Parsa Ghasemi

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Education

California State Polytechnic University, Pomona Pomona, CA
Bachelor of Science in Computer Engineering; GPA: 3.5/4.0 *Expected May 2027*

- Coursework: Data Structures, Embedded Systems, Digital Logic, Signals & Systems, Linear Algebra

Technical Skills

Programming: C/C++ (C++14/17/20), Python, MATLAB
Embedded: Teensy 4.1 (ARM Cortex-M7), Cross-Compilation (PlatformIO), Real-time Control, Safety-Critical Systems
Protocols: CAN Bus (FlexCAN), Ethernet/UDP, I2C, SPI, UART, Serial
Robotics & ML: Sensor Fusion, OpenCV, PyTorch, CARLA, Gymnasium, NumPy
Tools: Git, Linux, VS Code
Concepts: Multithreading, Kinematics, Motor Control, Path Planning, Occupancy Grids, Control Theory

Experience

Vice President (promoted from Research Assistant) Apr 2025 – Present
Autonomous Vehicle Laboratory, Cal Poly Pomona *Pomona, CA*

- Earned VP promotion within 3 months in DoE-funded graduate research lab with 50+ members
- Engineered embedded control system with 100 Hz loops and centimeter-level positioning on research vehicle
- Identified 3 CAN bus attack vectors; developed defense framework and presented at SCCUR (500+ attendees)
- Directed 15 researchers across 4 teams delivering 3 conference papers and 1 production AV platform
- Integrated CAN firmware, LIDAR perception, and GPS navigation into validated autonomous pipeline

Founder & President Jan 2025 – Present
Legged Robotics Lab (501(c)(3) Nonprofit) *Pomona, CA*

- Founded 501(c)(3) robotics nonprofit focused on legged locomotion; secured $10K+ in funding
- Designed bipedal robot platform with forward and inverse kinematics analysis for walking gait development
- Delivered workshops on embedded systems, control theory, kinematics, and robot locomotion

Projects

Distributed Embedded Vehicle Control System | ***C++, Teensy 4.1, CAN Bus, Ethernet*** 2025 – 2026

- Wrote and debugged distributed CAN bus firmware in C++ across 4 MCUs at 250 kbps with 100 Hz control
- Implemented Ethernet-to-CAN gateway bridging UDP commands to 3 actuator nodes with JSON state telemetry
- Developed motor controller firmware for stepper steering, linear brake actuator, and I2C DAC throttle
- Achieved zero safety incidents over 50+ hours via multi-layered E-STOP with <200ms watchdog response

Autonomous Vehicle Navigation System | ***Python, OpenCV, NumPy, Linux*** 2025 – 2026

- Architected multi-threaded sensor fusion pipeline processing GPS/IMU data at 100 Hz with mutex-protected state
- Implemented DWA local planner with bicycle model kinematics and Bayesian occupancy grid (0.1m resolution)
- Built Pure Pursuit path follower with adaptive lookahead and costmap-based obstacle inflation
- Integrated Velodyne LIDAR, RealSense RGB-D, and Xsens IMU via thread-safe sensor abstraction layer
- Tested and validated across 50+ hours of on-hardware execution with real-time telemetry and debugging

Reinforcement Learning for Autonomous Driving | ***Python, PyTorch, CARLA*** 2025

- Built CARLA simulation (100 steps/sec, <10ms latency); trained PPO agent across 10K episodes

Publications

Defense-in-Depth Security Architecture for CAN-Based AV Control Systems (SCCUR 2025)
Simplified Multimodal Imitation Learning for Day-Night Autonomous Driving (SCAIR 2025)
DRIVE: Development Research Infrastructure for Vehicle Education (ASEE 2026)