



SHAREWORK TRAINING COURSE

#3 HUMAN SAFETY AND CYBERSECURITY APPROACHES IN HUMAN-ROBOT COLLABORATION

INTRODUCTION

Safety and cybersecurity are key factors in Human-Robot-Collaboration (HRC) systems. Usually, when dealing with lightweight collaborative robots, safety is inherently implemented by force and torque measure. In case of industrial manipulators, such inherent safety is not available and new ways have to be found to guarantee operators' safety in a shared environment, avoiding collisions and adjusting robot velocity. In addition to that, implementing cybersecurity measures is more and more important due to the continuous growth of robotics systems and increase in cybersecurity attacks and safety risks.

In this course on human safety and cybersecurity in Human-Robot Collaboration, students will delve into data security strategies to protect manufacturing systems from cyberattacks and we presented the latest research in Human-Robot Collaboration safety from the point of view of using sensors to modify the robot reach and develop computational approaches to ensure a safe and effective collaboration between humans and robots.

TOPICS

- Cybersecurity strategies and concepts in Human-Robot Collaborative systems in a manufacturing environment.
- Touchless safety measures to detect operators entering the workspace of the robot to translate the distance measure into effective safety in form of velocity control.
- Understanding the distance-based 3D sensors versus presence-based safety sensors for collision avoidance.

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TARGETED TO

- Undergraduate, graduate or master students willing to learn about the application and research on safety and security approaches in collaborative robotics, Human-Robot Collaboration, cybersecurity in Industry 4.0 systems, Human-Machine interaction, etc.
- Researchers in Human-Robot Collaboration, safety in robotics, computer vision and Human-Robot Interaction, among other topics from Universities and research centers.
- Professionals from companies in the field of robotics, cybersecurity, sensorics or Industry 4.0.

SPEAKERS

SPYROS KOUKAS, SENIOR SOFTWARE ENGINEER - TECHNICAL LEAD, NETCOMPANY - INTRASOFT

Spyros Koukas studied in the Electrical and Computer Engineering school of the National Technical University of Athens. He has an Engineering Diploma in Electrical Engineering and Computer Engineering and an MBA in Engineering – Economic Systems.

Since 2008 he has been working full time on software engineering and he is experienced in software architecture, technical lead, software design, integration and development of distributed software systems. Since the beginning of his career, he has worked in an international environment in a wide range of applications such as Robotics, Manufacturing, IoT, Simulation, Security, Telecommunications and Web Applications.

AQUIB RASHID, SENIOR RESEARCHER IN ROBOT CONTROL AND VISION, FRAUNHOFER

Aquib Rashid has a bachelor's in computer engineering and a master degree focused on co-design methods for safety critical systems at TU Chemnitz. He has worked at various corporate and research institutions like Robert-Bosch, TU-Chemnitz and currently Fraunhofer. Passionate about working on projects that make large impact to everyday life of people, his research focus is in developing integrated robot control & vision systems. He has developed a new collision avoidance methodology comprising of 3D sensors and industrial robot, which is more flexible and efficient compared to state of art. He has published multiple research papers on the topic and aim to find industrial collaborations for the realization of the solution.

NILS MANDISCHER, SCIENTIFIC EMPLOYEE, RWTH AACHEN UNIVERSITY

Nils Mandischer M.Sc. is a scientific employee of four years at the Institute of Mechanism Theory, Machine Dynamics and Robotics (IGMR) of RWTH Aachen University. His main fields of research are computer vision, sensor data analysis and human-robot-collaboration in firefighting, resulting in the team lead of human-robot-teaming special research group at IGMR. His main contribution in Sharework is in the field of autonomous item detection and localization and safety for industrial manipulators.