Intelligent Data Engineering and Analytics

PhD in Computational Quantitative Biology

Aim and Description of the Course

Artificial intelligence and data analytics has shown the potential to truly improve the work of research centres, industries and businesses. Recognising the enormous value of the data collected and the importance of extracting information from it has been a milestone in knowledge engineering. This has highlighted the importance of having data analysis expertise for extracting meaningful information from often unstructured data, and advanced capabilities to learn and obtaining knowledge from the data.

This course focuses on the foudamental, advances and application of Data Engineering, Analytics and Information Extraction for Scientific Computing.

Data analysis methods and techniques will be introduced. Laboratory sessions will be included. Python programming methods and libraries dedicated to data analysis will be explained in detail. Open source data processing tools will be used.

The course is structured in twelve lessons: a two-hour introductory lesson and eight two-hour lessons.

Eight lessons will be held on the Microsoft Teams Platform, one laboratory lesson will be held in presence, at Laboratory of Monte Sant'Angelo.

Team link for course registration and lessons is:

[Intelligent Data Engineering and Analytics | Generale | Microsoft Teams](#)

CALENDAR

Introduction and Overview of the Course (Flora Amato) Thursday 18th Apr 16:30-18:30

Understanding Data, Exploratory Data Analysis (Flora Amato) Wednesday 24th Apr 12.30-14.30

Lab Session: Data analysis and manipulation, useful Libraries (Flora Amato)
Thursday 2nd May 12:30-14:30

The stage of Data Analysis, Recent Trends in Data Mining, CRISP-DM (CRoss Industry Standard Process for Data Mining) methodology, The IEEE 70xx standard (Flora Amato) Wednesday 8th May 12:30-14:30

In presence Lab Session: Data Characterization and Exploration (Flora Amato)
Thursday 9th May 12:30-14:30

Lecture Series Part II: Data discovery and Forecasting Analytics, Data view, Relationship view, Measures, Metrics, Time series analysis (Flora Amato) Wednesday 15th May 12:30-14:30

Time series analysis, Data Forecasting (Flora Amato) Thursday 16th May 12:30-14:30

Lab Session: Data Discovery, Analysis and Data Forecasting (Flora Amato) Wednesday 22nd May 12:30-14:30

Teacher Bio

Flora Amato is Associate Professor at the Department of Electrical Engineering and Information Technology of University of Naples Federico II, where she has been working since 2006. Her research activities include both theoretical and experimental work in Artificial

Intelligence, Knowledge Management and Information Integration. She is Principal Investigator and Scientific Coordinator of the European Project CREA3 - Conflict Resolution with Equitative Algorithms, Grant: 101160564. She is Scientific Coordinator for the University of Naples, of the European Project IDEA I-tools to Design and Enhance Access to justice, Grant: 101160528;of the European Project CREA2, Conflict Resolution with Equitative Algorithms 2, Grant 101046629; of the European Project DEUCE Digitalising European Uncontested Claims Enforcement, Grant 101138437. She is Principal Investigator for Resilient multi-task learning on the edge from incomplete and/or noisy data, Spoke 3 Resilient AI, of the PNRR FAIR project "Future Artificial Intelligence Research" and Scientific Lead for the Department of Electrical Engineering and Technologies of Information of the University of Naples for the MISE Project AI4Heritage. Prot. nr: 61521 of 13/03/2024.

She has been a visiting researcher at the Department de Ciències de la Computació of the Universitat Politècnica de Catalunya and at the Department of Computer Science of the University of Maryland (USA).She is the author of more than 180 research papers, published in Conference Proceedings and International Journals such as IEEE Transaction on Industrial Informatics, IEEE Transaction on Automation Science and Engineering, Elsevier Journal of Knowledge-Based Systems, Pattern Recognition Letters and Computer and Security.

Programme

Lecture Series Part I: General aspects, Data Analysis Python programming lab

Introduction and Overview of the Course *(Flora Amato)*

10th Apr 16:30-18:30

Understanding Data, Exploratory Data Analysis *(Flora Amato)*

11th Apr 15.00-17.00

Lab Session: Data analysis and manipulation, useful Libraries *(Flora Amato)*

18th Apr 12:30-14:30

The stage of Data Analysis, Recent Trends in Data Mining, CRISP-DM (CRoss Industry Standard Process for Data Mining) methodology, The IEEE 70xx standard *(Flora Amato)*

19th Apr. 16:30-18:30

In presence Lab Session: Data Characterization and Exploration *(Flora Amato)*

24th Apr 11:30-13:30 – Monte Sant'Angelo Building

Lecture Series Part II: Data discovery and Forecasting

Analytics, Data view, Relationship view, Measures, Metrics, Time series analysis (*Flora Amato***)**

2nd May 12:30-14:30

Time series analysis *(Flora Amato)*

8th May 12:30-14:30

Data Forecasting *(Flora Amato)*

9th May 12:30-14:30

Lab Session: Data Discovery and Analysis *(Flora Amato)*

15th May 12:30-14:30

Lab Session: Data Forecasting *(Flora Amato)*

16th May 12:30–14:30