Muhammad Saad

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Accomplishments

- **Technology & Digital Innovation Award**: Selected from 2800+ national and international startups at SEE Pakistan 2025 for developing an AI-powered indoor delivery robot demonstrating innovative automation solutions in Pakistan.
- **MITACS Globalink Research Internship**: Will Conduct research at **Concordia University, Montreal** under **Dr. Christopher Yee Wong** on elevator occupancy detection using the Stretch 3 mobile robot (Hello Robotics).
- **3rd Position – Human-Centered Design Competition 3.0**: Developed an AI-powered indoor delivery robot with a versatile base for industrial and Service; achieved 3rd place among 27 UET teams, MADE Foundation (USA).
- **Fiverr's Choice**: Platform-level recognition for robotics development excellence on international clients' projects.
- **Hoonhar Scholarship**: Merit-based full tuition scholarship awarded to the top 5% of students for academic excellence.

Education

University of Engineering and Technology **Lahore, Pakistan**
BSc. Mechatronics and Control Engineering ***(CGPA: 3.746/4.0)*** *September 2023 – June 2027*

Experience

Embedded Systems Lab | **August 2025**
Robotics Software Intern *Lahore, Pakistan*
- Built a low-cost mobile robot with LiDAR, Jetson Nano with optimized path planning for static and dynamic environments.
- Designed ROS navigation and simulation for efficient student training with detailed documentation.
- Reduced robot costs by 50% compared to international kits, making advanced robotics education accessible to students..

Human Centered Robotics Lab of NCRA **June 2025 – August 2025**
Robotics Research Intern *Lahore, Pakistan*
- Developed a **human-aware** navigation framework optimized for Edge-AI platforms (Jetson Nano) on a mobile robot.
- Filtered LiDAR and D435 data, integrating **leg-detection** and **NanoDet** models for real-time human localization.
- Developed ROS modules for dynamic costmap updates and smooth motion control via tuned PID controllers.

Fiverr **June 2024 – June 2025**
Robotics Software Engineer *4.9/5.0*
- Developed a ROS2-based software for **Approbotics**, for a mobile manipulator, using Nav2 and Moveit2 enabling automated pick-and-place of walls on construction sites.
- Re-engineered Ubuntu 22.04 by integrating required SDKs into a single bootable installer (.iso) with automated software deployment, reducing system setup time at **Approbotics** by **70%**.

Publications

M. Saad, M. S. Yasin, and A. Raza, **"Human Awareness for Mobile Robot Navigation on a Resource-Constrained Jetson Nano,"** in Proc. 27th IEEE Int. Multitopic Conf. (INMIC), Dec. 2025, doi: 10.1109/INMIC65900.2025.11348204.

Projects

Navitron (Indoor Delivery Robot) | *ROS, C++, Python, React* |
- Developed an Autonomous Mobile Robot (AMR) in ROS for material transport, integrated with SLAM, dynamic path planning, and sensor fusion (LiDAR & depth camera) for indoor navigation and dynamic obstacle avoidance.
- Designed chassis and suspension, conducting FEA to support an **80-100 kg** payload.
- Implemented an optimized navigation system, improving dynamic obstacle avoidance and reducing path deviation.

Borunte 2030a Robotic Arm Control | *ROS2, MoveIt2* |
- Integrated Borunte 2030a robotic arm with MoveIt2 for motion planning and manipulation.
- Utilized inverse kinematics solvers for end-effector pose control and joint-space trajectory generation.
- Enabled collision-aware planning, trajectory smoothing, and execution through ROS 2 controllers.

Multi-Robot Multi-Floor Navigation (Simulation) | *ROS 2, Gazebo, OpenRMF*
- Developed a simulation framework for multi-robot, multi-floor navigation using ROS 2 and Gazebo.
- Implemented fleet coordination, scheduling, and task allocation through OpenRMF.

Whiteboard Cleaning Robot | *Linux, Python, C, A*, YOLO*
- Developed an autonomous whiteboard cleaning robot with vision-based detection using YOLO for board localization.
- Implemented A* path planning for efficient coverage and collision-free motion along the board surface.
- Designed low-level control logic in C and Python on Linux for real-time motor control and system coordination.

Core Competencies

Languages	Python, C++, Embedded C, C, CMake
Frameworks	ROS1, ROS2, OpenCV, YOLO, MATLAB, SolidWorks
Tools	Docker, GIT, Apptainer
Platforms	Linux, Web, Windows, Jetson Nano, Raspberry, Arduino, ESP 32, Tiva TM4C123GH6PM
Soft Skills	Leadership, Problem Solving, Teamwork, Communication, Project Management, Quick Learning