Engineering Portfolio

Sagar Joshi

About Me

I’m a Mechanical Engineering Student passionate about everything Robotics, Design and Manufacturing. From an early age, I was fascinated by the synergy between form and function, leading me to this path of choosing Engineering. Identifying innovative approaches and providing solutions to challenges is what drives me.

Biography

Education:

University of Southern California, Los Angeles – USC

MS in Mechanical Engineering: May 2025

Dwarkadas J. Sanghvi College of Engineering, Mumbai – DJSCE

B. Tech in Mechanical Engineering: June 2023

Work Experience:

Research Assistant, Realization of Robotic Systems, USC

Robotics

Research Assistant, Zhao Research Group, USC

Soft Sensor Design

Engineering Intern, Mercedes-Benz AutoHangar

Diagnostics

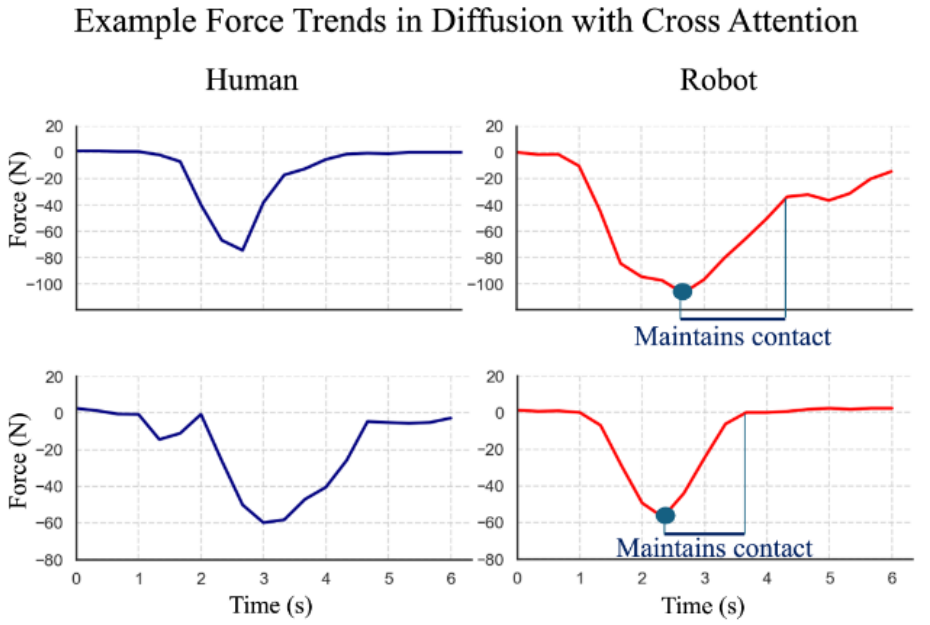
Junior Engineer Intern, Cosmos Cable Glands

Design and Manufacturing

Compliant Object Prying Using Diffusion Policy

Realization of RObotics Systems

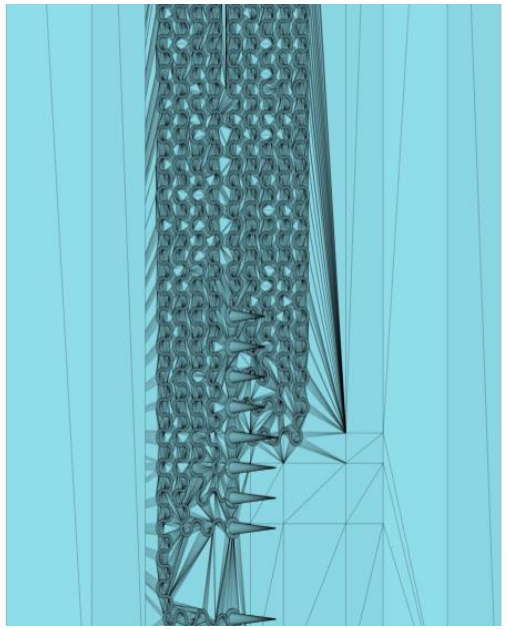
Developed a dual-arm coordination system for ABB and KUKA robots using Nvidia cuMotion and ompl for battery disassembly tasks. Implemented multi-view perception and transformer-based behavior cloning for intuitive data collection, while integrating diffusion models to handle uncertain object geometries. Created a real-time deployment pipeline for testing large models in real-world robotic applications.

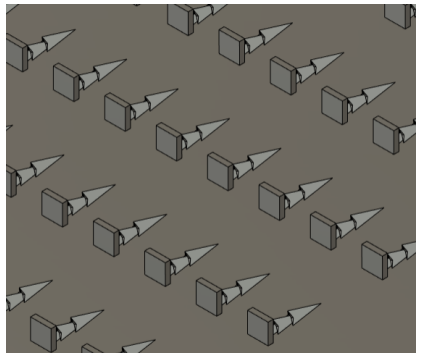


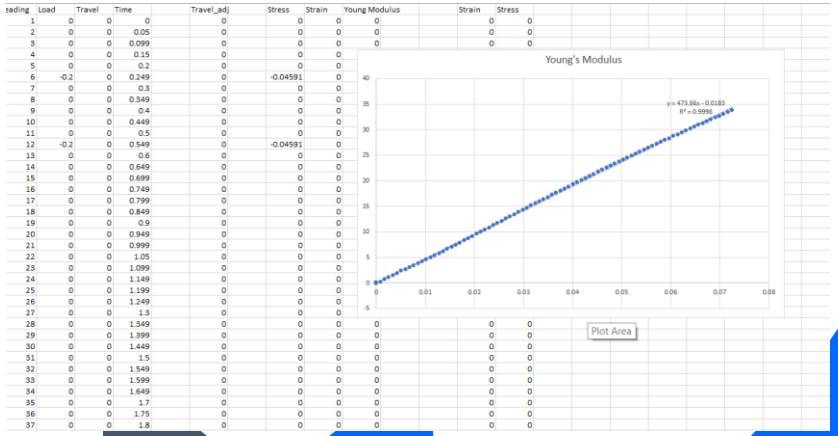
Design and Development of a Soft Sensor

Zhao Research Group

Assisted a Doctorate student in developing a soft electronic and stretchable sensor to take EMG readings from a patient. Modeled micro-structure array with serpentine design and used a Elegoo Saturn 12k 3D resin printer to manufacture it. Modified design to hook structure to user skin for 3d printed sensor. Collected data for the material properties of the sensor.



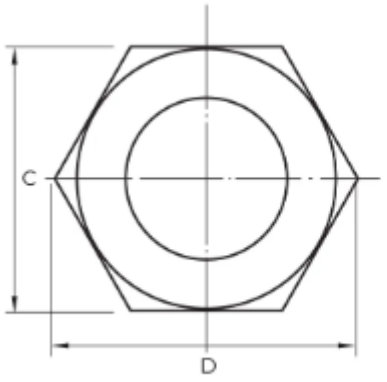


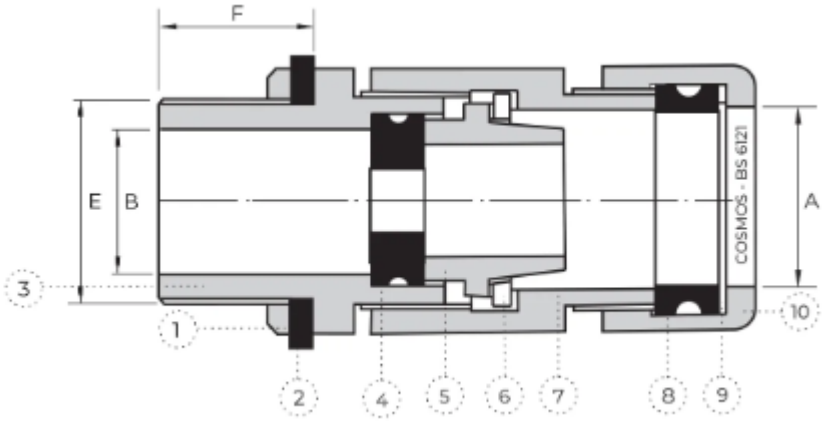


Design and Manufacturing of Compression Weather Proof Cable Gland

Cosmos Cable Glands

Involved in design, manufacturing and testing of various cable glands with predefined standards keeping in mind GD&T to ensure precision and quality. Designed the products using Solidworks for clients like Mumbai Metro, Reliance and ABB. Also researched on material specifications for client driven cost, properties and performance.

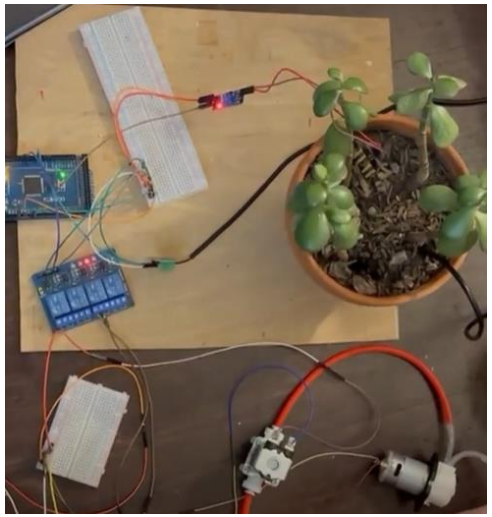


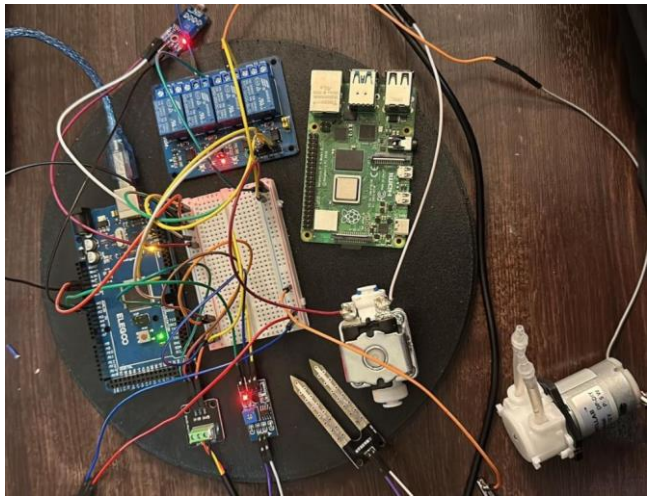


Smart Plant Health Monitor & Care System

USC

Developed an AI-powered plant health monitoring system using ChatGPT, Raspberry Pi, and Arduino to provide real-time sensor-based care recommendations and automated watering. The system integrates moisture, temperature, and light sensors for precise plant monitoring, enabling remote control and optimized hydration. Designed with a modular structure for improved stability, maintenance, and customization, enhancing efficiency and automation in plant care.

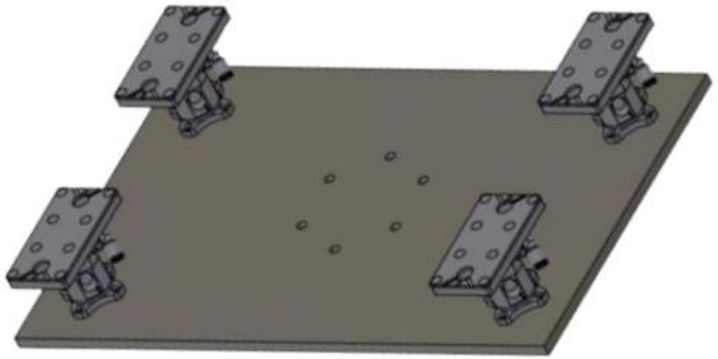


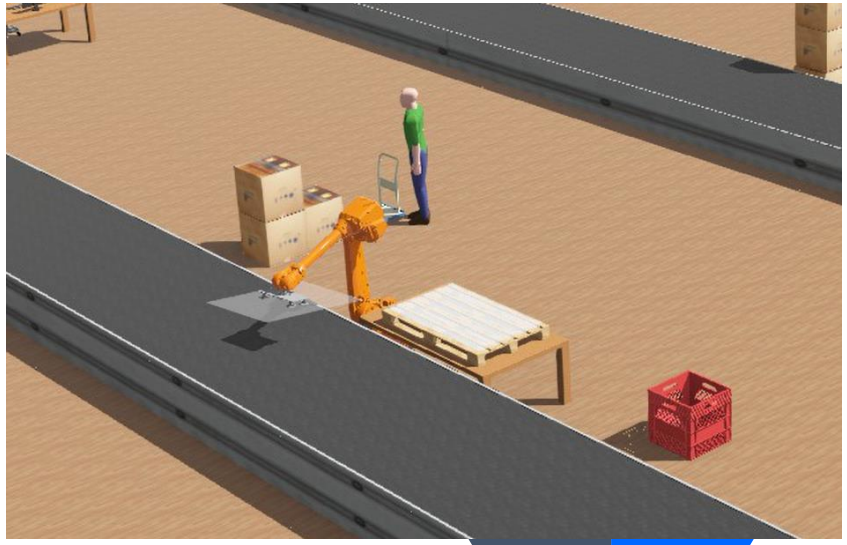


Modified Robot Gripper for Glass Handling

USC

Designed a Robotic Assembly to handle fragile 3mm glass panel stacks for a Solar Panel Plant. Simulated the pickup from a pallet to an edge handling conveyor in Webots. Developed a custom frame as end effector for gentle handling and to avoid smudges. Wrote python code to define functions for controlling the robot arm by applying inverse kinematics on the ABB IRB 4600/40 Robot.

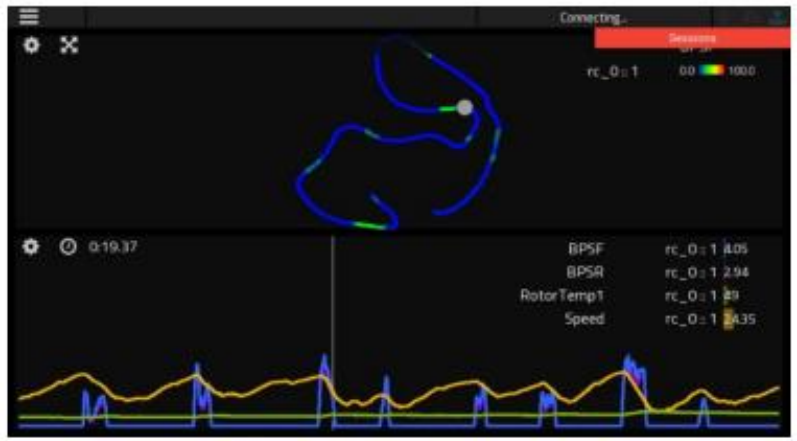




Senior Brakes Engineer

DJS Racing

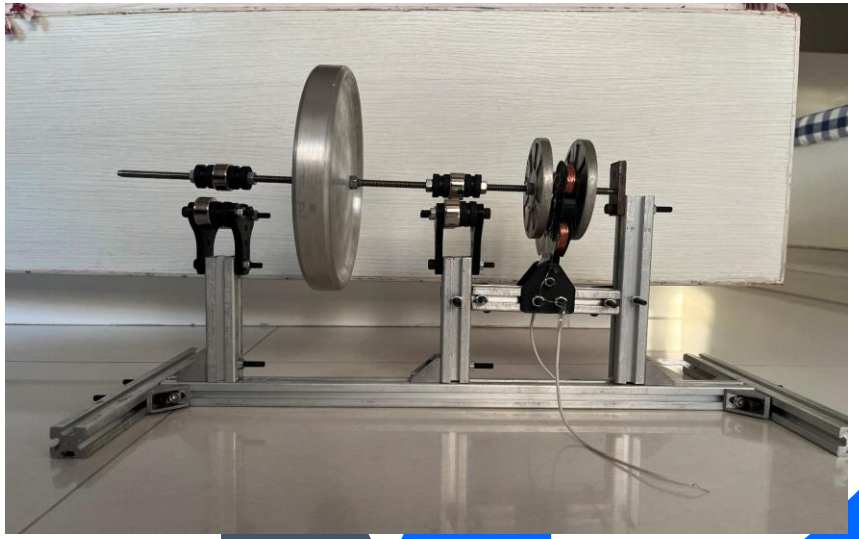
Designed and Manufactured the entire Brake Assembly for my undergraduate Electric Formula Student Vehicle. Leveraged the principles of DFMA, used Solidworks for the entire design, while validating it using Ansys Workbench. Manufactured and Assembled various custom components like Pedal Assembly, Calipers, Rotors etc. Conducted Data Acquisition using a telemetry system to test performance. Also involved in the manufacturing and assembly of the entire FS vehicle.



Design and Development of a Mechanical Flywheel Battery

DJSCE

Developed a Flywheel Energy Storage System that converts Mechanical Energy to Electrical Energy with 80% efficiency. Iterated flywheel designs attaining 29% weight reduction while also optimizing the system through strength analysis, topology optimizations resulting in a 30% reduced cost.



Thank You!

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