

# Sarthak Gupta

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## EDUCATION

### University of Florida

Bachelor of Science in Computer Science, Minor in Accounting (GPA: 3.77)

Gainesville, FL

Aug. 2024 – Dec. 2027

## RELEVANT COURSEWORK

Introduction to Software Engineering  
Advanced Programming Fundamentals  
Introduction to Virtual Reality  
Multivariable Calculus (III)  
Information and Database Systems Design  
Operating Systems

Computer Organization  
Data Structures and Algorithms  
Computational Linear Algebra  
Discrete Structures  
Engineering Statistics  
Business Finance

## TECHNICAL SKILLS & CERTIFICATIONS

**Languages:** Java, Python, JavaScript, C++, R, MATLAB  
**Frameworks & Platforms:** TypeScript, Angular.js, React.js, Node.js, Express.js, LangChain, FastAPI, TensorFlow, Robotics Operating System 2 (ROS2), PyTorch, React Native, Expo, Firebase, MongoDB, GIS  
**Tools & Technologies:** Git, NVIDIA Isaac Sim, OpenCV, OpenMV, AWS Polly, Figma, Ubuntu/Linux, QGIS, ArcGIS Pro  
**Methodologies:** SDLC, Agile, Scrum  
**Certifications:** Building Transformer-Based NLP Applications (NVIDIA), Fundamentals of Deep Learning (NVIDIA), Intermediate Web Development (CodePath)

## EXPERIENCE

### Robotics Software Developer

Jan. 2025 – Present

Machine Intelligence Lab @ University of Florida

- Developing a C++ Gazebo plugin within the **ROS2 control framework** for the SubjuGator 9 submarine's gripper, integrating **JointController** and **JointTrajectoryController** for **2-DOF** velocity and position control; enabling full open-close actuation and trajectory-based manipulation in simulation.
- Integrated a Water-Linked Doppler Velocity Log (DVL) into the submarine using Bash, Linux, Python and C++; increased localization update rate to **10 Hz** and reduced drift from **12 m/hr** to **4 m/hr** during sea trials.
- Contributed to the Software Team in advancing SubjuGator 9 to the **semifinals of RoboSub 2025**, ranking **12th of 55** international teams by enhancing autonomy, sensor fusion, and reliability.

### Undergraduate Researcher

May. 2025 – Present

Virtual Experiences Research Group (VERG) Lab @ University of Florida

- Developing an end-to-end AI video generation pipeline in **ComfyUI** for the US Air Force, producing training content for cadets on sexual assault prevention.
- Deploying and scaling the pipeline on **Hipergator High Performance Computing (HPC)**, processing **500 GB** of raw video and image data and generating **200 training videos** with automated text, voice, and visual effects.
- Configuring and running **multi-node Slurm jobs** on Hipergator parallelizing **CUDA workflows** to accelerate AI model inference and video synthesis.

### AI Developer Intern

Oct. 2025 – Present

Florida Resource Map Project @ Florida Community Innovation (FCI) Foundation

- Designing and deploying **LLM-driven agentic pipelines** using **LangChain**, **OpenAI APIs**, and **Python** to autonomously extract, validate, and structure non-profit and government service data from unstructured web sources.
- Building **web scraping and data-cleaning pipelines** to process over **5,000 resource listings** related to food, housing, and mental health; improving data coverage by **35%**.
- Implementing a **retrieval-augmented generation (RAG)** system with vector search for resource recommendations, increasing query accuracy and contextual relevance by **40%**.

## PROJECTS

### Audionomous | Python, OpenCV, MediaPipe FaceMesh, PyCAW, Arduino Nicla Vision

Oct. 2025 – Present

- Developed an AI-driven real-time vision-audio modulation system that adjusts headphone volume based on facial motion cues from an Arduino Nicla Vision Pro camera.
- Built a high-throughput USB-serial pipeline (30 FPS JPEG stream) with **NICL framing**, 32-bit big-endian length fields, buffered reads, and checksum validation for robust frame recovery.
- Implemented facial dynamics using **MediaPipe FaceMesh** (468 landmarks) to compute mouth aspect ratio, jaw displacement, and rotation; applied temporal filtering achieving ~95% stable detection under **200 ms** latency.
- Designed a multi-threaded **PyCAW** subsystem managing ISimpleAudioVolume sessions with asynchronous ramping, atomic cancellation, and safe restoration under concurrent process changes.

### PlayCast | React-Native, Expo, Node.js, Express.js, Google Gemini API, Firebase

September 2025

- Built a cross-platform mobile app delivering TikTok-style real-time highlight reels from live sports, using **React Native**.
- Developed a **Node.js + Express.js** backend serving highlight videos and normalized metadata through REST APIs using **CORS middleware** and range-enabled media streaming.
- Designed a live-to-highlight processing pipeline using **FFmpeg** for automated clip trimming, SportsRadar API play-by-play for timestamp alignment, and **Google Gemini API** for NLP-based scoring summaries and contextual captions.
- Integrated **Firebase Firestore** to persist user engagement data (likes, skips, favorites), powering a dynamic feed that increased personalized content relevance by an estimated **25%**.