Ojas Mediratta

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Education

Georgia Institute of Technology — Atlanta, GA

M.S. Robotics | Specialization in Artificial Intelligence, Perception, and Controls — *Expected May 2027*

Coursework: *Artificial Intelligence, Machine Learning, Computer Vision, Deep Learning, Deep Reinforcement Learning, Linear and Nonlinear Control Systems*

Georgia Institute of Technology — Atlanta, GA

B.S. Computer Engineering | *Graduated with High Honors* — *May 2025*

Coursework: *Data Structures & Algorithms, Digital System Design, Circuit Analysis, Prototyping Intelligent Devices, Embedded Systems Design, Fundamentals of Machine Learning, Network Security, Cybersecurity*

Experience

Graduate Research Assistant — Aug 2024 – Present

Georgia Institute of Technology - Contextual Computing Group — *Atlanta, GA*

- Conducted field robotics research in collaboration with Georgia Aquarium and the Wild Dolphin Project nonprofit, contributing to real-time dolphin communication research initiatives and enrichment for captive cetaceans.
- Engineered a custom bone-conduction headset for underwater use by researchers, enabling clear audio playback for real-time dolphin vocalization translation and two-way communication between researchers and dolphins.
- Developed and optimized tools for dolphin vocalization analysis using autocorrelation, waveform reconstruction, and spectrogram visualization, enabling researchers to accurately mimic essential sounds for testing.

Graduate Teaching Assistant — May 2025 – Present

Georgia Institute of Technology - College of Computing — *Atlanta, GA*

- Served as a teaching assistant for *Mobile and Ubiquitous Computing* and *Prototyping Intelligent Devices*; graduate-level, project based courses on embedded systems, firmware development, and edge machine learning.
- Guided 6–8 student teams in developing mobile-based prototypes and custom microcontroller projects, providing mentorship on report authorship that contributed to higher project success rates and more polished deliverables.
- Hosted office hours and asynchronous feedback sessions, guiding students through technical and research hurdles.

Projects

Cetacean Research AUV | *ESP32, Android, C++, Python, TensorFlow, DSP* — Aug 2024 – Present

- Built an autonomous underwater vehicle (AUV) controlled by dolphin vocalizations, enabling responsive, hands-free operation. Successfully deployed in 15+ controlled pool trials and 4 open-water trials in the Atlantic Ocean.
- Programmed an Android app to enable real-time acoustic control of the AUV, using a DSP pipeline with autocorrelation dolphin click detection and Goertzel algorithms to detect tone patterns from hydrophone input.
- Designed and fabricated parts in Fusion, iterating rapidly for waterproofing and durability for field deployment.
- Engineered and fabricated custom PCBs for ESP32 and internal electronics, tightening integration of inner layout.
- Programmed multi-threaded ESP32 firmware with PID-based closed loop control, stabilizing a 4-DOF underactuated vehicle at depths up to 7 m.

Hand-Wired Mechanical Keyboard | *C++, Arduino, Fusion 360* — Aug – Dec 2024

- Engineered a fully custom 55-key mechanical keyboard with hand-wired switch matrix, diodes, and enclosure; delivered a functional prototype from concept to finished hardware in 6 weeks.
- Programmed with custom QMK firmware in C, enabling multi-layer keymaps and OLED live status display.
- Validated hardware–firmware integration through continuity testing and debounce optimization, ensuring reliable key scanning and smooth user interaction through keys and a rotary encoder.

Smart Guitar Effects Processor | *C, C++, Arduino, Fusion 360, DSP* — May – Aug 2024

- Built a guitar-mounted audio effects controller using C++ on the Teensy 4.1 for analog to DSP via ADC.
- Implemented 6 effects, including drive, chorus, octave, and reverb, mimicking real-world guitar pedals.
- Designed a physical UI with LCD, improving usability and enabling real-time effect switching for live performance.

Skills

Hardware & Protocols: Arduino, Raspberry Pi, ESP32, ARM, I2C, UART, SPI, Serial, USB, PWM
Software: C, C++, Java, MATLAB, Python, Pandas, Pytorch, TensorFlow, Android, Kotlin, ROS2
Developer Tools: VSCode, Arduino IDE, Android Studio, Fusion 360, KiCAD, Git, Docker
Lab Tools: Oscilloscope, Multimeter, Soldering, 3D Printing, CNC Mill, Laser Cutter, Logic Analyzer
Advanced Topics: Firmware Programming, Control Systems, Computer Networking, PCB Design, Embedded ML