

Akshat Sharma

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EDUCATION

Maharaja Agrasen Institute of Technology
B.Tech - Electronics and Communication Engineering | **8.24 CGPA**

Rohini, Delhi
2023-2027

EXPERIENCE

Robotics Intern @ Rebhu Computing

- Developed an **autonomous UGV platform** with **ArduRover** using **CUAV X7+ Pro** and **Jetson Orin**.
- Integrated **Helios-16P 3D LiDAR** for SLAM using **GLIM** in **ROS2**.
- Created custom **ICP-based module for odometry estimation** from point cloud.
- Implemented **obstacle avoidance with PID controller** during waypoint navigation.
- Fused wheel encoder data (via **CAN bus**) and IMU data for enhanced localization.
- Worked on Ardupilot-Gazebo **SITL simulations**.
- Set up **RTSP** camera video capture pipelines using **GStreamer**.

Open Source Hardware Intern @ FOSSEE, IIT Bombay

- Worked on integrating **ESP32 emulation** into FOSSEE's Yaksh testing platform for testing and evaluating students with programming assignments and problems.
- Utilized **QEMU** for emulation with **MicroPython** and **ESP-IDF** firmware.

PROJECTS

MR ROBOT - ROS2 | FreeRTOS | microROS | Gazebo

[Project Link](#)

- **Implemented a fully functional Autonomous Mobile Robot (AMR)** on hardware using **ROS 2 Nav2**, achieving real-time SLAM and autonomous path planning.
- Engineered the system architecture powered by a **Raspberry Pi 5** and **ESP32 (micro-ROS over UART)**, integrating a **YDLidar X2** for mapping on a custom chassis.
- Architected a robust system framework using **FreeRTOS**. Developed automated boot system using **systemd and udev**, with the SBC serving as a dedicated access point.

3D Mesh Visualization & Embedded Display Streaming - ESP-IDF | SDL2

[Project Link](#)

- Implemented a **basic 3D renderer in C using SDL2** to project 3D (X, Y, Z) points onto a 2D screen.
- Wrote a simple **OBJ Parser** to retrieve faces and vertices from the file.
- Used **UDP sockets** to stream rendered frame data from a PC to an **ESP32**.
- Displayed the received stream on an **OLED screen** connected to the ESP32 via **SPI**.

WS2812B DMA-based Driver - STM32

[Project Link](#)

- Implemented a high-speed LED driver for **WS2812B** addressable LEDs on an **STM32F103C6T6** by configuring **hardware timers** for precise **PWM** signal generation.
- Optimized CPU utilization by offloading data transmission to the **DMA (Direct Memory Access)** controller, ensuring accurate timing for the single-wire serial protocol.
- Verified signals and timing on an **oscilloscope**.

Eyantra Robotics Competition '25 - Verilog

[Project Link](#)

- Made a **maze solving robot** using the **de0 Nano FPGA board**.
- Implemented **PWM generation, distance measurement** using **ultrasonic sensors, UART receiver and transmitter** and **DHT11 Humidity and Temperature** sensor interface.
- Designed and implemented a **RISC-V CPU** in Verilog supporting all **40 RV32I base instructions**.
- **Simulated, synthesized, and verified** the design using **Intel Quartus Prime and Modelsim**.

SKILLS

Languages: C/C++ | Python | Verilog

Technologies: ROS2 | Gazebo | CoppeliaSim | RViz | MicroROS | MoveIt | KiCAD | Docker | Linux | Git | Fusion360

Skills: Robotics | PCB Design | Embedded Systems | Control Systems | CAD