Syed Izzat Ullah

✉ sizzatullah@islander.tamucc.edu
☎ +1 (361) 371-1955
syedizzatullah
syediu.github.io
Corpus Christi, TX, USA

Education

Ph.D. – Computer Science — 3.83 (4.00) CGPA
Texas A&M University-Corpus Christi, USA — *May 2022-Present*

MS – Electrical Engineering (Robotics & Control Systems) — 3.16 (4.00) CGPA
Lahore University of Management Sciences (LUMS), Pakistan — *2017-19*

BS – Telecommunication Engineering — 3.83 (4.00) CGPA
Balochistan University of IT, Engineering & Management Sciences, Pakistan — *2012-16*

Professional Experience

Graduate Research Assistant - Texas A&M University-Corpus Christi — May '22 – Present
- Regulatory Policies and Risk Aware Heterogeneous Multi-Robot Motion Planning and Task Assignment

Team Lead - National Center of Robotics & Automation — Dec '19 – May '22
- Led the team in conducting research on ground robots for search and rescue applications using formal and learning-based methods

Visiting Researcher - The Robotics Research Lab, TU kaiserslautern, Germany — Jul – Sep '19
- Created a realistic canal-like environment in Unreal Engine (UE4) and Microsoft Airsim for testing autonomous drone navigation systems
- Implemented advanced motion and trajectory planning algorithms, ensuring autonomous drone navigation with collision avoidance

Research Assistant - National Center of Robotics & Automation — Jan – Jun '19
- Conducted comprehensive investigations and testing of various Motion Planning and Obstacle Avoidance algorithms to ensure the safe and reliable navigation of drones in dynamic environments
- Explored and implemented pointcloud data fusion methods, integrating stereo camera and 2D LiDAR data, enhancing environment perception, and boosting drone navigation accuracy and reliability

Teaching Assistant - Lahore University of Management Sciences (LUMS) — Jan – Jun '18
- Courses: Robot Motion Planning, Probability, and Mobile Robotics
- Assisted instructor in designing the courses, construct tests, prepare materials, and grade assignment

Research Publications

- Syed Izzat Ullah, et al. "Enhanced MADER: Integrating Kalman Filter for Improved Obstacle Prediction and Collision Avoidance in UAVs Trajectory Planning", IEEE Robotics and Automation Letters (RA-L), **[Submitted]**
- Syed Izzat Ullah, et al. "Coaxial Modular Aerial System and the Reconfiguration Applications", 2023 IEEE International Conference on Robotics and Automation (ICRA-2023), London
- Syed Izzat Ullah, et al. "Autonomous Navigation and Mapping of Snake Robots for Urban Search and Rescue (USAR)", 2023 IEEE International Conference on Robotics and Automation in Industry (ICRAI-2023), Islamabad, Pakistan
- Syed Izzat Ullah, et al. "Autonomous Navigation and Mapping of Water Channels in a Simulated Environment Using Micro-Aerial Vehicles", 2023 IEEE International Conference on Robotics and Automation in Industry (ICRAI-2023), Islamabad, Pakistan
- Syed Izzat Ullah, et al. "Motion Planning for a Snake Robot using Double Deep Q-Learning", 2021 IEEE International Conference on Artificial Intelligence (ICAI-2021), Islamabad, Pakistan

Academic Awards

1st Place in the Engineering and Computer Science Category — Oct 2023
11th Annual MSGSO Research Symposium

3rd Place Throughout the Engineering and Computer Science Category — Mar 2023
18th Annual TAMUS Pathways Student Research Symposium

Silver Medalist in BS – Telecommunication Engineering — Dec 2016
Balochistan University of IT, Engineering & Management Sciences (BUITEMS)

Research Projects

Ph.D. Research (Ongoing): Heterogeneous Multi-Robot Motion Planning and Task Assignment

- Developing regulatory policies and risk-aware motion planning framework for a multi-robot system comprising ground and aerial vehicles
- Focused on advancing drone-based last-mile delivery solutions by addressing complex challenges, including static and dynamic obstacles, and no-fly zones
- Leveraging advanced algorithms to ensure efficient, safe, and reliable multi-robot navigation, making a significant contribution to the development of cutting-edge last-mile delivery systems

Search and Rescue, Snake-Like Robot

- Contributed to the development of an autonomous snake-like robot for search and rescue missions. Employed formal methods and Deep Reinforcement Learning for survivor detection and exploration

Social Mobile Assistive Robot

- Part of the team to develop an assistive social robot, communicating with contextually relevant information in different environments using Natural Language Processing

Supervised Autonomous Whegged Robot Development for Versatile Terrain Navigation

- Supervised the development of an autonomous whegged robot capable of adaptive locomotion for obstacle navigation across diverse terrains

Hobby Projects

- Implemented UAV obstacle avoidance in Unreal Engine (UE4) using deep reinforcement learning, elevating autonomous navigation and safety
- Designed and simulated an agricultural field robot with autonomous navigation and mapping capabilities, geared towards precision agriculture
- Implemented control and navigation systems for an autonomous vehicle, utilizing the CARLA simulator and the Robot Operating System (ROS) for realistic virtual testing
- Developed an autonomous restaurant serving robot, simulated in Gazebo and ROS, demonstrating advanced automation and service delivery solutions
- Executed motion planning for a 6-link manipulator using MoveIt! in conjunction with the CoppeliaSim and ROS platforms, advancing proficiency in robot arm control and manipulation

---

Professional Certifications & Training

Udacity Nano-Degrees
Robotics Software Engineer, Introduction to Self Driving Cars, Flying Cars & Autonomous Flight Engineer

Coursera Specialization
Mathematics for Machine Learning, Robotics: Computational Motion Planning, Python for Everybody

Robotics, Computing & AI
Mobile Robotics, Robot Motion Planning, Data Structures and Algorithms, Design and Analysis of Algorithms, Multi-Agent Systems, Deep Learning, Machine Learning, Reinforcement Learning

Control & Communication
Digital Control Systems, Feedback Control Systems, Digital Communication, Digital Signal Processing, Wireless & Mobile Communication, Optical Fiber Communication, Satellite Communication

Mathematics & Optimization
Convex Optimization, Stochastic Systems, Probability and Statistics, Operation Research, Numerical Methods in Engineering, Complex Variable & Transform, Linear Algebra & Differential Equations

Networking
Skills set: Vlan, Switch Security, access layer routing, remote access (SSH, Telnet), Access list, NAT, DHCP, Routing Protocols (OSPF, EIGRP, RIP)

Computing Skills

Coding & Scripting Languages	Python, C++, MATLAB, Shell (Bash)
Robotics Frameworks	Robot Operating System (ROS), Gazebo, CoppeliaSim, Unreal engine (with airsim plugin), MoveIt!, and OMPL
Optimization Toolboxes	Matlab Optimization toolbox, CVX (Matlab/Python), Gurobi
Software & Tools	VICON, OptiTrack Motive, LabVIEW, Proteus, MS Office
Commercial Robots	Crazyflie 2.1 ecosystem, ROBOTIS Turtlebot3, UR3 robot arm
Operating Systems	Linux (Ubuntu), MS Windows
Version Control	Git/GitHub
CAD	SolidWorks, Blender, Inventor, and MS Visio