

PUSHPENDER

Software Development · Data & Machine Learning · Web Applications
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PROFILE

Final-year Computer Engineering student at UNSW Sydney with hands-on experience in software development, data analysis, machine learning, and web applications. Led a 3-person research team from data investigation to a working satellite-imagery detection system and built 3 applied software projects. Strong communicator with experience translating technical work for clients and non-technical decision-makers.

EDUCATION

University of New South Wales (UNSW Sydney)

Expected Sep 2027

Bachelor of Engineering (Honours), Computer Engineering — Sydney, NSW

Selected via interview for a Vertically Integrated Project in predictive maintenance and sensor data analytics.

Thapar Institute of Engineering and Technology

2023–2025

Computer Engineering — two years of study, credited as advanced standing toward the UNSW degree — Patiala, India

Relevant coursework: Artificial Intelligence · Probability & Statistics · Object-Oriented Programming · Software Engineering

TECHNICAL SKILLS

Programming & tools Python, C/C++, JavaScript, SQL, R, MATLAB, HTML/CSS; Git/GitHub, Linux, VS Code

Data & ML Data cleaning and validation, exploratory data analysis, feature engineering, statistical analysis, classification, threshold tuning, forecasting, model evaluation

Web & data systems Flask, REST APIs, WebSocket; relational, vector and graph databases; embedding-based similarity search

Geospatial & AI Google Earth Engine, Sentinel-2 imagery, GeoTIFF, Leaflet, LLM-generated summaries

Professional Client requirements gathering, technical communication, tutoring, project leadership

Languages English (full professional), Hindi (native)

RESEARCH EXPERIENCE

Research Intern & Project Lead — RAVEN

2024 – May 2025

Thapar Institute · Floodplain encroachment detection from satellite imagery · Supervisor: Dr Ashima Singh

- Led a 3-person team through 100% of the project lifecycle, from initial data investigation to a working detection system, while owning delivery and timelines.
- Faced missing and cloud-corrupted satellite observations, so established a cleaning and validation workflow to prepare multi-band imagery for downstream analysis.
- Needed to distinguish potential unauthorised construction from surrounding land, so engineered 5 spectral-index features and iteratively tuned classification thresholds and a proximity buffer.
- Authorities needed accessible spatial results, so built an interactive dashboard with 4 key capabilities—layer toggles, date-range controls, area controls, and live alerts—for non-technical users.
- Decision-makers needed interpretable findings, so converted detection outputs into readable change summaries to support review and communication.

PROJECTS

Hybrid Vector/Graph/Relational Data System

2024–2025

- The system needed to combine semantic similarity, entity relationships, and structured records, so designed a unified query pipeline bringing all 3 information types into one workflow.
- Related-record queries required more than conventional tabular retrieval, so designed the system to support large-dataset retrieval using complementary data representations.

Municipal Water Watch — Hackathon build

2024

- The hackathon required a working public reporting solution under time pressure, so built a case-based workflow where 100% of submitted reports persist as tracked cases with escalating alert levels.
- Users needed immediate visibility when cases changed, so implemented live status updates without requiring manual page refreshes.

Weather Forecast Web Application

2023

- The application needed both current conditions and short-range predictions, so integrated live weather information into a responsive web interface.
- Historical observations were available to extend the application, so added a short-range forecasting component trained on historical data.

WORK EXPERIENCE

Freelance Web Developer — Self-employed

Jul–Aug 2025

- Clients needed responsive applications delivered to specific requirements and deadlines, so gathered requirements directly and delivered web solutions within agreed timelines.
- Applications depended on external services, so integrated third-party APIs and improved page-load speed through implementation changes.

After-School Tutor — Self-employed

Jun–Jul 2025

- Students had different programming backgrounds, so created individualized lessons and adapted instruction around each learner's needs.
- Progress needed to be monitored across lessons, so tracked development and adjusted subsequent sessions based on individual progress.

ACHIEVEMENTS & VOLUNTEERING

- Finalist, HackTU hackathon.
- Selected for Thapar Institute's Summer Research Internship Program (2024).
- Volunteer, Prayaas (Mar 2024): coordinated volunteer teaching and awareness drives and organised local school events.