ALESSANDRO DE TONI

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EDUCATION

Politecnico di Torino – Master degree in Mechatronic Engineering   2020 – 2023
- **Grade:** 110/110
- **Thesis:** "Modeling, identification and control of an omnidirectional wheeled manipulator for intralogistics applications in shared workspaces"

Università Politecnica delle Marche – Bachelor degree in Software and Automation Engineering   2017 – 2020
- **Grade:** 110/110 cum laude
- **Thesis:** "Identification and control of a pressure actuator"

Liceo Scientifico G. Marconi, Pesaro – High school degree   2012 - 2017
- **Grade:** 100/100

EXPERIENCE

Thesis abroad, Technical University Munich (TUM)   October 2022 – June 2023

Munich, Germany

– *In this project, a model-based whole-body controller, capable of seamlessly handling both navigation and manipulation tasks while ensuring human safety, was developed. The controller incorporates dynamics by leveraging the impedance control theory, along with theoretical formulations of artificial potential fields used to exploit the system's redundancy. To maintain safety, instead, the Generalized Safe Motion Unit algorithm was employed.*
Furthermore, a big effort was placed to derive the comprehensive model of an omnidirectional-wheeled mobile manipulator, considering both dynamic and kinematic perspectives. The modelling was followed by an identification procedure of the RB-KAIROS+ robotic platform, currently employed in the EU project DARKO (https://darko-project.eu/). The resulting identified parameters served as the foundation for testing the bespoke control architecture through MATLAB/Simulink.
To approach real-world implementation, the architecture was then ported to C++, integrated with ROS, and simulated in Gazebo.
Finally, it is worth mentioning that the entire thesis project was carried out at the Munich Institute of Robotics and Machine Intelligence, under the guidance of Chairperson Sami Haddadin.
– Key words of this experience: Whole-body control, safety, force/position control, literature research, simulation, problem solving in real case scenario.
– Softwares used: Robot Operating System (ROS), Gazebo, MATLAB, Simulink, C++, Docker, Ubuntu.

Member of student Team Diana   November 2021 – September 2022

Torino, TO, ITALY

Team Diana is a student team of about 100 members that aims to create a mars rover and participates to several rover challenges like the ERC. www.teamdiana.it
– Member of the mechatronic/computer science department.
– Key words of this experience: Simulation, digital twin development, firmware, control of the mobility part, path following, position controller.
– Softwares used: CoppeliaSim, C++, Ubuntu, MATLAB, Simulink, Github.

Internship, Loccioni Group (AEA srl.)   June 2020 – October 2020

Ancona, AN, ITALY

– System identification of a pressure actuator followed by the development of a position and velocity control system (PID controller with antiwindup).
– Softwares used: TwinCAT, MATLAB, Simulink.

University projects and Teamworks
– Develop and realization of a game controller for "Asteroids" on the board STM32 NUCLEO using IMU sensor, a microphone and buttons.
– Simulation of a plant using Fluidsim, Codesys and TIA portal.
– Control of thrust of a quadcopter through a Renesas microcontroller and an altimeter.
– Develop of a restful API using JAVA.

SKILLS

Technical skills

- Basic: Python, Docker, Arduino, TwinCAT, Fluidsim, Codesys, TIA portal
- Intermediate: JAVA, C, ROS, Simulink, Ubuntu
- Advanced: Matlab, Embedded systems, Windows, C++

Soft skills

Teamworking and organization, problem solving, determination, initiative, critical thinking, adaptability, listening.

LANGUAGES

Italian	Mothertongue
English	FCE (B2) Grade A - Full professional proficiency, Master degree completely taught in english
French	Elementary

INTERESTS

- Basketball and sports in general, robotics, scout movement, TV series and videogames.