Sakar Pathak

sakar.pathak111@gmail.com | +977 9841671676 | Kathmandu, Nepal

sakar111 | pathaksakar.com.np | sakar-pathak

Personal Profile

Passionate about building intelligent robots that merge perception, motion, learning and control. Experienced in both control algorithms and hardware implementation, I aim to develop autonomous systems that are adaptable, robust, and ready for real-world deployment.

Education

B.E. in Electronics, Communication and Information Engineering (78.04%) 2018–2023
Pulchowk Campus, Tribhuvan University, Nepal

Graduation Rank: 9th out of 500+ students in Electronics
Engineering Entrance Exam Rank: 24th out of 16,000

Relevant Modules:
Engineering Mathematics, Probability and Statistics, OOP, Data Structures and Algorithms, Artificial Intelligence, Microprocessor, Computer Networks, Embedded System, Control System, Filter Design, Wireless Communication, Antenna and Propagation, Digital and Analog Communication System, Electric Circuits and Machines.

Awards and Scholarships

- Full Undergraduate Scholarship, Pulchowk Campus
- Top-ranked in Electronics Department – Engineering Entrance Examination
- Winner – National Science Exhibition
- Full Government Financial Aid during High School

Research and Development

Reusable, Autonomous VTOL Vehicle (Bachelor's Thesis)

- Designed custom flight computer integrating IMU, barometer, GPS, and LiDAR for autonomous vertical flight.
- Implemented asynchronous EKF for sensor fusion, reducing GPS horizontal noise by 96% and achieving sub-meter position accuracy.
- Developed 250 Hz attitude estimation on embedded hardware and performed system identification using MOESP to derive state-space models.
- Designed and implemented LQG controller with integral action for attitude stabilization; characterized thrust for feed-forward altitude control.
- Developed and simulated MPC for trajectory optimization (CasADi/IPOPT), achieving 20× faster computation using multiple shooting.
- Demonstrated autonomous takeoff and stable hover in experimental flight tests.

Quadruped Robot Kit (Open-Source Platform)

- Designed a low-cost (sub-$80) 12-DOF quadruped robot with custom mechanical and embedded system architecture.
- Developed Python GUI tools for kinematics, calibration, stabilization, and real-time control.
- Developed crawl and trot gaits validated in physics-based simulation and on real hardware.
- Implemented IMU-based stabilization and calibration pipelines for robust locomotion under disturbances.
- Led iterative mechanical and control design through multiple hardware revisions and open-sourced the complete platform.

Work Experience

Co-Founder & Lead Engineer Feb 2024 - present
Axar Space Pvt. Ltd. *Kathmandu, Nepal*

- Developed complete mechanical, electrical, and firmware stack for programmable robotics platform, enabling students to build multiple projects from a single kit.
- Led development of embedded hardware and software across multiple projects.
- Produced technical video content demonstrating robotics concepts through hands-on projects.

Electronics Engineer Jan 2024 - Apr 2024
Sandbox Software Pvt. Ltd. *Pokhara, Nepal*

- Led development of 1000 HID devices (keyboard and mouse) using microcontrollers and ASICs.

Robotics Engineer Aug 2024 - Oct 2024
North Star Developer's Village *Kathmandu, Nepal*

- Led completion of Person Following project for an Autonomous Robot, achieving 75% accuracy.

Teaching Experience

Lecturer, Discrete Mathematics & Digital Logic May 2024 - Sep 2025
Kantipur College of Management and Information Technology *Kathmandu, Nepal*

Service and Leadership

Hardware Coordinator Mar 2022 - Mar 2023
LOCUS 2023, Pulchowk Campus

- Led the organization of six Robotics competitions during the LOCUS 2023 exhibition, attracting hundreds of participants and more than 20,000 viewers.

Skills

Programming & Software	C/C++, Python, MATLAB/Simulink, JavaScript; ROS2 node development, FreeRTOS, STM32CubeIDE
Electronics	Analog/digital circuit design, Passive & active components (op-amps, MOSFETs, comparators, voltage regulators), Power and signal conditioning
Embedded System	Microcontrollers (Arduino, ESP32, STM32, Raspberry Pi, Jetson), Low-level interfaces (I2C, SPI, UART)
Control System	Sensor fusion (LKF, EKF, UKF), Feedback control (PID, LQR, LQG), Model predictive control (MPC), System identification
Perception & AI	SLAM, Computer vision, Convolutional Neural Networks (CNNs), Digital signal processing
Product Development	PCB design (Altium Designer, KiCad), 3D printing (Fusion 360), Simulation & modeling, Git/GitHub, Web/GUI development (Figma, React, MySQL)

Test Scores

IELTS: Overall 7.5 (Listening: 7.5, Reading: 7.5, Writing: 7.5, Speaking: 7.0) Nov 7, 2025