SUMEDH PRASHANT SATHE

(864) 624-2774 | ssathe@clemson.edu | 201 Campus Dr, Central, SC 29630 | linkedin.com/in/sumed

EDUCATION

Master of Science, Mechanical Engineering, Clemson University | GPA 3.7/4.0 — May 2021
Bachelor of Engineering, Mechanical Engineering, University of Pune | First Class w Distinction — May 2017

PROFESSIONAL EXPERIENCE

Graduate Assistant, Clemson University — Jan 2019 – May 2021
- Worked on Industry-academia collaborative projects in robotics, automation, and microfluidics in Automation Robotics Mechatronics Laboratory (ARMLAB) and Multiscale Manufacturing Laboratory (M2L)
- Developed automated solution for fixture loading, unloading, inspection and pack out of parts
- Demonstrated prototype and proof-of-concept using 3D printing, Kuka robot, conveyer, vision systems
- Developed experimental setup and protocol for microfluidic cell lysis using scientific and analytical instruments

Automation Engineer, Alfa Laval Inc. — Aug 2017 – July 2018
- Supported design, testing, installation, startup of automated process equipment for food/ pharma/ biomanufacturing
- Applied CAD modeling, Engineering Analysis, Data Analysis tools to produce detailed engineering drawings
- Programmed PLC controllers and HMI for automating process cycles, calibrated electromechanical hardware
- Participated in Factory Acceptance Testing (FAT), quality inspection, troubleshooting and maintenance

Project Intern, Aker Solutions Pvt. Ltd. — Aug 2016 – May 2017
- Designed the propulsion system, ballast mechanism and 6 DOF Robotic Manipulators of an underwater ROV
- Integrated Hydraulics, DC motors, fans, Electronic Speed Controllers, stepper motors, power electronics
- Programmed Arduino, Raspberry Pi controllers and created GUI using LabVIEW software
- Fabricated prototypes using sheet-metal, CNC machining & 3D printing

RESEARCH

- Research sponsored by Advanced Research Projects Agency- Energy on Velocity Optimization in Connected Automated Vehicles
- Designed an Optimal Control system for connected automated vehicles to optimize speed trajectory for minimum fuel consumption and impact on surrounding traffic based on Model Predictive Control and Convex Optimization
- Developed a coupled model for relating vehicle dynamics and traffic flow

SKILLS

Programming: MATLAB, Simulink, Python, C++, ROS, Linux, LabVIEW, Kuka
Software Tools: SolidWorks, COMSOL, ANSYS, Altair Hypermesh, AutoCAD, Microsoft Office, JMP
Hardware: MyRio, LMS TestLab, PLC, 3D Printers, Embedded Controllers

PROJECTS

Automated Manufacturing Cell Design — Dec 2020 – May 2021
- Developed and analyzed design concepts for an automated manufacturing cell consisting of fixture loading, unloading inspection and pack out processes
- Validated concepts for cycle time using motion simulation using SolidWorks and V-REP Simulator
- Developing proof of concept using hardware-in-loop setup consisting of 3D printed prototypes, conveyers, robots, and vision systems

Design of Experiments for Biological Cell Lysis — Jan 2020 – March 2021
- Developed experimental setup consisting of electron microscope, oscilloscope, function generator and power electronics for determining optimal levels and range of experimental parameters in electrical lysis of yeast cells
- Designed and manufactured microfluidic chips for lysis using Photolithography and CNC milling
- Statistical analysis of experimental data for validating experimental protocols and processes

Battery Modeling and System identification — Aug 2020 – Dec 2020
- Prepared instrumentation setup consisting of shunt resistor, thermocouple, DSPACE data acquisition system
- Measured data of State of Charge, Terminal Voltage and Temperature for different discharge currents
- Estimated parameters of first order electro-thermal model for Lead Acid Battery using Method of Least Squares

Induction Motor Characterization and Control — Aug 2020 – Dec 2020
- Prepared test setup consisting of DSPACE controller, encoder, DC Motor Generator, DMM and Oscilloscope
- Measured data for stator and rotor currents, impedances and phase at rated voltage and frequency.
- Using circuit analysis, calculated internal parameters, and plotted open loop torque-speed characteristic.
- Designed and tuned V/f controller and PID controller to regulate induction motor speed in response to variable load.

Autonomous Driving of F1/10th Vehicle Jan 2019 – May 2019
- Instrumented F1/10th sized radio-controlled car with cameras, ultrasonic sensors, Arduino controller.
- Implemented Adaptive Cruise Control using PID control and Kalman Filter processing of ultrasonic sensor data.
- Developed and tested lane tracking algorithms through edge detection from camera vision, Stanley control
- Detected road signs using 15-layered Convolutional Neural Network

Analog Circuit Design for Duffing Oscillator Simulation Aug 2018 – Dec 2018
- Designed and prototyped an analog electronic circuit to demonstrate nonlinear behavior of the duffing oscillator.
- Performed circuit simulation using MATLAB/ Simulink tools
- Tested prototype and observed phase portrait using function generator and oscilloscope.

Experimental Modal Analysis of BiW Structure Aug 2019 – Dec 2019
- Calibrated and installed Array of accelerometer sensors and electrodynamic shakers on a prototype car body
- Measured accelerometer data and plotted power spectrum, Frequency Response Functions using LMS TestLab.
- Calculated mode shapes and resonant frequencies associated with torsional and bending modes.

Experimental Order Analysis of BMW 530d Aug 2019 – Dec 2019
- Performed vehicle Instrumentation using accelerometer and microphone sensors, chassis dynamometer calibration.
- Measured vibrations in powertrain, driveline, vehicle interiors using LMS TestLab data acquisition platform.
- Plotted Auto-power spectrum, Power Spectral Density, Frequency Response and Order plots
- Identified resonant sources and calculated transmissibility using Transfer Path Analysis
- Studied polymers and soft materials for damping application to optimize structure-borne noise transmission.

Strain Gauge Measurement of Pressure Vessel Loads Aug 2019 – Dec 2019
- Installed strain gauge rosette on the surface of a 150-psi rated pressurized gas tank.
- Measured strains for different gas pressures and converted strain data into stress from Mohr's Circle calculations

ACTIVITIES

Baja SAE Tech Team Vehicle Dynamics Lead Feb 2014 - Feb 2017
- Demonstrated astute leadership by leading a team of 5 undergraduate students in SAE's Baja recreational off-road technical design and racing challenge, winning awards at national and international level.
- Consistently ranked in the Top 5 teams amongst over 100 teams nationwide
- Led efforts in design, analysis, prototyping and testing of suspension and steering subsystems

Rotaract Club Public Relations Officer July 2013 – July 2015
- Rotaract is an international network of over 10,000 clubs spread over 189 countries dedicated to bringing together young people and developing leadership and professional skills through social service.
- As a public relations officer, I hosted fund raisers for various social causes.
- Interacted with industry leaders, sportspersons & fitness experts, environmentalists for hosting and managing various professional and leadership development and recreational events.