Vipul Prajapati

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SKILLS

Software & Tools: MATLAB/Simulink, Stateflow, Linux, Git, SolidWorks, AutoCAD, MS Office, Visual Studio.
Programming & Libraries: C/C++, Python, ROS (Noetic), Node.js, MySQL, CUDA (Jetson), OpenCL (basic), Matplotlib, Django.
Autonomous Driving: Path Planning (A*, RRT*), Localization, PID controller, ADAS Sensor Integration.
Simulation & Modeling: ROS-Gazebo, Rviz, Simple Sim, IPG car maker 11.0.
Middleware & Embedded Systems: Embedded Linux, Raspberry Pi, Jetson Nano, CAN (CANoe, CANalyzer), vFlash, JTAG.
Networking & other: Ethernet, CAN Bus, ECU communication, HIL Testing, Debugging, Image Processing, 5-why, 8D, CAPA.

WORK EXPERIENCE

System test Annotator | Magna Electronics | Global Connect, *Auburn Hills, MI, USA* **March 2025 – Present**

- Conducted system-level and in-vehicle testing for ADAS and autonomous driving systems, ensuring feature functionality, safety, and reliability across multiple ECUs. Validated key ADAS features, including Park Assist Modules, Surround View Systems, CVADAS (Computer Vision ADAS) modules, Pedestrian Detection, Parking Line Detection.
- Executed DVP&R (Design Verification Plan & Report) activities across all validation phases, ensuring compliance with system requirements and test coverage. Used CANoe and CANalyzer for CAN bus analysis, signal validation, and ECU communication monitoring during static and dynamic tests.
- Performed ECU flashing and embedded software updates using vFlash and JTAG, ensuring modules are updated and validated per build version.
- Authored and executed structured test cases and validation scripts in alignment with OEM standards, ISO 26262, and ASPICE-compliant workflows.
- Created Python-based automation scripts for diagnostic log parsing, CAN data extraction, and test result processing, reducing manual overhead by 30%.
- Managed testing documentation, failure reports, and traceability using PTC Integrity, supporting program audits and compliance reviews.

Test and Diagnostic Engineer |Ford motors company | HCL Tech, *Troy, MI, USA* **Sep 2024 – March 2025**

- Utilize Professional Technician System (PTS) for advanced diagnostics, service information access, and technical support, ensuring accurate identification and resolution of software and hardware issues in vehicle systems such as APIM (Accessory Protocol Interface Module), ADAS (Advanced Driver-Assistance Systems), IPMA (Image Processing Module A), and TCU (Telematics Control Unit).
- Support firmware updates and validate real-time performance validation on computer platforms with Linux/QNX OS, ensuring compatibility across modules.
- Analyze diagnostic data to identify trends and implement predictive maintenance strategies, minimizing system downtime and improving operational efficiency.
- Leverage MIRO and other platforms for effective project management, team coordination, and streamlined workflows.
- Collaborate closely with engineering teams to escalate recurring technical issues, provide actionable feedback for system enhancements, and contribute to continuous product development.
- Led team coordination efforts and implemented continuous improvement strategies, resulting in increased customer satisfaction and reduced average response time.
- Participate in regular training sessions provided by HCL to stay updated on advancements in Ford technologies, steadily improving expertise in automotive and embedded systems troubleshooting.

Computer Science Intern |Centrepolis Accelerator, *Southfield, MI, USA* **Jan 2024 – Aug 2024**

- Prototyped a Linux-based automotive control compute unit using Raspberry Pi 5 and Jetson Nano, integrating sensors and custom drivers using Python and C++.
- Built and deployed a Python/Node.js middleware stack for real-time control and visualization of automotive plant propagation systems and transit vehicles.
- Implemented a modular hardware abstraction layer to interface GPIO, I2C, CAN via socket CAN on Linux.
- Supported GPU-assisted image processing for camera-based environmental sensing (object detection, lane detection).

Student Assistant Tech Transit |Lawrence Technological University, *Southfield, MI, USA* **Oct 2022 – Dec 2024**

- My role involves ensuring the safety and smooth operation of transportation for students, professors, and other university members by managing logistics and the traffic control system and responsible for overseeing the schedule of other student drivers, ensuring their work proceeds without inconvenience, and contributing to the efficient operation of the transit service.
- I contribute to the development of web applications, enhancing the technological aspects of our transportation management system. Designed and implemented the creation of a college transit website utilizing React JS, Node JS, and MongoDB.

- This platform featured clear booking systems and real-time seat availability, enhancing user experience and operational efficiency. The introduction of this system led to a significant increase in transit utilization by providing clear demand insights.

Automotive Control Engineer |UNITED AUTOTECH, *India* **Oct 2020 – May 2022**

- Led the establishment of an advanced Hardware-in-the-Loop (HIL) Simulation Environment, focusing on ADAS integration.
- Conducted precise PID controller tuning sessions for ADAS algorithms, resulting in enhanced system responsiveness.
- Coordinated sensor and actuator calibration using MATLAB and Simulink for optimal performance during ADAS testing.
- Maintained meticulous documentation for comprehensive testing procedures and results, ensuring a robust foundation for system validation and future reference.
- Utilized CAN-based communication tools for analyzing and troubleshooting electrical issues within automotive systems.
- Collaborated closely with Engineering Support teams, including systems and design release engineers, to integrate electrical features seamlessly into vehicle programs and with suppliers to ensure the seamless integration of electrical components, fostering strong working relationships to resolve issues promptly and support successful vehicle launches.
- Documented and reported defects based on test plan failures, facilitating continuous improvement in the validation process.

PROJECTS

IGVC (Intelligent Ground Vehicle Competition), (ROS, Python, SimpleSim, NiceGUI) **Jan 2024 – June 2024**

E-Stop Manager for (Autonomous **C**ampus **T**ranspo**r**t) **ACTor vehicle for IGVC**

- Responsible for manual and wireless eStop mechanism using raspberry pi model 3 & 3B+.
- Developed and performed software to run eStop using ROS and Drive by Wire mechanism instead of old software based eStop.
- Designed and implemented the electrical and communication interface between RPi and the vehicle's Drive by wire system.
- Integrated RPi with the vehicle's CAN bus to directly send and receive control messages, enabling direct vehicle control.
- Utilized the RPi's GPIO pins to control external devices like relays and actuators directly connected to the vehicle's hardware systems.
- Enabled real-time visualization and control of the eStop system by utilizing a simulation interface with SimpleSim and NiceGUI, facilitating improved debugging and validation of autonomous functionalities.
- Calibrated and tested different test cases for eStop for various conditions to ensure smooth and responsive braking.
- Integrated other ADAS features such as lane keeping, parking pull in/out, parallel parking using modules like camera and lidar.
- https://www.ltu.edu/content/news/ltu-wins-college-self-driving-car-competition-for-7th-straight-year

Adaptive Cruise Control Model (ADAS), (MATLAB, IPG Carmaker) **Mar 2024 – April 2024**

- Modeled a control system for vehicle time gap and cruise control using MATLAB and Simulink.
- Integrated the model with carmaker adjusting maneuver and sensor positions to test the system for various test cases.
- Developed the logic and tuned the parameters of PID controller to match the actual vehicle parameters.
- Generated test scenarios with ego and target vehicles on several lanes and observed the test scenarios on Birds eye scope.

Autonomous Emergency Braking Controller Design (ADAS), (MATLAB, IPG Carmaker) **Jan 2024 – Feb 2024**

- Developed a test run focusing on ADAS, AEB system by establishing conditions like defining maneuver, adding traffic, collision detection, setting up AEB system and RADAR using IPG CarMaker 11.0.
- Tested and validated multiple tests runs for the various Named Values like speed, distance, and horizon of radar.

Autonomous Room Exploration and Mapping with Waypoint Navigation, (ROS, Python) **Aug 2023 – Dec 2023**

- Designed and implemented algorithms for autonomous room exploration in unknown environments, developed mapping strategies to create accurate representations of the room's layout and obstacles while following line using computer vision using Robot Operating System (ROS).
- Utilized Rviz of waypoint placement on the generated map, ensuring efficient navigation, programmed the robot to drive autonomously to waypoint in the designated order.

Dream Home Web application, (SQL, React.JS, Node.JS) **Jan 2023 – May 2023**

- Designed full-stack web software for a Property Dealer agency for ease and well-organized of their business.
- Developed a web application with different web pages by considering constraints for the project and integrating it with SQL database, Node.js and React.js.
- Integrated voice-based feature into application to enhance accessibility for blind individuals.
- https://vipul180495.github.io/AAVAS/

EDUCATION

Master of Science in Computer Science, Intelligent Systems | GPA: 3.82 **Graduation: Dec 2024**

Lawrence Technological University **Southfield, MI**

Coursework: C++ and Data structure, Artificial Intelligence, Database system, Robot operating System (ROS), ADAS, Algorithm Design & Analysis, IGVC 2024, Cyber security, Edge of AI

Bachelor of Technology, Mechanical Engineering | GPA: 3.6 **Graduation: June 2017**

University of Mumbai **Mumbai, India**

Coursework: Thermodynamics, IC Engines, Production Control and Planning, Vehicle Systems, Industrial Electronics, Composite Materials