UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

PHD PROGRAM IN INFORMATION AND COMMUNICATION TECHNOLOGY FOR HEALTH

PHD PROGRAM IN INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

PhD course announcement

Title: **Social Robotics**

Lecturer: **Prof. Silvia Rossi**

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Prof. Alessandra Rossi

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Credits: 4

Short bio notes

Silvia Rossi is an associate professor at the Department of Electrical Engineering and Information Technologies, University of Naples Federico II, where she is the scientific director of the PRISCA Lab (Projects of Intelligent Robotics and Advanced Cognitive Systems – http://www.prisca.unina.it). She received the M.Sc. degree in Physics from the University of Naples Federico II, Italy, in 2001, and the Ph.D. in Information and Communication Technologies from the University of Trento, Italy, in 2006. She is an Associate Editor for IEEE Robotics and Automation Letters (RA-L), the International Journal of Social Robotics, Pattern Recognition Letters, and for Intelligent Service Robotics journal. Prof. Rossi has been involved in several EU and non-EU projects. She is currently the principal investigator and coordinator of the MSCA-ITN-2020 PERSEO (European Training Network on Personalized Robotics as Service Oriented applications), PI of the HORIZON-TMA-MSCA-DN project TRAIL (TRAnsparent, InterpretabLe Robots), PI of the CHIST-ERA IV project COHERENT (Collaborative HiErarchical Robotic ExplaNaTions), and Coordinator of the national PRIN project ADVISOR (ADaptiVe legIble robotS for trustwORthy health coaching). She was the general chair of RO-MAN 2020 and RO-MAN 2022, Program Chair of ICSR 2020 and ICSR 2023, and she is in the program committee of several international conferences on human–robot interaction and artificial intelligence. Her research interests include Socially Assistive Robotics,

Human-Robot Interaction, Cognitive Architectures, and User Profiling and Recommender Systems. Her main research activities aim at the investigation of computational approaches for autonomous agents' behaviors able to interact and support people by extracting meaningful information to model the user and to adapt the agent behavior. She published more than 180 papers in international journals, books, and conferences.

Alessandra Rossi is Assistant Professor working as part of Italian PON R&I 2014-2020 – REACT-EU (CUP E65F21002920003). She was previously a postdoctoral researcher on the BRILLO project (PON I&C 2014-2020 MISE) at the University of Naples "Federico II". Her PhD thesis was part of the Marie Sklodowska-Curie Research ETN SECURE project (https://secure-robots.eu/) at the University of Hertfordshire (UK). Alessandra is co-PI of the AFOSR ERROR project, Project Manager of Marie Sklodowska-Curie Research ETN PERSEO, and involved in the scientific coordination of several national and international projects. She has been Publicity chair at IEEE RO-MAN 2022 and 2023, Virtual Organizing Chair of IEEE RO-MAN 2021, Registration Chair and Social Media Responsible for IEEE RO-MAN 2020. Alessandra is currently Special Session Chair at IEEE RO-MAN 2024, and she is Exec member of the RoboCup Humanoid League since 2022. Her research interests include Human–(Multi) Robot Interaction, social robotics, trust, XAI, multi-agent systems and user profiling.

Overview

In this module, students will learn the key aspects of designing and developing robots' behaviours that are accepted and familiar to people. Particular attention will be given to robotics applications and scenarios where robots are expected to have close interactions with people and support therapists and caregivers. Students will be provided with an overview of the multidisciplinary aspects to consider in order to design a human-robot interaction (HRI) by discussing and learning aspects and techniques from different relevant fields, such as robotics, computer science, engineering, psychology, and artificial intelligence (AI). Students will learn how to design and conduct a HRI study, and how to choose subjective and objective measures to evaluate the interaction with the robot, and people's perception of the robot's behaviours and their effect on users. Students will also be exposed to different robots, such as Pepper and Furhat, that are used in human-centred scenarios, such as assistive robots in private homes, care facilities and hospitals, robotic companions in home environments, and robots in rehabilitation centers.

There will be a final assessment.

Dates and Locations

The lectures will be held on 3, 4, 8, 9 15 April in room Savastano (near the photocopy shop) at DIETI in Piazzale Tecchio, 80125, Naples.

The assessment will be on 16 April at the PRISCA lab, backward-left building, third floor in Piazzale Tecchio, 80125, Naples.

Schedule

Lecture	Date	Time	Topics	Lecturer
1	03/04/2024	9:00-11:00	Introduction: Human-Robot	Alessandra Rossi

			Interaction (HRI)	
2	04/04/2024	9:00-12:00	Perception in HRI	Alessandra Rossi
3	08/04/2024	9:00-12:00	Intentional Action	Alessandra Rossi
4	09/04/2024	9:00-13:00	Social Robotics Applications	Silvia Rossi
5	15/04/2024	9:00-12:00	HRI Experiments	Alessandra Rossi
6	16/04/2024	10:00-13:00	Assessment test	Silvia Rossi

Content details

Lesson 1 – Introduction (200-300 car.): In the first lecture, we will introduce the Human-Robot Interaction field, and the fundamental principles shaping the dynamic interplay between humans and robots, delving into communication, design, and ethical considerations.

Lesson 2 – Perception in HRI (200-300 car.): We then are introducing the sensors and perception system of robots, how robots can recognise and track humans, techniques for speech recognition and dialogues, intent recognition and affective technologies.

Lesson 3 – Intentional Action (200-300 car.): We will look at the Intentional Action in Human-Robot Interaction with particular attention to the techniques for understanding and interpreting human intentions, pivotal for fostering intuitive and effective collaboration between humans and robots.

Lesson 4 – Social Robotics Applications (200-300 car.): Examples of modern social robotics applications will be provided to show how it is possible for robots to build long-term relationships with particular attention to people's perception of acceptance and trust of a social robot.

Lesson 5 – HRI Experiments (200-300 car.): We will provide key points for designing a user study for Human-Robot Interaction, beginning from research methods, metrics and measurement to be used, and concluding with inferential statistics and analysis of variance (ANOVA) of the data collected.

Lesson 6 – Assessment test (200-300 car.): Students will choose a scientific paper within HRI topic from one of these two journals "international journal of social robotics" or "transactions on human-robot interaction". Then, they will prepare a 10-minutes presentation describing the article in a critical manner. Noting the research hypotheses, methodology, the results, and provide conclusions by paying particular attention to user studies.

Participants are requested to send an e-mail to alessandra.rossi@unina.it and silvia.rossi@unina.it by 22 March 2024, with the following information:

Student name and surname, name of the PhD course, PhD cycle.

For information: Prof. Alessandra Rossi (DIETI, UniNA) – alessandra.rossi@unina.it *(organizer)*

Prof. Silvia Rossi (DIETI, UniNA) – silvia.rossi@unina.it *(organizer)*