Syed Izzat Ullah

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🎓 Syed Izzat Ullah
📍 Corpus Christi, TX, USA

Education

Ph.D. – Computer Science   3.83 (4.00) CGPA
Texas A&M University-Corpus Christi, USA   *May 2022 – Present (Expected: Spring 2026)*
  Research focus: Risk-aware multi-robot motion planning in dynamic environments, incorporating collision avoidance, knowledge sharing, and transfer learning using a combination of traditional and reinforcement learning methods.

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*

Computing Skills

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

Professional Experience

Graduate Research Assistant - Texas A&M University-Corpus Christi   May '22 – Present
- Developing risk-aware motion planning for a multi-robot system comprising ground and aerial vehicles.
- Employing a hybrid approach that combines traditional motion planning methods for safety and machine learning techniques for adaptive behavior in dynamic, unknown, or partially observed environments.
- Designing and optimizing collision-free trajectories, accounting for both static and dynamic (cooperative and non-cooperative) obstacles.
- Leveraging knowledge sharing and transfer learning to enhance robot collaboration and accelerate learning in new environments.

Team Lead - National Center of Robotics & Automation   Dec '19 – May '22
- Led a team of ten researchers in conducting research on a search and rescue, and socially assistive robots
- 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
- Part of the team to develop an assistive social robot, communicating with contextually relevant information in different environments using Natural Language Processing

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

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

Research Publications

- Syed Izzat Ullah, et al. "Enhanced-MADER: Trajectory Planner in Multiagent and Dynamic Environments with Improved Collision Avoidance", IEEE Robotics and Automation Letter (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	
Attended IEEE RAS Summer School on Multi-Robot Systems in Prague	Jul 2023
Czech Technical University	
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)	

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)