NAVEEN VUNNAM

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Exceptionally accomplished and skilled Embedded Software Developer with superior knowledge of MATLAB, Simulink, C/C++/Python languages, AUTOSAR and experience of CAN/LIN protocol, machine learning and computer vision.

WORK EXPERIENCE

L&T Technology Services LLC — March 2017- Present
Dearborn Electronics India Pvt Ltd — Jan 2014-Dec 2014

EDUCATION

University of Missouri Kansas City
Master of Science, Electrical Engineering, December 2016 — GPA-3.79/4

Jawaharlal Nehru Technological University, Hyderabad, India — GPA-3.5/4
Bachelor of Technology, Electronics and Communication Engineering, 2014

TECHNICAL SKILLS

- Strong Experience with Design and Development of Model-Based Software for Manufacturing and Construction equipment.
- Expertise in formal software development lifecycle activities including peer reviews, defect tracking, verification testing, deployment, etc.
- Strong knowledge of creating complex Simulink models from MATLAB scripting.
- Experience with AUTOSAR SW-C Development, AUTOSAR Testing, Debugging, CAN/LIN Protocol testing, Testing of Frames and Embedded Software development.
- Experience with Model-In-Loop and Processor-In-Loop testing.
- Involved in Requirement Analysis, writing test cases and test plan creation.
- AUTOSAR SW-C Integration experience and RTE generation for BSW layers.
- Strong basics of PID controllers, Micro controllers, and Control Systems.
- Strong background in RF, DSP, computer architecture, Networking, and PCB design and Layout design.
- Experience in performing unit tests, integration tests on HIL using CANoe, Networking emulators, oscilloscopes.

- **Languages:** C, C++, Python, LINUX
- **Simulation**: MATLAB, Simulink, VEOS, Trace32 PPC Simulator, Multisim, Pspice, Cadence, Verilog-HDL
- **Compilers/IDE**: GCC/G++ (Eclipse), Code Warrior, Code Composer Studio, Diab, Visual Studio
- **Configuration management:** Git, Git Extensions, ClearCase.
- **Debug Tools and Devices:** Code Warrior, Trace 32

- Autonomous Vehicles
- Kalman Filters | EKF | UKF
- Particle Filters
- Sensor Fusion
- Localization | Perception
- Image processing
- LiDAR | Point Clouds
- Neural Networks
- TensorFlow | Keras
- OpenCV
- Object Detection and Tracking

PROJECT EXPERIENCE

Caterpillar Inc.

Project Name	**Model Based Design & Development Support**	
Role	Developer/Tester	
Duration	June 2019 to Till Date	
Team Size	3	
Environment **(with-skill versions)**	**Software**	**Languages: Embedded C** **Tools**: MATLAB, Simulink, Stateflow, Control System Toolbox, Embedded Coder, AUTOSAR Blockset, System-Architect, CANape, CANalyzer, LINanalyzer, MATLAB App Designer, Dynasty, NI VeriStand
	Hardware	MPC5746R, Trace32, NI HIL Bench.

Project Description:

This project involves designing and development of Electro-Hydraulic Control Models for Construction equipment. This work involves working closely with the System Engineer to Productionize the existing the prototype model which includes providing support for Solenoid Fault Monitoring, PI Controller Command generation, Hydraulic System Manager, Valve Control and shutdown requirements.

Contribution:

- Requirement analysis and requirements review with System Engineer.
- Developing application-level software to implement features and functions at a product and system level.
- Design and development of AUTOSAR SW-C.
- Modeling in MathWorks environment (Simulink-Stateflow; full MAAB compliant) of the machine functionalities.
- Designing and implementing embedded software (C, C++) for embedded vehicle controls and power electronics
- Using MATLAB scripting to automate the process of creating complex models from spreadsheet data.
- Upgrade the legacy models to latest versions of MATLAB/Simulink and document the challenges faced while upgrading.
- Understand and Validate Simulink control algorithms in both Model in Loop (MIL) and Processor in Loop (PIL).
- Build / generate C code for the target platform (Simulink /Embedded Coder).
- Review the bugs with the developers along with the Simulink Test results and provide feedback for improvement.
- Provide active support to HIL verification and validation group.
- Active support to the system engineers in identification of standards for “well-written” system requirements specifications.
- Create simulation models to validate the machine functionality.
- Use MATLAB App Designer/GUI to create Apps for supporting the Simulation Testing.
- Using VEOS to simulate and test AUTOSAR ECUs.

Caterpillar Inc. – 1 year

Project Name	**MG-Articulation MIL & PIL**	
Role	Developer/Tester	
Team Size	4	
Environment (with-skill versions)	**Software**	**Languages: Embedded C** **Tools**: MATLAB, Simulink, Simulink Test, Trace32 Simulator for PPC
	Hardware	mpc5646c

Project Description:

This project involves performing model in loop testing, code coverage and developing requirement documents for 26 SWCs that are related to Articulation feature. The support activities shall be aimed towards functional safety certification ISO 13849 PLrD for Motor Grader product line that include testing the functionality of Sensors, Articulation Lever, Auto Articulation, Auto Neutral Articulation, Solenoid Fault Monitoring, PI Controller Command generation and shutdown requirements.

Contribution:

- Requirement analysis and requirements review with customer.
- Design high level Software Requirement Specification(SRS) document for each model in accordance with Functional Safety level PLrd.
- Understand and Validate Simulink control algorithms in both Model in Loop (MIL) and Processor in Loop (PIL).
- Define and develop test cases based of the developed requirements using Simulink Test tool.
- Build / generate C code for the target platform (Simulink /Embedded Coder).
- Write test cases and Validate C code (White box testing) based on the test cases using Trace32 MATLAB/Simulink integration package.
- Review the bugs with the developers along with the Simulink Test results and provide feedback for improvement.

Dearborn Electronics (INDIA) – 1 year

Project Name	**Driver Assistant Control Unit (DACU) for Volvo Trucks.**	
Role	Developer/Tester/Integrator/Team Member	
Team Size	6	
Environment (with-skill versions)	**Software**	**Languages:** C **Internal Tools**: Clear case, Clearquest, Matlab Simulink, TargetLink, CANalyzer 6.1, Candela studio 7.1, Visual studio, DaVinCi configurator & developer.

Project Description:

DACU is an Active Safety Node in Truck and responsible for providing information (like Lane change support, Collision mitigation, ACC, Driver alert support) to the driver. This project includes AUTOSAR Application SWC development using MATLAB Simulink and integration of these SWC's using Vector tools (Candela, Geny, EAD, Davinci developer).

Contribution:

- Analysis of Application software interfaces.
- Involved in Code Reviews and Functional Testing.
- AUTOSAR SW-C Development using SystemDesk
- Integration of MICROSAR (Vector AUTOSAR BSW) into DACU.
- Responsible for configuration of BSW modules
- Responsible for AUTOSAR RTE configuration& generating through Vector Davinci tool.
- Responsible for integration of Micro Controller Abstraction Layer.
- Responsible for simulation of CAN frames using CANalyzer.
- Integration of DACU AUTOSAR application SWC's (CM, ACC, DAS, LCS).
- Flash boot Loader integration.
- Implementation of I/O Control for sensors and actuators.
- Unit testing, QAC testing, Smoke testing, V1 testing, and I4 testing with sensors.
- Developed CAPL for testing MATLAB/Simulink models AUTOSAR ports
- MemStack (NVM/Fee) block configuration through EAD tool
- Com stack Configuration through GenY tool
- Constructive knowledge sharing among the team members

ACADEMIC PROJECTS

Behavioral Cloning

- Utilized Keras deep learning framework and OpenCV computer vision framework in Python to train a car to drive in a simulator.
- Achieved full performance in the training environment, as well as a previously unseen environment, through intricate data selection/augmentation strategy and neural network tuning.

Traffic Sign Classification

- Utilized TensorFlow deep learning framework and OpenCV in Python to train a classifier for the GTSRB traffic sign dataset.
- Implemented data augmentation and image jitter to achieve 95.6% accuracy on hold-out test data set.

Advanced Lane-Finding

- Utilized OpenCV in Python Jupyter notebook to create a robust image processing pipeline for detecting, recognizing, and identifying the current highway lane in an image or video.
- Additionally, calculates car position within lane and lane radius of curvature based on coefficients of polynomial fit.
- Achieved lane recognition across all frames of a fifty-second vehicle dash cam video.
- Applied a distortion correction to raw images.
- Used color transforms, gradients, etc., to create a thresholded binary image.
- Applied a perspective transform to rectify binary image ("birds-eye view").
- Determined the curvature of the lane and vehicle position with respect to center.