RISHAD HASAN

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EDUCATION

University of Michigan | *Ann Arbor, MI* **August 2021 – December 2025**

- Senior pursuing: Major in Robotics, Minor in Electrical Engineering, Asian Studies
- Awards: University Honors – Fall 2021, Winter 2022, Fall 2022, Winter 2023, Fall 2024, Winter 2025

SKILLS

Languages: C++, Matlab, Python, Verilog, C, ARM Assembly, Julia, Robot Operating System (ROS), VISA
Software: CAD: SolidWorks; Digital IC Layout: Virtuoso; FPGA: Intel Quartus Prime; Microcontrollers: STM32; PCB: KiCad
Skills: Embedded systems design, Simultaneous localization and mapping (active SLAM), Sensor fusion, TCP/IP

EXPERIENCE

Lelantos – Product Engineer Intern | *New York, NY* **June 2023 – August 2023, June 2025 – August 2025**

- Built a fully autonomous testing setup to characterize the effect of nanomaterials on MEMS hazardous gas sensor array
- Wrote error-tolerant and modular code in Matlab and C to control 9 lab devices for continuous, multi-day operation
- Achieved consistency of 0.041˚C and 0.045% RH using embedded control system of heaters, coolers, and mass flow controllers
- Implemented physical model of adsorption of CO_2 and H_2O to accurately extrapolate gas concentrations beyond calibration data
- Generated reproducible sensor calibration curves to quantify performance and validate technology for investors and customers
- Collaborated with professors at Columbia University to research future designs and applications

Toyota Motor North America – Powertrain R&D Intern | *Ann Arbor, MI* **January 2023 – April 2023**

- Benchmarked existing and prototype electric vehicles to reverse engineer design motivations of battery management systems
- Conducted battery durability test by drop testing vehicle; analyzed strain gauge, laser distance, accelerometer data in Matlab
- Critiqued high voltage circuit layout and recommended design changes to increase safety and durability of battery pack
- Evaluated structural heat efficiency of battery pack and investigated heat-resistant materials to mitigate thermal runaway damage
- Analyzed varying markets for electric vehicles and costs of redesigning current internal combustion platforms

University of Michigan Robotics Department – Instructional Aide | *Ann Arbor, MI* **January 2024 – Present**

- Created new curriculum and labs for Intro to Human-Robot Systems to teach 100+ students about HRI algorithms and practices
- Collaborated with experts and professors in the field to use the class as a blueprint for other robotics programs across the country
- Consulted for UM Hospital to create human-centric robotic solutions for common problems healthcare workers face at work

PROJECTS

AURA Collaborative Painting Robot **September 2024 – Present**

- Formulated pipeline for user biometric data to affect 6 DOF robot arm behavior while collaboratively painting
- Analyzed and interpreted emotions using heart rate, electrodermal activity, and IMU data with Kalman filter and neural network
- Applied motion capture and eye-tracking systems to predict user intent and create metric for authenticity of art
- Tracked pose of user, painting utensil, and robot for collision prevention and path planning of robot brush strokes
- Human-Robot Interaction Award winner at Arts in Robotics at IEEE International Conference on Robotics and Automation 2025

Fabric-Embedded Resistive Soft Sensor for Therapeutic Robot **January 2025 – Present**

- Architected soft sensor array using a matrix of conductive and resistive textiles for touch localization on deformable objects
- Deployed a sequential I/O scanning algorithm on an Arduino microcontroller to map touch coordinates on a 4x4 resistive matrix
- Achieved resolution of 1 cm at 1 Hz using Matlab controller, with expandability to 159 Hz using dedicated microcontroller
- Sourced low-cost, commercially available textiles, greatly increasing accessibility compared to existing soft robotic solutions

Multiagent Robotic Firefly Mural **September 2024 – Present**

- Designed and implemented bio-inspired self-synchronization algorithms for firefly-mimicking robots
- Developed a 38kHz IR communication protocol for reliable data exchange under varying ambient lighting conditions
- Programmed RP2040 microcontrollers to execute synchronization and parse serial binary streams for message validation
- Designed custom PCBs to streamline production of firefly swarms for an art installation assessing human interaction with robots

EIPC Architectural Research **January 2021 – April 2023**

- Integrated IR camera, stereo camera, and Lidar via Azure to scan point clouds of physical spaces for digital visualization
- Created custom software in C++ and Python operating in high-resolution stationary and low-resolution SLAM modes
- Designed and 3D printed housing for sensors to mount to each other and other equipment such as a tripod or robot
- Created platform for autonomous driving robots to efficiently scan large indoor spaces such as stadiums and buildings