Samanvay Upadhyay

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Education:

University of Massachusetts Amherst **Anticipated May 2026**
Bachelor of Science in Computer Engineering, Minor in Linguistics **GPA: 3.88**
Honors Research Grant, Chancellor's Award, Tau Beta Pi, Commonwealth Honors College, Rise Scholar, Dean's List: All Sems

Research Experience:

Undergraduate Honors Thesis — Hybrid Energy-Harvester Scheduling (Advisor: Prof. Gummeson)
UMass Riccio College of Engineering, Amherst **Sep 2025 - Present**

- Designing and evaluating a hybrid energy-harvesting embedded system (thermal + solar + kinetic) for a battery-less wearable sensor platform.
- Implementing trace-driven simulations to compare scheduling policies across harvester modalities and quantify uptime & sensing coverage.
- Developing low-power firmware to implement energy-aware duty-cycling; measuring power with high-resolution instrumentation and validating against the simulations.
- Awarded Honors Research Grant to fund hardware and measurement expenses; accepted to present at Mass URC (2026).

Honors Project: 5G IoT Cyber Security Testing
UMass Riccio College of Engineering, Amherst **Sep 2024 - Jan 2025**

- Leaded a group project in analyzing timing vulnerabilities and potential attack vectors in 5G IoT on the nRF9160DK
- Developed data-driven security assessments using timing analysis to detect anomalies and assess protocol robustness.
- Documented findings in a comprehensive technical report detailing experimental results and mitigation strategies

Selected Projects:

Wavemix: Sensorized Expressive Glove Controller (Senior Design)
UMass Riccio College of Engineering, Amherst **Sep 2025 - Present**

- Creating embedded firmware for ESP32 to sample IMU, Flex and Force sensors to stream gesture events; implementing gesture-to-audio mapping and low-latency BLE support
- Designing power budget and optimizing sampling/duty-cycle to extend usability time on battery.

PlayStation 2 Wireless Driver Kernel
HackUMass XI and Personal Project **Nov 2023 - Mar 2025**

- Reverse engineered PlayStation 2 Controller's proprietary port and its communication protocol for general bluetooth RF use meant to pair with a portable PS2; implemented Linux-side driver on Raspberry Pi to enable Bluetooth pairing.

Work Experience:

Software Engineering Intern
IoT++, Houston **May 2025 - Aug 2025**

- Built and tuned CNN models for NVIDIA Jetson devices, optimizing throughput and power using quantization techniques
- Developed TensorRT inference pipelines and integrated them into a real-time edge alerting system running on IoT HW
- Worked with firmware team to cut end-to-end latency and make on-device inference more reliable under memory limits

Python Programming Teaching Assistant
UMass Riccio College of Engineering, Amherst **Feb 2024 - Present**

- Design projects with technical writing for the Python course with increasing difficulties of Python/Numpy Programming
- Collaborate in creating questions with Professor and TAs for weekly quizzes regarding coding syntax and computation
- Solve students' doubts with lab assignment questions, lectures and logistics along with general academic guidance

Embedded Software Engineering Intern
Nursing Engineering Laboratory, Amherst **May 2023 - Aug 2023**

- Worked on a multi-tiered Embedded System on nRF52 CPU firmware that records and transfers Medical Signals to a Pi
- Optimized the C code that filters the sensor data into computable ECG values for transfer in real-time using oscilloscopes
- Learned and applied Fast Fourier Transforms to make the control system's code require less power to transmit data

Skills:

Python, JavaScript, Numpy, Pandas, Git, Matlab, Kernel Programming, Hardware Testing, Java, Signals, RestAPI, Linux, HTML, Embedded System Development (ESP32, Pi, Arduino, ARM, 5G-IoT), RF, LTSpice, Security Analysis, Sensors, Pytorch

Relevant Courses:

Low Power Embedded Systems, Embedded Systems Lab, Algorithms, Data Structures, Systems Programming, Digital Design & Computer Architecture, Computational Linguistics, Artificial Intelligence, Security Engineering, Linear Algebra, Probability & Statistics, Circuits, Continuous-Time Signals and Systems