**PRUTHAK PARIKH**

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| **SUMMARY** |

# Mechanical engineer holding a Master of Science degree & specialization in Automotive & Control Systems. Automotive industry experience with an internship and hands on automotive related project experiences. Skills in control theory, advanced controls, MIL, SIL, and MATLAB/Simulink. Committed and delivering results in competitive environment.

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| **EDUCATION** |

Michigan Technological University (MTU) | Houghton, MI January 2019-August 2020

**MS Mechanical Engineering** **| Automotive and Control Systems** | GPA: 3.95/4.00

Birla Vishvakarma Mahavidyalaya (BVM) Engineering College | India July 2014-May 2018

**BE Mechanical Engineering |** CGPA: 9.38/10.00

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| **ENGINEERING WORK EXPERIENCE** |

**Vehicle Modeling and Simulation (MIL) | Self Projects** August 2020-Present

* Modelled an automatic transmission system driven by road-load torque requirements in Simulink.
* Implemented Field Oriented Control (FOC) on a BLDC motor model in addition to a **PI controller** to regulate the speed.
* Modeling and scripting a **receding horizon model predictive control (MPC) algorithm** for a simplified steering control considering lateral dynamics of the vehicle.

**Product Development-R&A Intern | Virtual Internship** June 2020-August 2020

Propulsion Controls Department | Ford Motor Company | Dearborn, MI.

**Project:** Aftertreatment mid-bed and tail-pipe sensor correlation/correction

* Implemented **Machine Learning algorithms** by training on database to determine parameters to estimate hydrogen content in exhaust gas, to compute the normalized air-fuel ratio (lambda), while performing data analysis.
* Applied MATLAB’s **systemIdentification and Neural-Networks** tool to estimate and test a model/transfer function for the HEGO sensors at different locations. **Improved the calibration of the model by 32%.**
* Conducted quality improvement of the Neural-Networks estimation models by using the supplier transfer function of the sensor as an added feature for tuning weights of features.
* **Testing models** for inverse sensor transfer function, providing estimated sensor readings to be used for error detection and correlating sensors to operating modes.

**Automotive Control Systems Design | MTU - MEEM 5812** January 2020-April 2020

* Designed a PI controller to **control the fuel injection** for varying air intake and equivalence ratio along with implementation of a Smith predictor to account for plant transport delay of the EGO sensor.
* Drafted an **integral LQR controller** for **idle-speed control** of the engine under effect of external load by linearizing the engine speed-load model.
* Developed a PI controller for regulating vehicle speed. Designed an LQR controller for regulating the headway distance from a lead vehicle. **Integrated the two controllers** with bumpless control transfer to design a simple **adaptive cruise control (ACC) system**.

**Embedded (MBD) Control Systems Design | MTU - MEEM 5750** January 2020-April 2020

* Designed a **powertrain controller** for a hybrid electrical vehicle engineering module using stateflow model and conducted **verification & validation of the model** from the simulation of the system under different scenarios.
* Implemented and tested a PI controller design, to control the opening of the throttle plate of an electronic throttle body in response to the pedal position in **real time (Hardware-in Loop Modeling)**.
* Designed models for error detection between redundant sensors. Updated the model to use **CAN communication** to transmit sensor readings to control module and control output back to ETB’s DC motor.

**Design of a Simplified Active Suspension System | MTU - MEEM 5715** September 2019-December 2019

* Designed a control system for an active suspension system with observer estimated state feedback and an integrator.
* Used principles of **optimal control** and LQR to optimize the gains of the feedback loop and minimize the required input. Used **Kalman-filter** to reduce the variations in estimated states from sensor noise.

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| **SKILLS** | | | |
| * MATLAB/ Simulink/Stateflow | | * Embedded Control Systems | * MIL, SIL, HIL |
| * Machine Learning * MotoHawk/MotoTune | | * Neural Networks * CAN Protocol (Vector CANoe) | * Hybrid Electric Vehicles * Data Acquisition (LabVIEW) |
| * Database Management * Python, C++ * FMEA, V-Cycle | | * MS Office (Word, Excel, …) * AutoCAD 2D * AMESim | * GT-Power * ANSYS (Structural, Fluent) * Solidworks | PTC Creo |
| **OTHER WORK EXPERIENCE** | | | |

* Research Assistant | Energy-X Lab, Michigan Technological University
* Enhancing performance of HVAC system using sorption/desorption unit. September 2020-Present
* Analysing performance of 3D-printed heat exchanger. May 2019-September 2019
* Design & Analysis of Hydraulic Arm with Gripper | BE Final Project August 2017-April 2018
* Fabrication Engineering Intern | Elecon Engineering Company June 2017

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| **CERTIFICATES** |

* Machine Learning | Stanford University | Online Course May 2020
* Self-Driving Cars Specialization | University of Toronto | Online Course May 2020-Present
* PLC Programming (RSLogix 500/ Allen-Bradley) | Online Course August 2020