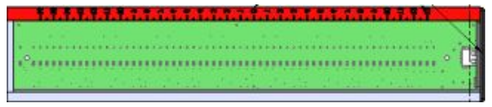
Hardware and Applied Machine Learning

Virakboth Hang, CE, 1st year MS; Charvi Shukla, CS, 2nd year MS
Managers and Mentors: Daniel Vandewiele, Daniel Neasmith, Cindy Yu, Emily Ye

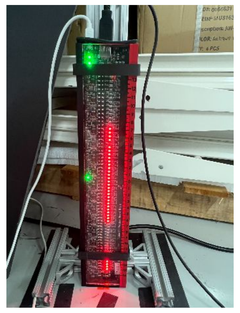
UC San Diego
JACOBS SCHOOL OF ENGINEERING
Team Internship Program

LiDAR Calibration Board



Purpose/Problem

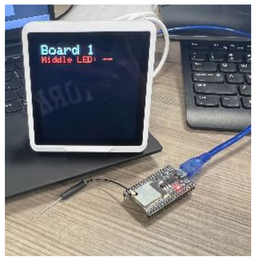
Custom PCBAs calibrate LiDAR sensors for accurate robot navigation and detection. Currently, LED levels must be inspected manually at close range, making the process tedious and inefficient.



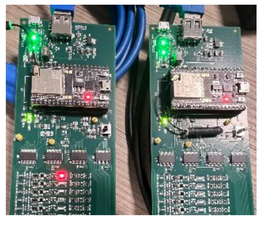
Approach & Solution

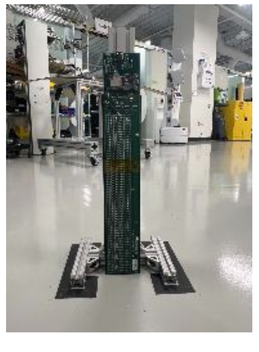
- Prototyped LED state communication redesigns through breadboarding and firmware iteration
- Implemented redesigns using EDA and simulation softwares
- Performed bring-up on manufactured PCBAs, validating power, sensing, and communication subsystems
- Resolved hardware-firmware mismatches on boards through firmware revisions











Results

- Implemented a more efficient procedure using automated LED state reporting from each board
- Each board transmits the active LEDs to a portable central hub near the operator, eliminating the need for close-range visual inspection

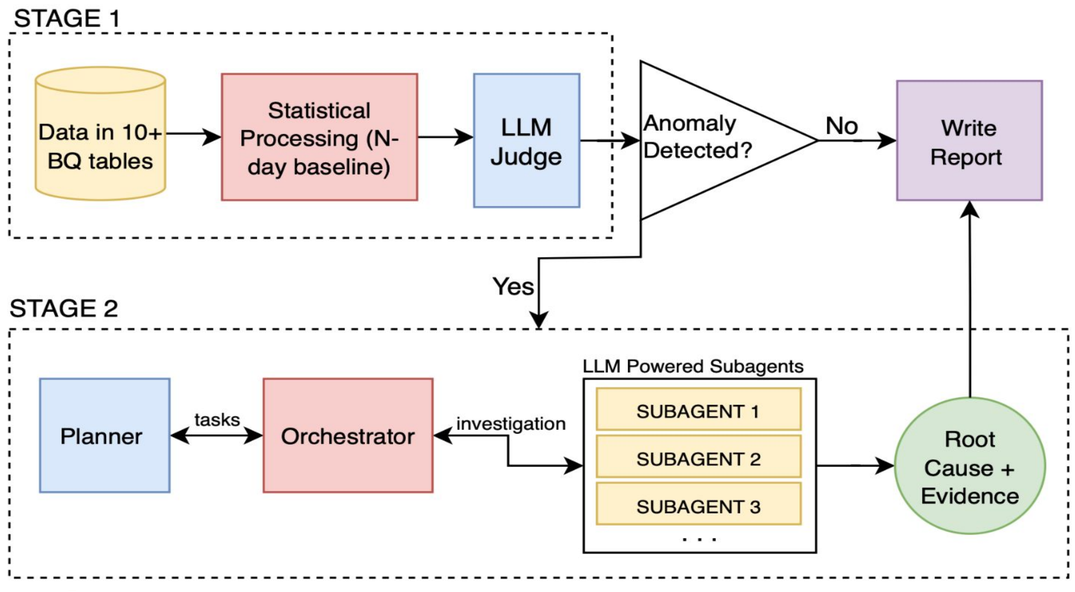
Otto: Monitor Debug Agent



Problem Statement:

- **Current State:** A fleet of robots executes daily shelf scans, pushing data through an extensive CV and insights pipeline
- **Problem:** Inconsistent physical environments and operational mistakes generate data anomalies. They may silently go undetected.
  - Need humans to manually monitor dashboards
  - Need humans to debug using various sources (BQ, logs, codebase etc

MVP Solution



Results

- **67%** accuracy on **18 trials**, with **6 real incidents** involving code, data and wrangler issues.
- Graded **deterministically** and **semantically** using Eval Harness