SHYAM SUNDAR PRADHAN

ssp.titu@gmail.com | +1 9063707434 | 2112- E, Woodmar Dr Houghton, MI |
linkedin.com/in/shyam-sundar-pradhan-3b98a6138/

EXPERIENCE

Grad Lab Assistant in Distributed Embedded Control System, Michigan Tech *Jan 2020 - Apr 2020*
- Experienced in model-based embedded control system design, discrete-event control, sensors, actuators, electronic control unit, digital controller design and communications protocols. Worked in Moto Hawk/Moto Tune, oscilloscope, Throttle Position Sensor, Pedal Position Sensor and Controller Area Network (CAN) in Lab.

Robotics Research Intern, Eschoollerning (ESL), Kolkata, India *Feb 2018 - Sep 2018*
- Was involved in designing robotics control system in MATLAB & Simulink. Implemented Linear and non-linear model, linearization of any non-linear system. Learned observability, controllability, pole placement and designed observer to build robust control system.

Locomotive Intern, Eastern Indian Railway, Burdwan, India *Jul 2016*
- Worked in Power Pack, Air Braking, Undercarriage system and learned lubrication oil & fuel oil process. Learned 4-s diesel engine, principle of turbo supercharger, air compressor and cooling operation.

Mechanical Intern, Thermal Power Project of CESC Ltd, Haldia, India. *Jun 2015 - Sep 2015*
- Experienced in fabrication and erection process, various welding techniques, working of turbine and cooling operation at 2*300 MW power plant.

PUBLICATION

- **"Control system design of configurable hybrid electric modules"** published in **International Research Journal of Engineering and Technology (IRJET).**
- **"Autonomous Car Parking using CAN bus communication"** published in **EPRA International Journal of Research & Development (IJRD).**

PROJECTS

KALMAN FILTER DESIGN USING PYTHON
- Implemented this model in Python and base on car's initial position and its velocity and acceleration, predict its future position and velocity through this Kalman filter. Calculate Kalman gain and compare with its measurement value and predicted value.

INTELLIGENT CRUISE CONTROL DESIGN
- A velocity control system of a linearized plant was designed using PI controller and keep steady state error zero.
- In Simulink created a headway control of the same plant where headway is three times the commanded speed. This is a PID controller and use LQR with to minimize error. Combined headway and speed controller so that speed is maintained when the lead vehicle is far away, and the headway is maintained when the vehicle is close.

AUTOMOTIVE APPLICATIONS USING CAN BUS COMMUNICADTION
- Worked on CAN Bus algorithm of ADAS module, vehicle direction control unit using Arduino 2560 and Embedded C code developed in Arduino IDE. Also worked in CAPL code for ECU in CANoe software. Controlled various sensors and actuators.
- Performed OBD-II with CAN on CANKING software and understand the diagnostic mechanism of ECU nodes.

ACTIVE SUSPENSION DESIGN USING SIMULINK
- Designed an active suspension system for vehicle. Used LQR to generate a state feedback controller and used an observer to estimate the states of the system. Set the observer poles to be four times the state feedback poles and test for four different road profile.

ELECTRIFICATION OF HYBRID ELECTRIC VEHICLE AND DESIGN ROAD DYNAMICS
- Developed an EPA fuel economy window sticker based upon a two-drive cycle (FTP-75 and HWFET) of EV, ICE, series PHEV, P2, PHEV and Input Powersplit PHEV by using AMESim simulation.
- Design Road dynamics with Aerodynamic force, Rolling resistance, Grade and Acceleration force for different car model (Tesla Model S/3, Rivian R1T/S).

THROTTLE BODY CALIBRATION AND FUEL INJECTOR ACTUATION, HIL
- A discrete feedback controller was designed to control the throttle valve opening by using Pedal Position Sensor that is connected to ECU and Throttle Position Sensor calibration and sending the generated PWM signals to the DC motor. Improved and validated the model for actuation of fuel injector for different injection duration and start of ignition timings with feedback from Hall Effect sensor and thermistor.

EDUCATION

Masters, Mechanical Engineering *Sep 2019 - Present*
Michigan Technological University (Houghton, MI, USA) **GPA:** 3.52

Bachelor, Mechanical Engineering *Aug 2013 - Jun 2017*
West Bengal University of Technology (Kolkata, India) **GPA:** 3.7

Course Work: Dist Embedded Control Systems, Automotive Control Systems, Linear system theory and design, In-Vehicle Communications Network, Vehicle Battery Cells and Systems, Robotics and Mechatronics.

SKILLS

MATLAB / Simulink, Stateflow, Python, C, C++, MotoHawk, MotoTune, CAN, LIN, OBD II, CANoe , CANKING, Arduino, Amesim, ECU Test, , Oscilloscope, Embedded System, HIL, MIL, SIL, Mathematica, SOLIDWORKS, CREO 5.0, Microsoft Office

CERTIFICATE

Introduction to Self-Driving Cars (University of Toronto) | Control of Mobile Robots (Georgia Institute of Technology)