Sai Manohar Vangara

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OBJECTIVE

I am a dedicated and innovative Mechanical Engineer with hands-on experience in product design, automation, and control systems. Seeking to leverage technical skills and project experience in a dynamic role that fosters engineering development and sustainability.

EDUCATION

University at Buffalo, The State University of New York, Buffalo, NY — **January 2023 - June 2024**
Master of Science in Mechanical Engineering — **GPA 3.77/4**
Amrita Vishwa Vidyapeetham, Bengaluru, India — **June 2017 – June 2021**
Bachelor of Technology in Mechanical Engineering — **GPA: 3.29/4 (Top 10%)**

SKILLS

Software: Solidworks, Ansys, Creo, AutoCAD, Fusion 360, Catia, Abaqus, Coppelisim, Inventor, Word, Excel, PowerPoint, Logix500 Mirco, PlatformIO, HMI (Wonderware InTouch, Win CC Advance), Siemens TIA Portal, Factory IO, MSC ADAMS.

Programming: MATLAB, C++, Ladder Logic,Python.

Methodologies: Design of Experiments, GD&T, DFM, 2D&3D drafting, Rapid prototyping, Calibration.

Equipment: 3D Printers, CNC coding, Lathes, Pneumatic systems, Programmable logic controller (Siemens S7-1200/1500) (Rockwell Allen Bradly MicroLogix 800,1000 and 1100 series), Sensors

EXPERIENCE

Mechanical Engineer Intern — **September 2024 – Present**
Green2Gold, Lahaina, HI (Remote)

- Contributed to advance design and analysis of an open-source Geothermal energy plant design focusing on power cycle performance and heat exchange design.
- Performed thermodynamic modelling and analysis to select the optimum working fluid and heat exchange using Ansys fluent.

Graduate Student Assistant — **February 2023 – May 2024**
University at Buffalo, The State University of New York, Buffalo, NY

- Teaching assistant for Digital control system, Engineering materials, CAD applications course, offering feedback on diverse mechanical and control system topics.
- Provide expert consultation on material selection, 3D printer choice, and post-processing techniques to ensure optimal outcomes in Digital Manufacturing Lab.

Associate application developer — **February 2022 – October 2022**
Accenture Solutions Private Limited, Bengaluru, India

- Received comprehensive training in SAP S/4HANA

Mechanical Engineer, Team Vegam — **June 2018 – December 2019**
Amrita Vishwa Vidyapeetham, Amrita school of Engineering, Bengaluru, India

- Collaborated with a team to design the Go-kart frame using **SOLIDWORKS** under GKDC-7 rule book, conducted impact analysis and Torsional Rigidity analysis using **ANSYS** to evaluate the structural strength of the frame under unexpected or accident conditions.

ACADEMIC PROJECTS

DESIGN and Product development

Study on effects of cutting parameters on the metal cutting process by simulation and experimentation

- Developed a **FEM (Finite element method)** model to Abaqus using **Johnson-cook damage model parameters** measure cutting forces for various cutting parameters and rake angles for 2D orthogonal cutting.
- Conducted **milling experiments** with an HSS tool on Aluminum 7050, applying factorial DOE and regression analysis achieving a maximum error of 11.94% between experimental and mathematical model results.

Selection of the Optimal Truss Structure Based on Load Capacity Analysis and Mesh Optimization Using Abaqus

- Simulated load capacity, Response spectrum and analyzed structural performance under varying loads to recommend truss structure.
- Used MATLAB for converting acceleration data in time to frequency using Fourier series for response spectrum analysis.

Design and Optimization of Micro-Scale Jumping Microrobot

- Led a project to optimize a micro-scale jumping robot, achieving a 50% increase in jump acceleration through **MATLAB**-based optimization, achieving 9.4 m/s acceleration, improving the robot's manufacturability using RIE or DRIE methods.

Tribovoltaic MEMS Energy Harvester based on Metal-Semiconductor Junction

- Collaborated on implementing tribovoltaic principles in **MEMS** for energy harvesting, optimizing the design and fabrication plan
- Tested the concept at **MEMS** scale, confirming its feasibility and potential.

CONTROL SYSTEMS AND ANUTOMATION

Pick and Place control using Micro logix 500

- Developed ladder logic for Pick and place using ladder logic programming with **Allen Bradley PLC Micro logix 500** for packaging.

Autonomous Maze-Solving Robot with Flood Fill Navigation

- Designed robot chassis in **SOLIDWORKS** and 3D printed the parts, implemented a Flood-fill algorithm in **C++**, integrated sensors, motor driver, and DC motors with Arduino, optimizing pathfinding and decision-making logic.

Discrete control of Autonomous flight of Quadcopter

- Modeled the nonlinear dynamics of a quadcopter, followed by linearization into **state-space** form for control system.
- Developed Designed and implemented a Proportional controller by pole placement in **MATLAB** for a quadcopter with 12 states, outputs, 4 inputs ensuring hovering and altitude control under wind disturbances.
- Enhanced state estimation accuracy in the control system by integrating a **Luenberger observer** into control law for a linear model, leading to improved control system stability and performance with no overshoot and setting time of 1.25 seconds.

3D Printer Nozzle Control Model

- Developed a Model for dynamics of a DC motor and print nozzle and used **PI controller** to properly position the nozzle, Visualizations of the printer movement using Simulink.

PID Controller-Based Tank Level Control Using Siemens TIA Portal and Factory IO

- Developed ladder logic **in Siemens TIA Portal** for a PID controller-based tank level control system using **Siemens 1500 PLC** with HMI WinCC advanced. **PID tuning** and optimized control parameters to achieve precise level regulation in **SIMULINK**.

Rejecting Unwanted Objects Using Machine Vision

- Simulated a conveyor system in **CoppeliaSim**, using **MATLAB** to process image data from vision sensor, enabling the automatic rejection of unwanted objects based on specific shapes and colors.

Trajectory planning of end-effectors to avoid obstacles while welding

- Led a team of two to design different paths for end-effectors passing through welding path using Cubic spline-Hermit interpolation and Beizer methods using **MATLAB** and **SIMLINK** for inverse kinematics of Kuka LBR iiwa 14 robotic arm.

PUBLICATIONS

V. Sai Sanjay, V. Sai Manohar, P. Ganesh Chowdary, Y. Jayanth Karthik, Prakash Marimuthu K**, Effect of Speed, Feed and Depth of Cut on Cutting Forces While Machining Al-7050 T7451,** *Journal of Mechanical Engineering Research & Developments · Oct 4, 2021*

CERTICIFICATIONS

Six Sigma Yellow Belt -Coursera, Completed October 2024,

CFD Ansys Fluent– Udemy, Completed April 2020,

Solidworks 2018 – Udemy April 2020,

Control Design Onramp with Simulink-Mathworks,2024,

MATLAB onramp-Mathworks,2024