

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Course announcement

Title: **On the challenges and impact of Artificial Intelligence in the Insurance domain**

Lecturer: **Ing. Lorenzo Ricciardi Celsi, PhD, MBA**

ELIS Innovation Hub & Università Campus Bio-Medico di Roma

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Academic year: **2022-23**

Credits: **3 CFU**

Short bio notes

Lorenzo Ricciardi Celsi, IEEE Senior Member, received his Ph.D. degree in Sciences et Technologies de l'Information et de la Communication from Université Paris-Saclay, Paris, France, in 2018 and an International Master in Business Administration from Luiss Business School, Rome, Italy, in 2022. His research interests include cooperative control methodologies for multiagent systems and applied research in artificial intelligence. From 2020 to 2021 he was the scientific responsible for the Joint Research Project initiative and since 2022 he has been the program manager of Open Italy – Open Innovation Based R&D, both at ELIS Innovation Hub, pursuing technology transfer from academia to industry.

Overview

The course introduces how Artificial Intelligence (AI) is reshaping insurance, ranging from multimedia forensics to car crash detection based on telematics data. In addition to a general introduction to the field of AI applications in insurance, we discuss a few topics that are widely considered very effective and promising. We will also discuss the results obtained with respect to some relevant use cases. In particular, (i) the role of deep learning in multimedia forensics, and (ii) the concept and benefits of explainable AI will be discussed.

There will be a final assessment.

Schedule

Lecture	Date	Time	Topics	Lecturer
1	21/11/2022	10.00-13.00	A survey on deep learning for multimedia forensics	L. Ricciardi Celsi
2	24/11/2022	10.00-13.00	Identification of social media platform of videos through the use of shared features Enabling the digitalization of claim management in the insurance value chain through AI-based prototypes	L. Ricciardi Celsi
3	28/11/2022	10.00-13.00	A deep learning based anti-fraud system for car insurance claim management	L. Ricciardi Celsi
4	30/11/2022	10.00-13.00	XAI for car crash detection based on telematics data	L. Ricciardi Celsi
Final assessment				

Lecture 1 – A survey on deep learning for multimedia forensics

- Generating fake image and video content: multiple compression; manipulated media; generated media.
- Forgery detection on images and videos: manipulation specific architectures; challenges and best practices for forgery detection.
- Assessing the origin of multimedia content: camera model identification; device identification; social network and messaging app identification; best practices for source identification.
- Deepfakes and strategies to detect artificially generated content: deepfake human face detection with deep learning; do GANs leave artificial fingerprints?; towards the generalization of GAN-generated content detection; challenges and best practices for deepfake detection.
- Evaluation metrics for multimedia forensics.
- State of the art of multimedia forensics datasets.

Lecture 2

Part I – Identification of the social media platform of videos through the use of shared features

- Platform provenance analysis.
- A machine learning based framework for social media platform identification.
- Experimental evaluation on a real use case.

Part II - Enabling the digitalization of claim management in the insurance value chain through AI-based prototypes

- Six-step methodology for image analytics projects.
- Sensitive data detection and anonymization on claim images.
- Manipulation detection on claim images.
- Lessons learned in terms of translating business into analytics.

Lecture 3 – A deep learning based anti-fraud system for car insurance claim management

- Problem setting; deep architectures for damaged detection; proposition of a novel method for damage localization and claim-level feature aggregation; damage re-identification.
- Experimental results on a real use case.

Lecture 4 – Explainable AI (XAI) for car crash detection based on telematics data

- The current trend of translating XAI to multivariate time series.
- Description of a real use case of car crash detection based on telematics data.
- AI agent for car crash detection.
- Main concept of XAI and multivariate time series to image encoding.
- Relevant XAI approaches for multivariate time series: Grad-CAM, Integrated Gradients, LIME.
- Comparison among XAI approaches on the experimental use case and quantitative evaluation of the results

MsTeams:

<https://teams.microsoft.com/l/team/19%3a86Y6jVqKjy1klPgwa1Zbn67YsWoKLnGapnz412FsRqU1%40thread.tacv2/conversations?groupId=e616f27d-e58e-4f20-8418-9bd8e1e46f91&tenantId=2fcfe26a-bb62-46b0-b1e3-28f9da0c45fd>

Teams Code: **0kumc24**



For information: Dr. Lorenzo Ricciardi Celsi – lorenzo.ricciardicelsi@gmail.com

Interested students are requested to send an e-mail to Dr. Ricciardi Celsi by no later than September 30th, with the following information for participating to the course: student name and surname, PhD cycle.