PRUTHAK UTPAL JOSHI

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Education

University of California, Los Angeles **Present**
Master of Science in Mechanical Engineering, GPA: 3.9/4 *Los Angeles, USA*

Indian Institute of Technology Bombay *Mumbai, India*
B.Tech. + M.Tech. (Dual Degree) in Mechanical Engineering, GPA: 9.12/10
Specialization: Computer-Aided Design and Automation

Work Experience

Engineering Intern | Reazon Human Interaction Lab - subsidiary of Reazon Holdings **Present**
Pioneer in researching and developing advanced human-computer interaction technologies and systems *Tokyo, Japan*
- Designed an end-effector with a **gripping span of 110mm** for a teleoperated 7-DOF robotic arm using SolidWorks
- Employed iterative design methodology to finalize a **lead-screw-based 4-bar gripper** to minimize the mechanical footprint while enhancing gripping strength and maneuverability
- Implemented 3D printed **TPU-based adaptive gripper pads** to increase the gripping surface area, enhancing operator confidence when manipulating objects of varying sizes, ensuring capability for precise and repeated leader-follower actions

Design of MR-compatible Robotic System for Abdominal Interventions **Sept' 2022 - June 2024**
Advisor: Prof. Tsu-Chin Tsao, Mechanical and Aerospace Engineering Department, UCLA *Los Angeles, USA*
- Designing, modeling, and prototyping a **3-DoF MR-compatible robot** for teleoperated abdominal interventions inside a **70 cm bore diameter** MRI machine using remote centre of motion mechanism and linear guides
- Characterizing a **hydrostatic actuation** and transmission network to create MRI-safe and low friction actuation
- Created a testing setup to characterize the force and motion transmission across actuators using **precision linear stages** with the aim to develop a model using parameters such as back pressure, tubing length, and amplitude and frequency of motion

Engineering Intern - Seating Systems | Lear Corporation **April 2020 - June 2020**
Global automotive technology leader in Seating and E-Systems | Ranked 147th in 2019 Fortune-500 rankings *Pune, India*
- Delivered a **design guideline** by **benchmarking 10+ side valance designs** currently in practice using a2mac1
- Performed **calculations** for comparing the strain generated through bending and compression due to side and frontal impact loads in the ribbing patterns of the automotive side valance to arrive at a structure with optimal shape and dimensions
- Developed an Excel based calculator for calculating deformation in the ribs based on the input design variables

Research Experience

Smart Machining: Data Collection, Sensing, and Monitoring **Dec' 2022 - June 2024**
Advisor: Prof. Tsu-Chin Tsao, Mechanical and Aerospace Engineering Department, UCLA
- Conducting machining operations to gather vibration and power data across a spectrum of machining parameters, aimed at constructing a predictive model during drilling and milling procedures utilizing Haas TM2P CNC machine
- *Poster:* Chi Yitian, **Joshi Pruthak**, Panda Shivam, Korambath Prakashan, Tsao Tsu-Chin, Li Xiaochun, Jawed M.Khalid. ***Smart Machining - Sensing and Monitoring. Smart Manufacturing Symposium**; 2023 September 29*

Modelling and Characterization of a Soft Robotic Finger | Master's Thesis **May 2021 - June 2022**
Guide: Prof. Abhishek Gupta, Department of Mechanical Engineering, IIT Bombay
- Examined two models for a **3-link, 3-joint tendon-actuated** soft robotic finger to formulate model-based control strategies
- Experimentally verified the accuracy of the **RRR model** in predicting the fingertip position across various trajectories, resulting in a correlation of **0.9722 in the x-coordinate, and 0.9330** in the y-coordinate
- Corroborated the dynamic behavior of the finger through **image processing** and **simulations in MATLAB and Simulink**

Leadership and Mentoring Roles

Team Leader and Lead Mechanical Engineer | IITB Mars Rover Team **April 2020 - April 2021**
- Led the team to **4th position in IRDC-2020** among 28 international teams from 7 countries (best position to date)
- Raised funds and managed resources worth **INR 1.38 Million+** acquired through the institute STP Committee
- Designed using **SolidWorks** a 3-link, 6-DOF robotic arm capable of reaching heights upto 1.2m and lifting upto 5 kg weights
- Implemented **ANSYS** to perform **structural and multibody dynamics analyses** of the design and achieved a 30% weight reduction and 5% increase in strength by using carbon fiber links over Al and SS alloys

Scholastic Achievements and Accolades

- Secured an All India Rank of 425 among 0.17 million candidates in JEE Advanced **2017**
- Achieved an All India Rank of 191 among 1.2 million candidates in JEE Main **2017**

Technical Skills

Programming: C++, Python
Modeling and Analysis Software: SolidWorks, ANSYS, ADAMS, Abaqus, Siemens NX, AutoCAD, Fusion 360
Scientific Tools: MATLAB, Simulink, GCode, Arduino