Anmol Gupta

Final Year Dual Degree Student
B.Tech: Material Science & Engineering
M.Tech: Mechanincal Engineering

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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2018 - Present	BT-MT	Indian Institute of Technology, Kanpur	10/10(PG) | 7.34/10(UG)
2017	CBSE(XII)	M.S. School, Tundla	82.4%
2015	CBSE(X)	M.S. School, Tundla	9/10

Technical Skills

- **Programming Languages and Web-Dev:** C++, Python, OOPs, DSA, HTML, CSS, JavaScript, React, Node.js, Express.js, Passport.js.
- **Software and Tools:** MATLAB, OpenAI Gym, Blender, Unreal Game Engine, Autodesk Inventor, AutoCAD, VS Code, Git, DBMS.
- **OS and Others:** Windows, LaTeX, Word, Powerpoint, Excel, Sensors, Controllers, Actuators, Arduino.

Scholastic Achievements

- **Top 10**%, among the IIT Kanpur students registered on the online coding platform Geeks for Geeks. *2022*
- **A Grade,** Secured for outstanding performance in 17 Academic Courses at IIT Kanpur. *2018-2022*
- **Bronze Award,** for DIC's Terrace Farming Robot Challenge in Inter IIT Tech Meet 8.0 by IIT Roorkee. *2019*
- **Best Documented Project Award,** for Fastest Line Follower completed during SnT summer camp, IIT Kanpur. *2019*
- **Best Project Award,** for BIRA under robotics club completed during SnT summer camp, IIT Kanpur. *2019*

Work Experience

Industry4.0 - MTech Thesis Project, IIT Kanpur (*May'22-**ongoing***)
Guide: Nalinaksh S. Vyas, Professor, IIT Kanpur

Objective: To implement **Industry 4.0 solution** first on **simulation** and then on real machines and factories.
- Developed an **HMI application** for employees, the frontend was written in **React-Native** and backend **Rest Api in NodeJs**.
- The HMI app can keep **track of employees** in the factory, the machine and part they were working on, and their exact location.
- A **real-time machine monitoring** application was developed on **LabView** which gave real-time machine data from **Siemens Machines**.
- The app was developed with simulated data from **Siemens Sinutrain** and then checked with a real machine in **Ordnance Factory**,Kanpur.

Drone and Anti-Drone Simulator - Intern, ARTPARK IISC Bangalore (*Jun'21-**ongoing***)
Guide: Vineet Vashishtha, Software Architect, ARTPARK IISC Bangalore

Objective: To build a **drone and a anti-drone simulator** for the purpose of training of drones using **reinforcement learning techniques**.
- **Simulated** a terrain of Galwan valley in **Blender** using **NASA's elevation data** to create a virtual environment for the training of drones.
- Designed & simulated a **drone** in **Blender** & **Unreal Game Engine** using **Python API** to fly it manually in the mountain-valley terrain.
- The drone **dynamics** was simulated with some combinations of thrusts applied on four rotors by keyboard inputs to achieve specific **motion**.
- Simulated the **Anti-Drone Technology** at ATC tower, Bangalore Airport which **shoots** down the invading drones with a **wind blast**.

Key Projects

PARAS (Partly Autonomous Robot for Agriculture in Step Farms) (*Nov'19-Dec'19*)
Winter Project - Robotics Club, IIT Kanpur

Objective: To analyze and make a robot for terrace farming solutions over conventional farming for DIC's challenge in Inter IIT Tech Meet 8.0.
- Found a solution for **terrace farming robot** to participate in **DIC's Terrace Farming Robot Challenge** and won **bronze medal**.
- **Designed & fabricated** a prototype of a **four-moduled** machine that was capable of doing all required terrace farming tasks in step farms.
- The design was a primary machine with a **lead screw-based climbing**, harvesting cutter, and combined sow mechanism.
- Programmed data was collected from several **sensors** (6 ultrasonic sensors, soil sensor, IMU, CNC), its **feedback system and PID controls**.

Bottle Filling and Capping Machine (*Jul'19-Nov'19*)
Manufacturing Process Project - IIT Kanpur

Objective: To make an automatic bottle filling and capping machine for course project TA202 which fills and caps the bottle at periodic intervals.
- **Designed** a machine in **AutoDesk Inventor** and manufactured it with the help of 3D printing, Lathe, Drilling and Milling machines.
- It can **fill and cap** the bottles at **periodic intervals** using **gears, cylindrical cam, and geneva wheel** powered by a motor.

BIRA (Brain Interfacing Robotic Arm) | GitHub Repo (*Jun'19-Jul'19*)
Summer Project - Robotics Club, IIT Kanpur

Objective: To make a robotic arm and control its movements with the human brain to assist physically challenged individuals.
- Designed & built a **four-parallel bar** linkage-based **Robotic Arm** with 4 DOF and controlled it by **EEG Signals** extracted via **gel electrode**.
- **Recorded a small portion** of the brain EEG signals of **blinks, double-blinks and meditation** with the help of an **EEG Device**.
- The arm joint angles were calculated using **Inverse Kinematics** in **MATLAB** for the given coordinates of the arm gripper in 3D space.
- Used EEG signals to **coordinate the movements** of the arm with calculated angles sent to servo actuators via **Arduino** & **HC05 module**.

FLF (Fastest Line Follower) | GitHub Repo (*Jun'19-Jul'19*)
Summer Project - Robotics Club, IIT Kanpur

Objective: To make a wheeled line follower bot for traveling from the start to end point on a path autonomously in minimum time.
- Designed & built a compact wheeled bot which can **autonomously** follow black lines using **Line Follower Sensor** mounted below the bot.
- Implemented **PID controller** for stabilization and **Left-Hand Algorithm** to handle the intersections, loops and dead-ends in the path.

IARC (International Autonomous Robotics Challenge) | GitHub Repo (*Jan'19- Mar'19*)
Techkriti, IIT Kanpur

Objective: To make a wheeled bot for line and wall following and detect nodes with specific patterns in between the path.
- Made an **autonomous wheeled bot** to follow black lines & walls, detect nodes in the path & display their counts and the traveled distance.
- Used six **Infra Red** and three **Ultra Sonic sensors** for line & wall following and a multi-color **Oled screen** to display numbers.

IRC (International Robotics Challenge) (*Nov'18-Dec'18*)
Techfest, IIT Bombay

Objective: To make an autonomous wheeled bot for wall following and a manual wheeled bot to perform specific tasks coordinated by each other.
- Designed and made an **autonomous bot** for wall following with **ultrasonic sensors**, detecting & scanning the **QR codes** with a camera.
- The **manual bot** was designed for lifting boxes with a **screw-scissor lift** mechanism and gripping boxes with a **rack and pinion** mechanism.

Self Projects

Web Music Player Application | GitHub Repo (*Jun'22-Aug'22*)

Objective: To make and deploy a functional web music player application for playing songs.
- Created a **web music player** to play songs, wrote its frontend with **HTML, CSS & JS** and used browser's local storage to store song's data.
- Developed its **backend** based on **Model-View-Controller architecture** using **Node.js, Express.js** & **EJS** view engine.
- Used **Passport.js** and Passport-local-strategy for user's **authentication and authorization** while signing-in and signing-up.
- Used **MongoDB** for permanently storing users data, and **Mongoose ODM** for the communication between MongoDB and the express server.
- Made an **API** of song's data and used **AJAX request** to get the **JSON** data to **play** and display details of required song on website.
- **Deployed** the web application using **Heroku** hosting service and connect it to the MongoDB using **MongoDB Atlas cloud database**.

Web Social Media Application | GitHub Repo (*Jun'22-Aug'22*)

Objective: To make and deploy a web social media application for users to share their thoughts.
- Deployed a **web social media application** having basic functionality of user's **authentication, creating-deleting posts & comments**.
- Developed its frontend with **HTML, CSS** & **JS** and **backend** based on **MVC architecture** using **Node.js, Express.js** & **EJS** view engine.
- Used **Passport.js**, Passport-local & Passport-jwt strategy for users **authentication & authorization** and MongoDB for storing users data.

Web Chat Application | GitHub Repo (*Jul'22-Aug'22*)

Objective: To make and deploy a real-time web chat application.
- Created and deployed a **real-time web chat application** where multiple users can join different chat rooms and can **chat with each other**.
- **HTML, CSS & JS** were used to write the **frontend** and the **backend** was developed using **Node.js and Express.js**.
- **Socket.io** was used for **low latency, bidirectional communication** between client and server for smooth chatting.

Simple Calculator | GitHub Repo (*Jun'22*)

Objective: To make and deploy a simple calculator for performing basic mathematical operations.
- Developed the frontend of a simple calculator with **HTML and CSS** for taking inputs of mathematical expressions and displaying its results.
- Implemented the calculation **logic with JavaScript** to perform **simple mathematical operations**.

Snake Mania | GitHub Repo (*Mar'22*)

Objective: To make a custom OpenAI Gym environment.
- Made a custom training environment inherited from **OpenAI Gym** to train a snake to eat food without dying using **reinforcement learning**.
- **U**sed **Pygame** library for rendering the **training environment** window, the snake movements and the food while training.

Position of Responsibility

Senior Executive, Media and Publicity, Udghosh'19 (*Jun'19-Sep'19*)
- Coordinated with 2 head & 4 senior executives to lead a **team of 24 people** and conduct **professional talks, shows and a press conference**.
- **Finalized deals** for collaboration of Udghosh with **social media pages** and **online magazines** for publicity.
- Manage **junior students** and **coverage team** for coverage of different ongoing events in Udghosh.

Secretary, Robotics Club, IIT Kanpur (*Mar'19-Mar'20*)
- **Assisted coordinators** for conducting different club events, competition, lectures and workshops on various topics of **robotics**.
- **Mentored freshers** in robotics workshops, robot building competition - **Robotricks, Takneek** and for **IARC**, Techkriti, IIT Kanpur.

Secretary, Photography Club, IIT Kanpur (*Mar'19-Mar'20*)
- **Assisted coordinators** for conducting different club events, lectures, talks and workshops on **photography** and **in coverages**.
- **Mentored freshers** in **photography workshops**, during **coverage in festivals** and **photography competition in Galaxy'20**.

Major Courses

Introduction to Computing	Thermodynamics & Phase Equilibria	Introduction to Solid Mechanics
Fluid Mechanics	Structure & Characterization of Materials	Applied Dynamics and Vibrations
Mathematics for Engineer	Mechanical Behaviour of Materials	Selection & Designing With Engineering Materials
Applied Numerical Methods	Diffusion in Solids	Creep and High-Temperature deformation of Materials

Extra-Curricular Activities
- Volunteered in **coverage** team in Udghosh'18 and Antaragni'18.
- **Junior Executive** in **Ritambhara**, and **Media and Publicity cell** Antaragni'18, IIT Kanpur.
- Participated in **Photography competition** in **Galaxy'19 and Galaxy'20**, and a **robotics competition, Robotricks** in Takneek'19.
- Did a **photoshoot for Online Modelling Competition** in Inter IIT Cult Meet 4.0 and secured the **sixth position**.
- Volunteered in **Unnat Bharat Abhiyan** to conduct guest lectures and made **photostory blogs** for their social media pages.