AD HOC TEACHING MODULE Announcement

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

PHD IN INFORMATION AND COMMUNICATION TECHNOLOGY FOR HEALTH

PHD IN INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

PHD IN COMPUTATIONAL AND QUANTITATIVE BIOLOGY

Module Title: Big Data Architecture and Analytics

Lecturer: Prof. Giancarlo Sperlì

University of Naples Federico II

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CV: is an Assistant Professor at the Department of Electrical and Computer Engineering of the University of Naples Federico II. He obtained his PhD in Information Technology and Electrical Engineering at the same University defending his thesis: "Multimedia Social Networks". He is a member of the PICUS (Pattern analysis and Intelligent Computation for mUltimedia Systems) departmental research groups. His main research interests are in the area of Cybersecurity, Semantic Analysis of Multimedia Data and Social Networks Analysis. Finally, he has authored about 80 publications in international journals, conference proceedings.

Lecturer: Prof. Giovanni Improta

University of Naples Federico II

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CV: is an Assistant Professor at the Department of Public Health of the University of Naples Federico II. He has two master degrees in Management Engineering and in Biomedical Engineering. Furthermore, he obtained three PHD among 2009 and 2017 in Economics and Management of Health Organizations at the University of Naples Federico II, Bioengineering at University of Bologna Alma Mater Studiorum and Industrial Product and Process Engineering at University of Naples Federico II. His research interests lie in the area of multi-criteria decision systems, digital health, Lean and Six Sigma in healthcare, and Health Technology assessment. He also participated in several national and international research project in the field of digital health. His authored more than 100 publications on the management and optimization of health process.

AD HOC TEACHING MODULE Announcement

Lecturer: Prof. Jari Haukka

University of Helsinki

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CV: is a University Lecturer at the Department of Public Health in the University of Helsinki. He has PhD in Public Health in University of Helsinki. His research interests lie in epidemiology, especially in cancer, oral health, ophthalmology, psychiatry, and pharmacoepidemiology. He has also participated in several national and international research project in many fields of epidemiology and served as professor in Tampere University. He has authored more than 290 publications (https://orcid.org/0000-0003-1450-6208) and has supervised and is currently supervising several PhD candidates.

Lecturer: Prof. Peter M.A. van Ooijen

University Medical Center Groningen

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CV: is an Associate Professor in AI in Medical Imaging at the department of Radiation Oncology of the University Medical Center Groningen, Groningen, The Netherlands and Coordinator of the Machine Learning Lab of the Data Science Center in Health (DASH) at the same institution. He obtained his Master in Technical Computer Science with specialization in Computer Graphics from the Delft University of Technology and his PhD from the University of Groningen on "Technical and Clinical Evaluation of non-invasive coronary imaging using advanced three- and four-dimensional visualization techniques". His research is in the application of AI into the area of Medical Imaging with a focus on cancer imaging. He is (co)author of 196 scientific publications and 29 book chapters. Currently, he is (co)supervising a group of 13 PhD students. Internationally he is board member of the European Society of Medical Imaging Informatics (EuSoMII) as chair of the scientific committee and workgroup member of committees of the European Society of Radiology (ESR). He is also one of the series editors of the EuSoMII book series "Imaging Informatics for Healthcare Professionals".

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Dates and Locations

Date	Hours	Lecturer
6 April 2022	**14:30-16:30**	**Giancarlo Sperlì**
8 April 2022	**10:00-12:00**	**Giancarlo Sperlì**
22 April 2022	**10:00-12:00**	**Giancarlo Sperlì**
27 April 2022	**14:30-16:30**	**Giancarlo Sperlì**
29 April 2022	**10:00-12:00**	**Giancarlo Sperlì**
4 May 2022	**14:30-16:30**	**Giovanni Improta**
6 May 2022	**10:00-12:00**	**Jari Haukka**
11 May 2022	**14:30-16:30**	**Peter M.A. van Ooijen**
28 June 2022	**14:30-16:30**	**Giancarlo Sperlì**

Content

The aim of the course is to investigate Big Data methodologies and architectures for supporting several analytics in health field from different point of views. In particular, the course provides an introduction to Big Data and Data Analytics Lifecycle, with reference to the design of large and complex data systems. Furthermore, the course focuses on the processes of ingestion, modelling, analysis and visualization about Big Data. Possible applications of these methodologies and architectures for Health case studies will be discussed from different point of views at the end of this course. There will be a final assessment.

I Lesson

Introduction and fundamentals about Big Data; design and definition of Big Data system; Data Model for Big Data, Definition and design of Kappa and Lambda architectures.

II Lesson

Introduction of NoSQL databases; Fundamentals of NoSQL databases; Differences between SQL and NoSQL databases; Analysis of NoSQL databases' families: Key-value systems - Column-family storage systems, Graph storage systems, Document Database systems.

III Lesson

Case studies using Document (MongoDB) and graph (Neo4J) based NoSQL databases for supporting health analytics.

IV Lesson

Introduction and fundamentals of Big Data Analytics (BDA); State of art of Big Data Analytics; Big Data Analytics Lifecycle; Hadoop Framework. Investigation of both Lambda (Spark) and Kappa (Storm) architecture.

V Lesson

Application of Big Data Analytics architecture and methodologies for Health case studies using graph neural networks

VI Lesson

Application about Lean and Six Sigma in healthcare using Big Data

VII Lesson

Application about epidemiology in healthcare using Big Data

VIII Lesson

Application about image analysis in healthcare using Big Data

IX Lesson

Application of Big Data methodologies

ECTS Credits 5

Notes

Lectures will be delivered in on line mode on Microsoft Teams

https://teams.microsoft.com/l/team/19%3akPIreNw1VVcmdPjvkLcFLJyhSFKBqmJ6qvsdO4lJ4z81%40thread.tacv2/conversations?groupId=6fa68568-d358-4fdf-83d6-9517643893c8&tenantId=2fcfe26a-bb62-46b0-b1e3-28f9da0c45fd

(Team Code: 0ms5oj6)

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