Aiza Batool

ABOUT MYSELF

I am a results-driven engineering researcher with a background in robotics, control systems, and AI. Alongside my academic interests, I value meaningful interactions and enjoy supporting others in adapting to new environments. I am reliable, approachable, and work well in team settings. With strong communication and problem-solving skills, I aim to contribute positively to collaborative and multicultural spaces.

WORK EXPERIENCE

⊞ INFORMATICI SENZA FRONTIERE – ITALY
RESEARCH COLLABORATION – 15/06/2024 – 15/12/2024

Conducted an in-depth study on UAV applications in developing regions.
Focused on agricultural, infrastructural, and logistical challenges.
Evaluated the sustainability and scalability of UAV systems.

⊞ MILITARY COLLEGE OF SIGNALS – PAKISTAN
TEACHER ASSISTANT – 04/2016 – 08/2016

Delivered lectures on OSSIE software installation and waveform development.
Compiled a detailed engineering guide for the department.
Assisted in technical projects and supported student learning.

⊞ OIL AND GAS DEVELOPMENT COMPANY LIMITED – PAKISTAN
INTERNSHIP – 06/2015 – 12/2015

Worked with the plant and process department, gaining exposure to operational systems.
Learned bid processes and back-plant operations in the head office.

EDUCATION AND TRAINING

01/01/2022 – CURRENT Rome, Italy
PHD IN COMPUTER ENGINEERING Sapienza Università di Roma

Research Area: Collision-Free Trajectory Tracking for UAVs
My research focuses on safety-critical control and collision-free trajectory tracking for quadrotor UAVs in dynamic and constrained environments. I developed a closed-form tracking controller integrated with Control Barrier Functions (CBFs) and compared its performance to Model Predictive Control approaches. The CBF-based controller, incorporating elliptical boundary , ensures real-time safety clearance with high computational efficiency, demonstrating superior trajectory tracking accuracy and reduced execution times.
Courses: Deep Learning and Applied AI, Control of Multi-Robot Systems, Advanced Topics in Reinforcement Learning,Vision and Perception in Human Robot Interaction.

25/09/2017 – 07/05/2020 Rome, Italy
MASTER IN CONTROL ENGINEERING Sapienza Università di Roma

Thesis: Global Period Estimation for Periodic Signals: Application to Robot Synchronization.
A new solution to the synchronization problem for MIMO nonlinear systems, in which the period characterizing the periodic signals to be tracked is uncertain. A new global identifier is introduced and applied to the asymptotic joint position tracking of a 2-link planar robot with uncertain dynamics since it is a global period identifier, it is expected to converge with no restrictions on the uncertainty size, which improves related local results in the literature.
Courses: Process Automation,Robust Control,Nonlinear Systems and Control,System Identification and Optimal Control,Multivariable Feedback Control,Control of Communication and Energy Networks.

01/10/2018 – 27/08/2019 Dortmund, Germany
MASTER IN AUTOMATION & ROBOTICS Technische Universität (Erasmus Mobility)

Course Project: Pseudo Bacterial Artificial Potential Field Path Planning Algorithm for Autonomous Robots.
Autonomous navigation of a mobile robot for the indoors in a dynamically changing environment. The data source is a binary map of the environment and the goal was to determine the shortest path from the start to the goal point while

maintaining a safe distance from the obstacles and implementing an evolutionary algorithm to make the algorithm adaptive to the environment.
Courses: Advanced Engineering Mathematics, Application of Robots,Computational Intelligence,Cyber-Physical System Fundamentals, Fundamentals of Robotics,Learning in Robotics, Logic Control,Networked Mobile Robot Systems.

05/09/2011 – 15/07/2015
BACHELORS OF SCIENCE IN ELECTRONICS COMSATS University Islamabad

Thesis: Sensor Array Interfacing with Adaptive Systems.
A cost-effective and indigenous solution of the data interface is introduced. In order to implement an array antenna (sensor array) interface. Signal from two uniform antenna arrays are captured and after down conversion for the signal processing data and channel, information is received (BSSID). Complete server installation and from software development tools extract the WLAN data and security keys. Captured data is in the form of packets saved in a file utilized in adaptive systems. The captured information is displayed on a designed GUI.

DIGITAL SKILLS

Simulation, Programming & Documentation Tools

MATLAB, Simulink, Circuit logic designing, Handling of Electronic Equipment, LaTeX Overleaf, MS Office.

LANGUAGE SKILLS

Mother tongue(s):   **URDU**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C2	C2
ITALIAN	A2	A2	B1	A1	A1

PUBLICATIONS

2021
Implementation of Power-Efficient Control Unit on Ultra-scale FPGA for Green Communication

2020
Application of Global Period Estimation in Periodic Signals for getting high performance during Robot Synchronization

2025
Collision-Free Trajectory Tracking for Quadrotor UAVs: Closed-Form versus Optimization-Based Controllers

Authors: Aiza | **Journal Name**: International Conference on Control,Decision and Information Technologies

PROJECTS

Academic projects

Designed and tested an Elliptical Boundary-based CBF Controller to enhance UAV Obstacle Avoidance.
Pseudo Bacterial Artificial Potential Field Path Planning Algorithm for Autonomous Robots.
Nonlinear Inverted Pendulum System using PID Controller and LQR implementation.
Prediction Error Estimation Methods implementation.
Coding and Simulation of Cruise Control Model.
Antenna design TX Circuit at a Specified Frequency.

HONOURS AND AWARDS

Academic scholarships

PhD funded by the Italian Ministry of Education, University, and Research (MUR).
Erasmus+ Mobility Grant for a year of study in Germany.
Master's Scholarship: Lazio Region Grant, Italy.
Bachelor's Scholarship: 4 years funded by OGDCL, Pakistan.
Twice scholarship award on scoring highest GPA by Physics department (COMSATS).

- **VOLUNTEERING**

Organizational skills

Organized a final-year project exhibition, receiving the "Best Organizer" certificate at COMSATS Islamabad.
Volunteered during an open day for young college students at Sapienza University of Rome.
Facilitated collaboration among multidisciplinary teams at the IEEE RAS Summer School on Multi-Robot Systems, Czech Technical University.
Elected as girl's representative for four consecutive years during undergraduate studies at COMSATS.
Experienced in leading academic projects by assigning tasks aligned with team member skill sets.