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 | Specialization in Distributed Systems and Cybersecurity *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.
- Annotated hours of audio data in Audacity and curated datasets to fine-tune Google's Dolphin Gemma LLM, improving model training and accuracy.

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, C++, Python, TensorFlow* 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.
- Implemented a MobileNet-style CNN with Pixel 9 to classify dolphin whistles from FFT-generated spectrograms of live audio, running efficiently on-device with TensorFlow Lite and accelerating inference using built-in T4 TPU.
- Designed and fabricated parts in Fusion, iterating rapidly for waterproofing and durability for field deployment.
- Coded ESP32 firmware and PID-based control logic for a three-thruster vectored drive, enabling stable 4 DOF underwater maneuvering at depths up to 7m.

Smart Guitar Effects Processor | *C++, Arduino, Teensy* 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.

Raspberry Pi Motion Game | *Raspberry Pi, Python, Linux* Aug – Dec 2021

- Built a Wii-style video game using Raspberry Pi, IMU sensor fusion, and UDP-linked Sense-Hat controllers.
- Integrated smart lighting and GUI on the server Pi, with real-time feedback and motion-based gameplay.
- Enabled synchronized multiplayer gameplay with real-time motion input sharing across Raspberry Pi devices.

Skills

Hardware & Protocols: Arduino, Raspberry Pi, ESP32, ARM, I2C, UART, SPI, Serial, USB, PCI, PWM
Software: C, C++, Java, MATLAB, Python, Pandas, Pytorch, TensorFlow, Android, Kotlin, ROS2, Fusion, Git, Docker
Lab Tools: Oscilloscope, Multimeter, Soldering, 3D Printing, CNC Mill, Laser Cutter, Logic Analyzer
Advanced Topics: Driver Development, Digital Signal Processing (DSP), Control Systems, Embedded ML