Harish Varma Tirumalaraju

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Skills

- **Software:** MATLAB, Simulink, Stateflow, INCA, CANape, CANalyzer, dSpace, CI/CD, C, C++, Python, SolidWorks
- **Technical:** Automotive Controls, Control Systems Design, Modern & Classical Control Theory, State Estimation, Linear & Nonlinear Controls, Optimal Control, LQR & PID Tuning, Model-Based Design, CAN, Calibration, Vehicle Dynamics, Dyno Testing, Scaled Agile, Simulations, Propulsion Systems, MIL, SIL, HiL, BEVs, HEVs.

Work Experience

Powertrain Controls & Calibration Engineer | General Motors | Michigan, USA July 2024 - Present

- Developed **Powertrain control algorithms** for torque flow and power features using **MATLAB/Simulink.**
- Performed **Unit**, **MIL and SiL** validation on software using Simulink Test harnesses.
- Executed **CI/CD pipelines** and scripted **Unit, Functional and System test cases** for various functions.
- Aided in development of torque management function **architecture** and **requirements** using **Visio and JAMA**.
- Generated and tested **calibrations for powertrain systems** utilizing **ETAS INCA & Creta.**
- Performed **ECU flashing**, assisted in **software validation** using **CANalyzer** from data logs.
- Conducted **dyno testing** for drive cycles, **data acquisition** from Cloud servers, performed data analysis with **Concerto.**
- Supervised **testing using Jira and Confluence**, diagnosed DTCs, resolved **CAN & LIN issues.**
- Used **Model Predictive Control for engine power optimization** in software features.

Powertrain Controls Engineering Assistant | FEV North America | Michigan, USA May 2023 – July 2024

- Developed logic using **Stateflow, auto generated code in C language.** Performed **Unit, MIL and SIL testing** on models using **Test harnesses**. Generated **coverage metrics** and documentation of feature concepts and procedures.
- Assisted in the design, implementation and testing of **Powertrain controls software** as a function owner for **Motor, Torque Converter, Torque Management, Automatic Transmission features,** using **ISO26262** standards.
- Performed **Calibration and HiL testing** using **INCA, CANalyzer and CANape tools.**
- Scripted **test cases using Python**, performed **feature testing**, **debugging and validation** using **Simulink Test.**
- **Systems and software requirements management using DOORS and JAMA**, **AUTOSAR and SW quality** checks, life cycle development under Systems Engineering**.** Proficient in version controls such as **SVN, GIT and Jira**.

Battery Simulation Intern | Exicom Tele-Systems Ltd. | Bangalore, India Oct 2021 - Mar 2022

- Performed **structural simulations** on battery packs for **BEVs** using **SolidWorks and ANSYS.**
- Carried out **Failure Mode and Effects Analysis (FMEA) and DFMEA, IP testing, drop test on battery packs; post-processing of simulation results,** aided in **battery thermal performance testing** using PCMs and thermocouples.
- Assisted in **battery pack design** and performed **cell testing** under various environmental conditions.
- Ran **Constant Voltage/Constant Current (CVCC) cycles** to test various battery packs.

Service Controls Diagnostics Manager | GET | Bajaj Auto Ltd. | Pune, India Jul 2019 – Jan 2021

- Collaborated with **Customer, Engineering, and Management teams** to **resolve product issues in ABS and electrical components using RCA and data acquisition, diagnostics and testing** of control issues on vehicles.
- Used **diagnostic tool to diagnose DTCs and system level faults**, performed **ECU flashing** using D&F tool.
- Analysed **hardware failures** through root cause methodology and Why-why analysis.
- Performed **battery failure analysis** in motorcycles and certain process-related modifications are employed.

Projects

Active Suspension System - Used LQR & Observers to weigh states, generated state feedback controller.
Advanced Cruise Control (ADAS) - Adaptive PID control, bumpless transfer within velocity & headway controllers.
Antilock Braking System (ABS) - Rule Based control via Matlab script to optimize performance for various road conditions.
Hybrid EV Power Split Control - Generated optimal battery SOC & engine power using MPC & Dynamic programming.
Autonomous Turtlebot - Used Djikstra and Heuristic algorithms for path planning along with LIDAR and Camera Vision.

Education

Michigan Technological University | MS Mechanical Engineering | GPA: 3.9 Apr 2024
SASTRA University | BS Mechanical Engineering | GPA: 3.4 May 2019

Leadership & Achievements

Teaching Assistant for Statics course in MTU.
Area Manager, Bajaj Auto - State head for Service department, Andhra Pradesh, India.
SASTRA Racing Team, Suspension head