Satvik Gupta

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Education

Thapar Institute of Engineering & Technology — Patiala, India
B.E.: Mechanical Engineering; CGPA: 8.39 — *2019 - Present*

Army Public School, Dhaula Kuan — New Delhi, India
CBSE, All India Senior School Certificate Examination (Grade XII); 93.8% — *2019*

Professional Experience

Project Associate, Systems & Control Lab — July 2022 - Present
Advisor: Prof. T.K. Bera — *Thapar Institute of Engineering & Technology*

- Developing a 6 DOF Robotic Mobile Manipulator for 3D printing, funded by The Dassault Systemes Foundation.
- Key responsibilities include the design, hardware & software prototyping, testing & control of the 6 DOF Mobile Robotic Arm using Stepper motors & drivers.

Research Intern, Advanced Robotics Centre, NUS — January 2022 - June 2022
Advisor: Prof. Marcelo H. ANG Jr. — *National University of Singapore*

- Developed a 4 mecanum-wheeled **autonomous omnidirectional mobile robot** for consumer based applications.
- Created ROS packages for teleop control of the robot using Xbox controller; implemented PID control, forward & inverse kinematics to achieve desired speed & direction.
- Created & implemented packages for different SLAM algorithms & ROS navigation stack for autonomous capabilities.

- Worked on the design & development of a **fully automated Eye Kiosk machine** to prevent blindness.
- Developed Computer vision algorithms for auto-detection of face & eye; auto-alignment of the camera with the eye.
- Explored & implemented liquid lens technology on Edmund Optics camera for autofocusing & autocapturing.

Summer Intern, Larsen & Toubro Ltd. — July 2021 - September 2021
Heavy Engineering Division, L&T — *Hazira, Gujarat*

- Designed an automatic strip cutting mechanism for installation on strip cladding head in the ESSC Welding Process.
- Worked & researched with the team setting up India's first IIoT based welding stations at L&T, HZMC.
- CAD modelled & designed various machine parts for the ongoing welding station setups.

Technical Skills

- **CAD & Design Tools**: Solidworks (Certified Associate), PTC Creo, Onshape, AutoCAD.
- **Hardware**: NVIDIA Jetson AGX, Nano, Raspberry Pi, LIDAR, Arduino, Encoders, Motor controllers, Drives.
- **Platforms & Frameworks**: ROS, Gazebo, RVIZ, Linux, LaTeX
- **Languages & Libraries**: Python, C/C++, OpenCV, Arduino IDE.

Projects

PocDoc Portable Device | *Solidworks, Raspberry Pi, Python* — May 2022 - Aug 2022

- Designed & fabricated a setup for out-of-hospital monitoring of eye diseases.
- Raspberry Pi operated device, integrated with an easy to use web- based application to perform 6-different eye tests.
- Successful development of the prototype & in clinical trial stage; under the guidance of *Dr. Rupesh Agrawal, Tan Tock Seng Hospital, Singapore.*

Analysis of Mechanical Properties using ML | *3D printing* — Aug 2021 - Present

- 3D printed 32 different dog-bone test specimens by varying input parameters using Polylactic Acid (PLA) material.
- Deploying Machine Learning models on the input & output parameters to predict tensile strength of parts.

Nurse Assist Mobile Robot | *ROS, Solidworks, Raspberry Pi, Python* Aug 2021 - Jul 2022

- Responsible for design & fabrication of chassis & other parts of the differential drive robot.
- Path planning using ROS based framework; used Hokoyu LIDAR & odom data from encoders.

3D Printing Mobile Robot | *Solidworks, Arduino, Motion Control* Aug 2020 - Dec 2021

- Designed & fabricated a mobile robot for 3D printing of infinite length parts.
- Custom 3D printer can be used to print parts having sizes greater than which a conventional printer can print.
- Printing parts in different layer stacking mechanisms to test properties of the parts so printed.

Design of Feed Pump | *PTC Creo, Onshape* Jan 2021 - May 2021

- Designed a pump running at 21 rpm by a Honda GX engine using Creo; optimized Crankshaft using BMX module.
- Designed Shaft Coupling, Gear Reduction and Cam Follower, and support structure using Creo AFX module.
- Assembled, analyzed & simulated the entire pump setup; graphed Velocity and Acceleration of plunger.

Achievements

- Competition Finalist & project awarded seed grant funding at **Medical Education Grand Innovation Challenge '22 (MEGIC)**, held in **Singapore.**
- Participated & represented North Zone (India) in Rescue Line League at **Indian RoboCup Junior'17**, held in **Bangalore.**
- **1st Runner Up** & bagged the Award for Best Creativity & Innovation in Rescue Line League at **Indian RoboCup Junior'17**, North Zone.
- Represented India at the **International RoboCup Junior'16** in Rescue Line League held in **Leipzig, Germany.**
- **Winner, Indian RoboCup Junior'16,** All India Nationals in Rescue Line League held in NewDelhi, India.
- **Winner**, Boat racing competition, **RoboKnights'15** (DPS RKP, Delhi).