Jacob McLaughlin

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Education

University of California, San Diego | BS in Computer Science – GPA: 3.92/4.00 Expected Jun 2028
- **Awards and Honors:** Tau Beta Pi Engineering Honor Society

University of California, Riverside | Computer Science Sep 2024 – Jun 2026
- **Relevant Coursework:** Data Structures & Algorithms, Object-Oriented Programming, Computer Architecture, Software Engineering & Construction, Discrete Structures

Experience

Research Intern | Collaborative Intelligence Systems Lab – Riverside, CA Jun 2026 – Present
- Constructed a full end-to-end indoor autonomous navigation stack on a delivery robot, building a custom LiDAR map with FAST-LIO, and achieving 95% goal-reaching success rate over 40 trials
- Built an outdoor GPS campus navigation system in Python/ROS 1 with ENU projection and a Dijkstra planner over a 45-building graph, rerouting dynamically at intersections and buildings
- Reverse-engineered a commercial-grade differential-drive robot's undocumented interfaces for use on UCR's campus, completing routes of up to 0.25 miles in dynamic environments
- Integrated MPC obstacle avoidance using LiDAR with a 3.5 m horizon, robust to variable lighting
- Utilized OmniVLA-edge to navigate unknown spaces, with an 85% success rate for goals up to 5 meters

Projects

ClipSifter – AI Video Clipping | clipsifter.vercel.app Jun 2026 – Aug 2026
- Built a full-stack AI video SaaS on Next.js and PostgreSQL that turns long videos into 9:16 clips with word-synced captions, storing media in Cloudflare R2 and billing users through Stripe
- Designed an async Python/Celery job pipeline with idempotent workers, so retries and worker crashes never duplicate clips or charges; validated by a pytest suite at 90% coverage
- Built an LLM pipeline using Whisper for word-level transcription and Gemini to rank the most engaging moments, with a validation layer that repairs malformed LLM output instead of failing jobs
- Discovered a silent production bug where OpenCV read 0 frames from AV1 videos, fixing it with an ffmpeg frame pipe, and added active-speaker detection to ensure the crop follows the speaker

Student Organization Web Apps | ubi.ucrhighlanders.org, cyber.ucrhighlanders.org Jan 2026 – Aug 2026
- Developed Next.js web applications within a team of 8 for Cyber, Archery, and UBI, leveraging SSR to reduce initial load times by up to 70% and improve SEO
- Optimized a responsive, mobile-first UI using Tailwind CSS, serving 200+ monthly student visitors

LiDAR Autonomous Delivery Robot Apr 2026 – Jun 2026
- Developed GPS navigation, converting fixes into map-frame goals for A* planning in Python/ROS 2
- Integrated 2D LiDAR costmaps with Nav2 for collision-free replanning at 10 Hz
- Fine-tuned YOLOv8 for person detection on Kaggle, enabling the unit to stop for people in 18/20 trials

Object-Detection Surveillance System (ACM@UCR | Project Lead) Jan 2026 – Apr 2026
- Led 10 members across 5 sub-teams to deliver an AI-powered surveillance system, coordinating Python and Next.js development to launch a functional prototype 2 weeks ahead of schedule
- Mentored team members on YOLOv8, Python multithreading, and MQTT for accelerated onboarding

Skills

Languages: C++, Python, C#, C, TypeScript, SQL
Frameworks & Libraries: React, Next.js, Node.js, Tailwind CSS, PyTorch, ROS 1/2, pytest
Tools & ML/CV: Git, Docker, Redis, PostgreSQL, Celery, YOLOv8, OpenCV, MQTT