

Satvik Gupta

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EDUCATION

Thapar Institute of Engineering & Technology

B.E.: Mechanical Engineering; CGPA: 8.43/10

Patiala, India

2019 - Present

Army Public School, Dhaula Kuan

CBSE, All India Senior School Certificate Examination (Grade XII); 93.8%

New Delhi, India

2019

Army Public School, Dhaula Kuan

CBSE, All India Secondary School Examination (Grade X); (9.4/10)

New Delhi, India

2017

RESEARCH EXPERIENCE

Capstone Design Project

Mentor: Prof. Ajay Batish

August 2022 - Present

Thapar Institute of Engineering & Technology

- The objective of the research project is to develop algorithms for weed detection & killing in wheat row crops.
- Currently in the design stage of the prototype and exploring the use of Microwaves to kill the weed.
- Project being done in collaboration with Punjab Agricultural University & Tel Aviv University, Israel.

Research Assistant, Mechatronics Lab

Mentor: Prof. T.K. Bera

July 2022 - Present

Thapar Institute of Engineering & Technology

- An ongoing project in the department of Mechanical Engineering, funded by The Dassault Systemes Foundation.
- Key responsibilities include the design, fabrication and control of the 6 DOF Mobile Robotic Arm for 3D printing application using appropriate concrete mixes.

Robotics Research Intern, Advanced Robotics Centre, NUS

Mentor: Prof. Marcelo H. ANG Jr.

January 2022 - June 2022

National University of Singapore

- * Omnidirectional Autonomous Mobile Robot (OAMR):
 - Developed a 4 mecanum-wheeled autonomous mobile robot for consumer based applications.
 - Created ROS based packages for teleop control of the robot using a keyboard & Xbox controller; implemented PID control, forward & inverse kinematics to achieve desired speed & direction.
 - Created & implemented packages for different SLAM algorithms including HectorSLAM & Google Cartographer;
 - Used AMCL package for localizing the bot and also ROS navigation stack for autonomous capabilities.
- * Smart Eye-Kiosk for Community (SEK-C):
 - Worked on the design and development of a comprehensive fully automated Eye Kiosk to prevent blindness.
 - Developed computer vision algorithms for auto-detection of face & eye; auto-alignment of the camera with the eye.
 - Explored & implemented the liquid lens technology on Edmund Optics camera for autofocusing & autocapturing of the retina.

Summer Intern, Larsen & Toubro Ltd.

Heavy Engineering Division, L&T

July 2021 - September 2021

Hazira, Gujarat

- Designed an automatic strip cutting mechanism for installation on strip cladding head in the Electro Slag Strip Cladding Welding (ESSC) Process.
- Worked & researched with the team setting up India's first IoT based welding stations at L&T, HZMC.
- CAD modelled & designed various machine parts for the ongoing welding station setups.
- *Internship completion certificate*

TECHNICAL SKILLS

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

PROJECTS

- PocDoc Portable Device** | *Solidworks, Raspberry Pi, Python* May 2022 - August 2022
- Designed and fabricated a setup for out-of-hospital monitoring of eye diseases, integrated with an easy to use web-based application.
 - Raspberry Pi enabled device to perform 6-different types of eye tests using keyboard or a gaming controller.
 - 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* August 2021 - Present
- 3D printed different dog-bone test specimens using (PLA) material by varying input parameters.
 - Deploying Machine Learning models on the input & output parameters to predict mechanical properties of the parts.
 - Manuscript under preparation, advised by *Dr. Vishal Gupta.*
- Nurse Assist Mobile Robot** | *ROS, Solidworks, Raspberry Pi, Python* August 2021 - July 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* August 2020 - December 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 160 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**.
- Represented India at the **International RoboCup Junior'16** in Rescue Line League held in **Leipzig, GERMANY**.
- Participated and 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.
- **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).

Engineers without Borders, NUS Chapter

External Relations Head

February 2022 - July 2022

National University of Singapore

- Ideated & organized a 3-day workshop on 3D printing & its applications for youth aged 14-18 in collaboration with Xin Yuan Community Centre, Singapore.
- Responsible for getting collaborations, grants & sponsorships for the training workshop.

Echoes Club, TIET

Founder & Editor-in-Chief

August 2020 - July 2022

Thapar Institute of Engineering & Technology

- Founded a club named Echoes Club functional in Thapar Institute. Launched university's first quarterly official student magazine with a cumulative readership of 10000+ students.
- Spearheaded a team of 100+ students to build a platform for the students to preach knowledge and creativity.

Rotaract Club, TIET Chapter

Sergeant At Arms

July 2019 - June 2021

Thapar Institute of Engineering & Technology

- Responsible for handling all the club documentation, ensuring smooth conduct of meetings between sponsor Rotary Clubs.
 - Made trips to the Local Old Age Home, carried out the collection of old woollens by In-Campus Residents that were to be distributed among the poor kids of the city & visited govt. schools of Punjab for various awareness drives and campaigns.
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