ABHISHEK CHATTERJEE

Model Based Development (Algorithm Engineer)

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RENAULT NISSAN TECHNOLOGY & BUSINESS CENTRE INDIA

Algorithm Engineer with a keen interest in Model Based Development.

EXPERIENCE (Total 5 Years)

2024

Algorithm ENGINEER, Renault Nissan Business Center India(RNTBCI)

Description:

Working with **NISSAN** under **WSMG Team** for the development of S3,S2 and S4.

Responsibilities:

- Experience in automotive Model Based development activities including model development and using **Matlab, Simulink, Stateflow and Target Link.**
- Analyzing System and Software analysis Software design
- Understanding the requirement of the process flow diagram.
- Working With different Projects Like **Automatic Parking System, Braking system, Cruise Control System e.t.c.**
- Good Knowledges in Sensors like **UltraSonics, Radar, Flow tube, Magnetic Flow Meter, Thermocouple, RTD**
- Using **Matlab Simulink** implementing the logics for Automatic Braking System in Nissan Vehicles for **S3 MD Cycle**
- Using **StateFlow** creating logics for interlocks according to Nissan Safety Guidelines.
- Working in Test Design/Execution Process for **MIL**, and **SIL**.
- Good Knowledge in Making Test Cases with **Signal Builder** for CP2 Activity where the desired Output meets with the Change Inputs.
- Having Good Experience in Tool Like **REACTIS** for total coverage of the Changed logics in the Model with different Test-Suite.
- Have Good Experience with **Model Advisor** to counter with Error and warnings.
- Having Good Experience in Tool **dSPACE** for model compare, and **McAP** for **HIL test cases in S4 Activity.**
- Light Knowlwdge with communication networks CAN Protocol.

- Demonstrated track record in developing and implementing automation of systems and engineering tools, model based engineering practices and advanced modeling and simulation
- Taking ownership of projects from start to finish.

Projects involved in RNTBCI

Project Title: Development of an Automatic Braking System Prototype

Introduction:

The **Automatic Braking System** is a critical safety feature in vehicles that helps prevent accidents by automatically applying the brakes when necessary.

This project aims to design and implement an ABS using ultrasonic sensors.

As part of a team project, I contributed to the development of an Automatic Braking System (ABS) prototype aimed at enhancing vehicle safety. The project encompassed various stages from conceptualization to implementation and testing.

Project Description:
Key Responsibilities and Achievements:

Research and Conceptualization: Conducted extensive research on ABS principles, including wheel speed sensors, brake modulation techniques, and control algorithms. Contributed to brainstorming sessions for conceptualizing the design and functionality of the ABS prototype.

System Design and Integration: Collaborated with team members and **NML from Japan** to design the ABS system architecture and select appropriate components such as wheel speed sensors, brake actuators.

Algorithm Development: Participated in the development and optimization of control algorithms to detect wheel lock-up conditions and modulate brake pressure accordingly. Implemented algorithms for real-time monitoring of wheel speeds and rapid adjustment of brake pressure to prevent wheel lock.

Testing and Validation: Assisted in conducting comprehensive testing of the ABS prototype under simulated driving conditions. Evaluated system performance in various scenarios including dry pavement, wet surfaces, and emergency braking situations. Analyzed test results and iteratively refined system parameters for optimal performance.

Technologies and Tools Used:
Matlab Simulink and StateFlow.

- Sensor integration (e.g., wheel speed sensors)
- Actuator control (e.g., solenoid valves)
- Control algorithm development

- Testing and validation methodologies on the Left hand side of the **V-Cycle.**
- Testing with **Reactis, HIL test case, d-Space.**
- Testing with **HIL, MIL, and SIL.**
- Analysing resultant graphs **using d-space Software.**
- Making all Coverage reports and documentation, revert back to Counter part for validation**.**

ASSISTANT ENGINEER, ITC PSPD UNIT- BHADRACHALAM

2021- 2022

Description:

System modelling of the Boiler Drum Level and Steam Temperature using **HART** Protocol implemented in **SIMULINK.**

Responsibilities:

- Understanding the requirement of the process flow diagram.
- Using **C-BOL** implemented the logic to feed the output to Control valve for maintaining the drum level.
- Using **HART** protocol in **SIMULINK** to created interlocks.
- Good knowledge in Test Design/Execution Process, Defect Life Cycle, and Test strategy & plan.
- Team reviews, raising problems, defect monitoring, providing feedback and worked closely with **IOT team**.

2020 – 2021

Description

Testing and monitoring the environment air quality by maintaining the Flue gases coming out from boiler chimney using **MATLAB SIMULINK** and **Yokogawa DCS**.

Responsibilities:

- Monitoring the Sulfur oxide, Nitrogen oxide and Carbon monoxide data from **SoX** and **NoX** detector.
- Using the **Yokogawa DCS** paralleling feature connect multiple devices into a single functional unit with Ethernet Connection to test multiple logics createdin **MATLAB SIMULINK** .
- Using **d-Space** and **HIL Testing** analyzed resultant graph to implement in the real-time scenario
- Signals from all circuits has taken in a scope and capture/widget function to analyze the data.
- Good knowledge in **SCADA** for easy-to-use graphical environment.

2019 – 2020

Description:

Working as Instrumentation Maintenance Engineer.

Responsibilities:

- Wastewater / ETP/WTP project engineering that includes P&ID review/finalization, preparation of basic study/concept note, system configuration.
- Preparation of material requisition, specifications, technical bid evaluation for PLC, DCS & ESD System.
- Complex loop and logic development as per cause and effect diagram.Familiar with various protocols like Modbus TCP-IP, Foundation Fieldbus, HART, Ethernet, Profibus, etc**.**

SKILL SET

- **Python** (3.9.x, 3.10.x)
- Pandas and NumPy
- Data visualization & Data Manipulation
- MATLAB and SIMULINK
- ABB DCS and Honeywell PLC
- Embedded C, C

COURSES

1. **Master Certification Course** in ***Data Science*** **and** ***Business Analytics***
2. *Python for Data Science* certified by **SimpliLearn**. *Certificate Code* – ***3281558***
3. **MATLAB** and **SIMULINK Onramp** certificate by ***MathWorks***

EDUCATION

2018 – B. TECH IN ELECTRONICS AND INSTRUMENTATION ENGINEERING
ACADEMY OF TECHNOLOGY, WEST BENGAL

2014 – HIGHER SECONDARY
TRIBENI TISSUES VIDYAPITH, TRIBENI, WEST BENGAL

2012 – ICSE
TRIBENI TISSUES VIDYAPITH, TRIBENI, WEST BENGAL

PROFESSIONAL PROJECTS

2022

REDUCE THE TIME A MERCEDES-BENZ SPENDS ON THE TEST BENCH

The aim of the project is to use different *Machine Learning* algorithms using Python to reduce the time that cars take in the test bench. Optimal algorithms are used for faster testing, resulting in the lower Carbon dioxide emissions without reducing Mercedes-Benz's standard. Results and graphs are plotted using libraries *matplotlib* and *pandas* .

Python Libraries: Pandas (1.4.2), **Numpy** (1.22.3), **Sklearn** (1.0.2), **Matplotlib** (3.5.2), **NLP, TFIDF**.

2021

IMPROVEMENT OF PULP BRIGHTNESS

We have done the improvement of pulp brightness by taking various data at every one-hour interval, after taking all the data's we have feed these data in to the various Python libraries to implement a graph for analyzing the pro and cons of the acid dosing in the Digester.
Python Libraries: Pandas (1.4.2), **Numpy** (1.19.3), control (0.9.0), **Matplotlib** (3.4.1).

ACADEMIC PROJECTS

- Project on *"Numerically Controlled Oscillator Based System Modeling,"* using MATLAB Simulink and Arduino Programming.
- Prototype design on *"Home Automation & Smart Security System,"* using Arduino Programming.
- Mini project on *"Hardware Circuit Design of Control Valve Signaling"* without using a DCS or PLC for the testing purpose.

ACTIVITIES & ACHIEVEMENTS

- Presentation on *"Modern Packaging System"* at Academy of Technology.
- Participated in the 2nd Inter College Competition on *"Prototype Design for Mankind",* at Heritage Institute of Technology, Kolkata.
- Participated in various events in Techfest organized by Academy of Technology

AREAS OF INTEREST

- Embedded Automotive System
- Process Control and Instrumentation

LANGUAGES KNOWN

- English
- Hindi
- Bengali
- Telegu