Paavan Shah

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Summary

Electronics and Communication Engineering student with 3+ years of experience in embedded systems, autonomous robotics, and satellite technology. Recently completed an internship at Space Applications Center (SAC), ISRO, contributing to sensor characterization and data analysis that improved calibration accuracy by 20%. Successfully led projects including an 8-wheeled autonomous rover and a fully integrated CubeSat prototype. Awarded 1st place at national-level Robofest 4.0 and state-level Mission CHANDRA SAC-ISRO rover competitions among 100+ teams. Proficient in C, C++, Python, Verilog, and MATLAB, with hands-on expertise in ROS, sensor fusion, and real-time hardware prototyping. Passionate about driving innovation in space systems and autonomous navigation.

Education

Birla Vishvakarma Mahavidyalaya Engineering College , BTech in Electronics and Communication — Sept 2022 – Present

- CGPA: 8.98/10.0
- **Coursework:** Embedded Systems and IoT, Satellite and Mobile Communication, Control Systems, VLSI Design

Shardayatan School, HSC — May 2021 – May 2022

- Percentage: 61.62

P.R. Khatiwala Vidya Sankul School , SSC — April 2019 – May 2020

- Percentile: 91.63

Experience

Junior Research Intern, Space Application Center, ISRO -Ahmadabad — 31 May 2024 – 9 Aug 2024

- Conducted electro-optical characterization and data analysis of the SWIR6000 image sensor using various gain and integration settings.
- Gained proficiency in LabVIEW for sensor data acquisition and analysis, producing over 50 detailed performance graphs
- Operated and troubleshooted the complete hardware setup of the SWIR6000 sensor, enhancing practical knowledge of optical detectors and image sensors.

Research Intern, Ural Federal University – Yekaterinburg, Russia — 21 Jul 2025 – 3 Aug 2025

- Completed a two-week international AI/ML internship featuring advanced lectures, hands-on coding, and real-world applications in Python, scikit-learn, and Streamlit.
- Developed NucLearn, an educational and gamified web platform on nuclear technologies, integrating JavaScript-based games, an AI chatbot, and interactive simulations.
- Collaborated with peers from multiple countries during a 24-hour HackAtom hackathon; led web development and AI logic implementation.
- Gained exposure to MLOps, recommender systems, clustering, time series forecasting, and neural networks; visited Sberbank Technohub for industrial AI insights.

Research Intern, Sardar Vallabhbhai National Institute of Technology -Surat — 26 May 2025 – 30 June 2025

- Developed a complete perception-to-planning pipeline for autonomous drone navigation
- Implemented real-time APF and VFH obstacle avoidance algorithms in Unreal Engine
- Deployed system on Jetson Nano, integrating Intel RealSense and Open3D for embedded execution

Space Tutor, Origin Antares — 1 May 2025 – Present

- Providing online tutoring on satellite systems, CubeSat, and space communication, helping students gain practical knowledge about space systems and technologies.

Chairperson, IEEE WIE AG (Women in Engineering) 21 March 2025 – Present

- Leading the Women in Engineering student body, organizing events, workshops, and outreach activities to promote gender diversity in engineering.

Vice Chair , The Space Association (TSA) 25 March 2025 – Present

- Overseeing operations and organizing space exploration-related events for the student community, including CubeSat workshops and lectures.

Projects

NucLearn – Interactive Platform for Non-Energy Nuclear Technologies github repo

- Designed and developed a gamified web application to educate users on non-energy nuclear technologies using simulations, storytelling, and a custom JavaScript chat-bot.
- Key modules include IsoAdventure (scenario-based game), Budget Challenge Simulator, AI Q&A Chatbot, and Isotopedia (interactive isotope encyclopedia).
- Tools Used: HTML, CSS, JavaScript, GitHub

Flute Frequency Isolation Using MATLAB github repo

- Developed a digital signal processing framework in MATLAB to isolate flute frequency components (585.544 Hz) from mixed audio signals using FFT, Butterworth band-pass filtering, moving average smoothing, and amplitude normalization.
- Tools Used: MATLAB, DSP Toolbox

8-Wheeled Autonomous Rover Project Demo

- Developed an 8-wheeled autonomous rover with advanced navigation, obstacle avoidance, and localization capabilities for efficient terrain traversal. Integrated sensor fusion and control algorithms to enhance stability and adaptability in diverse environments.
- Tools Used: ROS2, Jetson Nano, GPS, Python

4-Bit Calculator using Basys3 FPGA Board Project Demo

- Designed a 4-bit calculator on a BASYS3 FPGA board using Verilog HDL; supported basic arithmetic and handled division-by-zero with custom error display logic.
- Tools Used: Verilog, Vivado, BASYS3

CubeSat Prototype Project Demo

- Designed and built a functional CubeSat prototype integrating key satellite subsystems—power management, data acquisition, and onboard processing—on a compact PCB platform.
- Programmed microcontrollers for synchronized sensor data logging and telemetry simulation, reflecting real-world small satellite mission architectures.
- Tools Used: Sensors (IMU, GPS, Env), Custom PCB, C++

Maze Solver Bot Project Demo

- Developed an autonomous robot using Raspberry Pi Pico that achieved 90% accuracy in solving complex mazes using a custom navigation algorithm.
- Tools Used: Raspberry Pi Pico, ToF sensor, Arduino IDE

Mission CHANDRA Rover Project Demo

- Designed electronics and implemented object detection using Arduino Nano, NodeMCU, and Raspberry Pi Zero for a rover that won at SAC-ISRO competition.
- Tools Used: Arduino, Raspberry Pi Zero, OpenCV

IoT-Based Smart Farming System Project Demo

- Built an IoT system using ESP8266 and sensors for real-time monitoring of soil moisture, temperature, and humidity; improved crop growth by 15%.
- Tools Used: ESP8266, Sensors, Arduino IDE

Certifications & Achievements

- **S**ilver Medalist, Highest CPI in 1st & 2nd Year – EC Department, BVM — Feb 2025
- **G**aurav Puraskar recipient, Anand City - awarded for securing 1st Place, Robofest 4.0 National Level Robotics Competition, Rover Category — March 2025
- **G**aurav Puraskar recipient, Anand City - awarded for winning Mission CHANDRA, State-Level SAC-ISRO Rover Challenge — March 2024
- **1**st Place, Robofest 4.0 – National Level Robotics Competition, Rover Category — Jan 2025
- **1**st Place, Mission CHANDRA – State Level SAC-ISRO Rover Design Challenge — Oct 2023
- **2**nd Round Qualifier, Robofest 3.0 — Dec 2023
- **3**rd Prize, ECE Project Expo, BVM – CubeSat Prototype — March 2024
- **Organizer**, 8-hour CubeSat Workshop, Birla Vishvakarma Mahavidyalaya — Aug 2024
- **C**ompleted Course, Robotics Fundamentals – Robofun Lab — June 2021

Publications

- **Review Paper:** "Doppler Limits of LoRa in LEO: A Critical Review of the First In-Orbit Flight Tests," published in *Recent Trends in Electronics and Computer Science (RTECS)*, Volume 12, Issue 02, Pages 21–27, 2025. Read it here
- **Patent Published:** Eight Wheeled Rover Robot

Technologies

Languages: C++, C, Python, Verilog, MATLAB

Technologies: ROS2, Xilinx Vivado, Arduino IDE, MATLAB, CODESYS, EasyEDA, LTspice, Ubuntu, Jetson Nano

Embedded & Hardware Platforms: ATmega328P, ESP8266, Jetson Nano, Pixhawk 2.4.8, Arduino, Raspberry Pi, BASYS3 FPGA Board
Domains: Embedded Systems, Robotics, Autonomous Navigation, Sensor Fusion, Wireless Communication (LoRa, Bluetooth, Wi-Fi), PCB Design

CAD Tools: Fusion 360, Onshape

Soft Skills

- interpersonal and communication abilities; effective in cross-functional collaboration
- Able to convey complex technical concepts to non-technical stakeholders
- Proven team leadership and project management; 95% project completion rate within deadlines
- Adaptable and self-driven learner with experience mentoring junior team members