University Academic Curriculum Vitae

Personal information

Name RABERT RAJESH MALLAVARAPU

Education since leaving school

- 2017 Bachelors of Applied Science Mechanical Engineering, University Of Windsor, Canada.
- 2023 Masters in Industrial Mechanical Engineering (Automation), Free University Of Bozen-Bolzano, Italy

Present appointment

- Assistant Researcher
- Mar 2024 – Current
- European Project
- Libera Università di Bolzano
- Research Project: Redundancy for resilience in smart factories of the future through hybrid mobile robotic systems (R3D).
- Developed and integrated an advanced perception model into a robotic safety controller based on the Speed and Separation Monitoring guidelines from ISO TS 15066.
- The system is deployed at the Smart Mini Factory Laboratory to enhance safety and flexibility in Human-Robot Interaction (HRI) experiments involving mobile manipulators.
- Designed and validated an extrinsic calibration method for RGBD sensors using an experimental setup that enhanced system accuracy and reliability.
- Conducted a comprehensive evaluation of Human Pose Estimation (HPE) models, integrating CNN-based approaches for real-time human detection and motion tracking.
- Implemented a multimodal localization system that combined RGBD and inertial sensors for improved localization in indoor environments.

Professional experience

Chronological list of all previous employments (each with job title, starting and finishing dates, level, employer, responsibilities)

From / to	Job title	Name of academic Institution	Academic level	responsibilities
2024-2025	Assistant Researcher	Free University of Bozen-Bolzano	Assistant	Developed advanced perception systems for tracking humans to enhance Human-Robot-interaction.
2019-2020	Manufacturing Engineer	Rigmaster Power Ltd	Junior	Evaluated manufacturing processes based on quality criteria, such as throughput, and resource utilization. Organized and managed manufacturing workflows and resources.

Experience in academic teaching

Teaching Assistant Collaborative Robotics Applications In Industry.

- Instructed hands-on activities for advanced programming of collaborative robots.
- Developed exercises for teaching and evaluation of motion planning in collaborative robots for improved human safety and ergonomics, through implementation of safety Modalities from ISO TS 15066 such as Speed and Separation Monitoring (SSM) and/or Power and Force Limiting (PFL).
- Introduced sensors and Computer-Vision techniques for the human motion tracking.
- Tools Used: Universal Robot, Python, RGBD Sensors and collaborative robotics.

Research and scholarships

Current Research: The project – "Redundancy for resilience in smart factories of the future through hybrid mobile robotic systems (R3D)." is European research project funded by Deutsche Forschungsgemeinschaft (DFG).

- Research scholarship – 22.000,00 €/annum is awarded by Smart mini factory Lab of Free university Bozen- Bolzano.
- The role focusses on developing perception and motion models for redundant mobile manipulator and human actors respectively.
- The redundant sensor information is employed to track the Humans and Hybrid Mobile Robots motion through sensor fusion.
- The developed models are used for motion planning and control of Redundant mobile manipulators, such that the system enables Human-Robot collaboration or autonomous task execution.

Master's Thesis: Motion Planning and Control for a Redundant Manipulator with Experimental validation on KUKA LBR-IIWA robot. 03/2023-11/2023

- The thesis presented methods to analytically solve the inverse kinematic control problem of a Redundant manipulator while providing Redundancy Resolutions to avoid joint kinematic limits and singularities at position and velocity levels.
- The developed methods are evaluated using proposed KPI's and implemented on KUKA hardware using sunrise API.

Study Project: Development and integration of a Speed and Separation Monitoring (SSM) safety controller from ISO TS 15066 through ROS. 10/2022 – 03/2023

- The Project delivered an advanced safety controller which uses RGBD sensor to detect the Human in the environment and dynamically estimate the Safety Zones based on the online estimation of Stopping distances of the manipulator.
- The system reduces the safety distance to improve the human-robot collaboration fluency while still adhering to the safety requirements specified in the ISO TS 15066.

Date granted	Award Holder(s)	Funding Body	Title	Amount received
Mar 2024 – Feb 2025	Myself	Deutsche Forschungsgemeinschaft (DFG)	Assistant Researcher	22.000,00 €

Statement of interest

Industrial-Mechanical Researcher with experience in **Robotic Systems Development and Integration** for Automation of manufacturing and assembly tasks with specific focus on Human-Robot Interaction and Human-Centered collaborative applications. Possesses deep expertise in robot motion planning, Safety and Ergonomics, vision-based sensor technologies, AI-driven applications, sensor fusion, localization, and autonomous navigation systems.

Language competence

Mother tongue(s): Telugu

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	Proficient user	Proficient user	Proficient user	Proficient user	Proficient user
Italian	Basic user	Basic user	Basic user	Basic user	Basic user
German	Basic user	Basic user	Basic user	Basic user	Basic user

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user Common European Framework of Reference for Languages

Date

Signature