RISHAD HASAN

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EDUCATION

University of Michigan | *Ann Arbor, MI*

- MS in Robotics with a focus in Human-Robot Interaction **December 2026**
- BS in Robotics with Minors in Electrical Engineering and Asian Studies **December 2025**
- Publications & Presentations: ICRA 2025, FIE 2025, RoboSoft 2026, ICRA 2026

SKILLS

Languages & Tools: Python, C++, C, Matlab, ROS 2, Linux, Docker, Git, PyTorch, OpenCV, TensorRT, WebRTC, Verilog
Robotics: Computer vision, Sensor fusion, Physiological sensing, SLAM, LLM/VLM integration, Embedded systems, Audio DSP, IPC

EXPERIENCE

Bracket Bot – Robotics Engineer Intern | *San Francisco, California* **May 2026 – August 2026**

- Built mobile conversational receptionist robot with realtime voice LLM, VLM, YOLO perception, and SLAM on 8 GB Jetson Orin Nano
- Estimated per-person engagement from TensorRT YOLO tracks, head pose, velocity, and dwell time to auto-start conversations in ∼2 s
- Exposed 7 robot skills (navigation, vision, web search, memory) as LLM tools behind allow-list, schema, and rate-limit gate
- Integrated SLAM waypoint navigation into voice assistant via WebSocket bridge, map UI, and planner-enforced no-go zones
- Replaced Chromium echo cancellation with SpeexDSP daemon on hardware loopback reference, cutting CPU 5× and memory 4×
- Extended C shared-memory IPC with zero-copy reads and seqlock tear detection, cutting 1.8 MB record polls from 548 to 18 µs

University of Michigan – Graduate Student Research Assistant | *Ann Arbor, MI* **September 2024 – Present**

- Created 6-DOF painting robot arm that collaborates with an artist nonverbally, adapting its behavior to live biometric signals
- Closed loop in ROS 2 from artist heart rate to robot motion, retreating from artist's canvas quadrant as arousal rises
- Estimated emotions using heart rate, gaze, electrodermal activity, and IMU data with Kalman filter and neural network
- Trained robot image generation and action model on motion capture and emotion data to simulate short-horizon creativity
- Personalized robot behavior to artist preferences by analyzing style and color of artists' previous works
- Won Human-Robot Interaction Award at ICRA 2025 Arts in Robotics for implicit, biometric-driven human-robot co-painting

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

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

PROJECTS

Gaze Kinematics for Artist Authentication while Painting Using Machine Learning

- Developed an authentication model using Tobii gaze data, 84.8% session accuracy ($p < 0.001$) via LOSO cross-validation
- Evaluated 55 classifier configurations using nested cross-validation and 1000-permutation tests to eliminate model-selection bias
- Validated stable per-artist gaze signatures via KNN clustering, demonstrating high discriminability with only 3 training sessions

Cost-Effective Fabric-Embedded Resistive Soft Sensor for Therapeutic Robots, presented at RoboSoft 2026

- 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 Arduino microcontroller to map touch coordinates on a 5×5 resistive matrix
- Achieved response time of 81 ms with typical touch forces (0.82 N) with theoretical resolution of 0.12 in (with 2,500 points)
- Sourced low-cost textiles, increasing accessibility compared to existing soft robotic solutions ($1.14 per 100 cm^2)

Multiagent Robotic Fireflies for Educational Robotics Labs, accepted at IEEE FIE 2025

- Programmed RP2040 microcontrollers with bio-inspired self-synchronization algorithms in C++ for firefly-mimicking robot swarm
- Developed a 38 kHz IR communication protocol for reliable data exchange under varying ambient lighting conditions
- Designed custom PCBs to streamline production of firefly swarms for an art installation assessing human interaction with robots