

Bill Quach

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EDUCATION

University of Central Florida

Orlando, FL

Bachelor of Science in Computer Science

Expected May 2028

Relevant Coursework: Data Structures & Algorithms I & II, OOP, Discrete Structures, Algos for ML, Math for ML

EXPERIENCE

Undergraduate Researcher

Aug. 2026 – Present

College of Engineering and Computer Science, UCF

Orlando, FL

- Built a scripted **A/B benchmark harness** on CUDA/PyTorch with rotated run order and per-run cache instrumentation, measuring **38.4%** higher throughput from **KV-cache prefix caching**.
- Traced a **17% throughput loss** in ThunderAgent (ICML 2026) to **121 over-capacity admissions** using the same harness, cutting cache hit rate 0.82 to 0.65 and 5x'ing p90 latency to 16.6s.
- Fixed a **FastAPI** proxy defect that silently ignored **7 CLI flags** for **4 months**, self-looping every request and blocking all in-repo reproduction scripts; submitted upstream with **pytest** regression tests.

Quality Assurance Engineer

Jan. 2026 – Present

KnightHacks

Orlando, FL

- Debugged and integration tested demo code and repos across ML, database, and front-end stacks for **10+ technical workshops** delivered to **250+ attendees** while coordinating across a **15-member** team.
- Promoted workshop attendance and social media presence by collaborating with a **30+** member cross-functional Outreach and Design team.

PROJECTS

Halo | *Python, YOLO, OpenCV, NCNN, Three.js, Gemini API, Raspberry Pi 5, Arduino*

- Won **1st of 77** projects for **Waymo** and **1st of 34** for **State Farm** at **ShellHacks 2026** with a blind-spot detection bike helmet, leading its computer vision, sensor fusion, and real-time visualization.
- Detected vehicles at **sub-50 ms** latency on a **Raspberry Pi 5** with **YOLO** via **NCNN**, streaming time-to-contact alerts to an **Arduino subsystem** over non-blocking serial with a 1.5s watchdog failsafe.
- Cut side-distance error from $\pm 30\%$ in meters to **centimeter-level accuracy** via **sensor fusion** with median-filtered **ultrasonic sensors**, citing verifiable information for **Gemini API** incident reports on 10s clips.
- Built a real-time 3D threat **visualization model** in **Three.js**, rendering detected vehicles with threat severity and direction from 700-byte JSON snapshots streamed over **Server-Sent Events** at **15 Hz**.

Pinlist | *Python, JavaScript, CLIP, PyTorch, REST APIs, OAuth 2.0, Flask, SQLite*

- Engineered a full-stack multimodal music recommendation app, generating personalized playlists from image boards by **classifying 140+ images per call** across 20+ semantic labels via **CLIP zero-shot classification**.
- Achieved $\geq 80\%$ similarity score for top songs across mood categories by embedding **50 candidate tracks** into a shared text vector space and ranking via **cosine similarity** against pre-cached mood vectors.
- Built a Flask backend integrating Pinterest and Spotify **REST APIs** for board and playlist retrieval via **OAuth 2.0** with persisted session authentication in **SQLite**.

PageSense | *Python, Hugging Face Transformers, LangChain, ChromaDB, OpenAI Embeddings, Pandas*

- Built a semantic book recommendation engine over **7,000 titles** using **vector similarity search** with **LangChain**, **ChromaDB**, and **OpenAI Embeddings**, plus zero-shot genre and emotion classification.
- Scored all book descriptions across **7 emotion embeddings** (joy, fear, sadness, anger, disgust, surprise, neutral) via sentence-level inference and **max-pooling aggregation** to build an emotion fingerprint per title.
- Engineered a multi-stage **NLP data pipeline**, performing missing-value imputation, Spearman correlation analysis, and description filtering (≥ 25 words) to produce a clean, ISBN-tagged corpus for downstream modeling.

TECHNICAL SKILLS

Languages: Python, C++, C, Java, JavaScript, TypeScript, SQL

ML & Computer Vision: PyTorch, TensorFlow, CUDA, vLLM, OpenCV, YOLO, NCNN, Hugging Face Transformers, CLIP, LangChain, ChromaDB, pandas, NumPy

Frameworks & APIs: React, Node.js, Flask, FastAPI, Three.js, REST APIs, OAuth 2.0, Gemini & Claude APIs

Tools & Hardware: Git, GitHub, Docker, Linux, pytest, FFmpeg, SQLite, Jupyter, LaTeX, Raspberry Pi, Arduino