MODULES

01

Session I

1. Introduction to Big Data Analytics and the Cognitive Era
2. The Big Data Value Chain
3. Methodologies for Data Analytics project development
4. Data Science projects: phases and tasks

Session II

1. Type of Data Mining problems:
  - a. Clustering,
  - b. association,
  - c. classification
2. Tools and techniques

02

Students will be given a dataset and they will have to extract patterns out of it by using some data analytics tool (R, WEKA, Knime, ...)

03

1. Industry talk
2. Question and answer session

## Meet Our INDUSTRY SPEAKER



**Dr. Juan Miguel Gómez Berbís** is associate professor at the Department of Computer Science in the Universidad Carlos III de Madrid. He received his PhD from the Digital Enterprise Research Institute (DERI) at National University of Ireland, Galway. He received his MBA from IE Business School, an MS in Software Engineering from the Swiss Federal Institute of Technology (EPFL) in Lausanne (Switzerland) and an MS in Telecommunications Engineering from the Universidad Politécnica de Madrid (UPM). He is now leading H2020 initiatives and ITEA3 major flagship projects.