



Harshit Kalra

Bachelor of Technology
in Electrical Engineering
Indian Institute Of Technology, Ropar

+91-7082509456
harshit.kalra03@gmail.com
GitHub | Website
LinkedIn

EDUCATION

Degree	Institute/Board	CGPA/Percentage	Year
Bachelor of Technology	Indian Institute of Technology, Ropar	8.31 (Till 3rd Sem)	2024-2028
Senior Secondary	Central Board of Secondary Education	97.2%	2024
Secondary	Central Board of Secondary Education	98.6%	2022

EXPERIENCE

- Speedybyte Services Private Limited** Feb. 2025 - April 2025
Robotics & Software Development Engineer TBIF, IIT Ropar
 - Worked on motor control systems for autonomous robots, including PID tuning for industrial-grade e-bike motors and driver validation using a custom test bench
 - Configured industrial waveshare GSM modules using AT commands to enable ROS2 data transfer over cellular networks; set up NVIDIA Jetson Nano as onboard compute

PROJECTS

- Autonomous Rover for Rack Inventory Management System** Nov. 2025 - Dec. 2025
Robotics Club, IIT Ropar, Inter IIT Tech Meet 14.0 Github
 - Designed a **holonomic autonomous rover** using **mecanum wheels** for navigation in unknown warehouse environments; implemented **SLAM and Nav2** for real-time mapping, obstacle avoidance, and path planning
 - Built a belt-driven lift mechanism enabling camera travel from **25 cm to 2 m** for rack scanning; achieved **>95% QR detection accuracy**
 - Engineered full electrical architecture using **20,000 mAh 6S LiPo** with multi-rail power distribution, **E-stop safety** (SSR + mushroom switch), and motor control via **Cytron MD10C and TB6600 drivers**
 - Developed onboard/offboard **ROS2 pipelines (Raspberry Pi 5 + local system)** and a **WebSocket dashboard** to monitor battery, telemetry, and live **RViz** data
- Micromouse Bot** March 2025 - Sept. 2025
Robotics Club, IIT Ropar, Technoxian 2025 Github
 - Designed a **4-wheeled Micromouse robot** for autonomous maze solving using **VL53L0X distance sensors** and **BNO055 IMU** for precise sensing and orientation
 - Implemented **differential drive** using two **N20 motors** coupled via a custom gear mechanism to drive all four wheels
 - Currently developing maze-solving software using the **flood-fill algorithm** for efficient path planning
- Robotic Arm** Jan. 2025 - Aug. 2025
Robotics Club, IIT Ropar, Metrix 7.0 Github
 - Built a **6-DoF robotic arm** using **ESP32** with **MG995R and SG90S servos**, achieving smooth joystick-based manual control (**Arduino, C++**)
 - Extended functionality to autonomous pick-and-place and **OpenCV-based gesture control** using **computer vision** and **inverse kinematics**
- Gesture Controlled Car** June 2025
Self Github
 - Built a multi-mode wireless rover with joystick (**NRF24L01**) and gesture-based (**BNO055**) control; implemented full electronics on **perfboard**
 - Integrated **FPV system** with onboard camera and analog VTX; achieved stable **700-800 m** long-range control in open environments
- Real Time Water Quality Monitoring System** Oct. 2024 - Jan. 2025
Robotics Club, IIT Ropar, Robotics Shark Tank Github
 - Led a 3-member team to design an **IoT-based system** addressing delays, tampering, and unreliable water quality testing; secured **1st place** in Robotics Shark Tank
 - Built a real-time monitoring device using **ESP32** and sensors (**pH, TDS, Turbidity, DHT22**), transmitting data over Wi-Fi to a web dashboard using **Firebase**
 - Implemented **median filtering** for sensor data reliability and explored long-range communication options (**Wi-Fi, Bluetooth, nRF24L01**) for deployment in low-connectivity regions
- Autonomous Multi Target Inception** Dec. 2024
Self Github
 - Built a multi-node **ROS2 system** (controller + spawner) using custom **publishers/subscribers, services, and messages**
 - Implemented a **proportional controller** to autonomously chase the nearest target turtle along the shortest path
 - Used **/spawn and /kill services** with custom **launch files** to manage dynamic turtle creation and removal

TECHNICAL SKILLS

- **Programming Languages:** C/C++, Python, Verilog, HTML, CSS
- **Frameworks & Tools:** ROS2, Gazebo, Git, PlatformIO, Arduino IDE
- **Embedded Platforms:** Arduino, ESP32, Teensy, Raspberry Pi 5, Raspberry Pi Pico
- **Design & Simulation Tools:** Altium Designer, SolidWorks, Fritzing, TinkerCAD, Circuit Designer, Wokwi
- **Communication Protocols:** I²C, SPI, UART, Serial Communication
- **Sensors & Actuators:** LiDAR (2D), VL53LOX ToF, BNO055 & MPU6050 IMU, Ultrasonic, IR, OLED/LCD(I²C), nRF24L01, DC Motors, Servo Motors, Stepper Motors
- **Control & Robotics:** PID Control, Motor Drivers (L298N, TB6612FNG, Cytron-MD10C/MDD3A, BTS7960), PCA9685 Servo Driver

KEY COURSES TAKEN

- **Electrical & Electronics:** Digital Circuits, Basic Electronics, Signals & Systems, Material Science for Electrical & Electronics Engineers
- **Maths & CSE:** Calculus, Linear Algebra, Integral Transforms, & Special Functions, Differential Equations, Introduction to Computing & Data Structures
- **Self-Paced Courses:** Verilog (Prof. Indranil Sengupta, NPTEL), Digital Electronics, Verilog HDL for Digital Design & Verification, Self-Driving Systems & ROS2, PCB Design with Altium Designer (Udemy)
- **Others:** History of Technology, Workshop Practice, Physics for Engineers, Professional English Communication, Technology Museum Lab, Engineering Drawing, Introduction to Engineering Products

POSITIONS OF RESPONSIBILITY

- **Representative, Robotics Club, IIT Ropar** *May. 2025 – Present*
 - Led club operations across projects, technical sessions, and member engagement
 - Managed budget, equipment procurement, and event logistics
 - Represented the club externally; initiated workshops and hackathons

ACTIVITIES & ENGAGEMENT

- **Event Management & Outreach Team Member, RoboSoccer Event, Advitiya Tech Fest 2025** *Feb. 2025*
- **Content & Anchoring Team Member, Advitiya 2025; Anchored the *Catalysing Concepts* event** *Feb. 2025*
- **Club Representative at Exhibitions, Independence Day and IndustryLynk** *2024 – 2025*
- **Active Member, Robotics Club, IIT Ropar** *Aug. 2024 – Present*

MISCELLANEOUS

- **1st Rank, Robotics Shark Tank, Idea presentation and realisation** *Oct. 2024*
 - **2nd Rank, General Championship (Robotics PS), Problem statement on Inverted Walker** *Feb. 2025*
 - **6th Rank, Inter-IIT Tech Meet 14.0, Eternals PS on Autonomous Rack Inventory Management System** *Dec. 2025*
 - **Represented IIT Ropar, Technoxian 2025, Maze Solver Problem Statement** *Sept. 2025*
 - **11 km Marathon Completion, Finished in 76 minutes** *Oct. 2025*
 - **Demonstration, Metrix 7.0, Presented 6-DoF robotic arm at Mechanical Dept. technical event** *Jan. 2025*
 - **JEE Advanced, Achieved All India Rank (AIR) 4987** *2024*
 - **JEE Mains, Secured 99.626 percentile with an All India Rank (AIR) of 6108** *2024*
-