Abiral Gautam

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RESEARCH INTERESTS

GeoAI and geospatial machine learning; urban analytics; climate hazards and disaster resilience (floods, landslides, urban heat); Earth observation with satellite imagery for land cover mapping; reliable evaluation of spatial models (spatial cross-validation, leakage, explainability); open and reproducible research software.

PROFILE

Computer engineering graduate with a first-author paper under review on operational flood risk monitoring that integrates machine learning and GIS. Builds end-to-end geospatial workflows: from satellite and GIS data on Google Earth Engine, through models validated with temporal hold-outs and spatial cross-validation and interpreted with SHAP, to open-source tools and web maps that others can use. Brings 5+ years of professional software engineering in Python, JavaScript and PHP to research code.

EDUCATION

Pokhara University, School of Engineering, Pokhara, Nepal Sep 2022 – Aug 2026

Bachelor of Engineering in Computer Engineering · CGPA 3.51 / 4.00

- Major project: grid-wise flood risk monitoring with machine learning and GIS for Bharatpur, Nepal (basis of the first-author paper below).
- Merit scholarships for the highest SGPA in three semesters.

Acme College of Engineering, Kathmandu, Nepal 2017 – 2020

Diploma in Computer Engineering · 71.79%, First Division

- Merit scholarship for ranking first in the entrance examination.

PUBLICATIONS AND PRESENTATIONS

- **Gautam, A.**, Aryal, P., Paudel, S., Paudel, L., & Sharma, B. (2026). Operational, grid-wise flood risk monitoring via machine learning and GIS integration: Bharatpur, Nepal. *Discover Hazards* (under review, submitted 29 Sep 2026). Preprint: doi.org/10.21203/rs.3.rs-11143809/v1
- **Gautam, A.**, & Khanal, S. (2025). Vehicle traffic congestion detection using deep learning and clustering-based technique. Presented at the 4th Conference on Recent Trends in Science, Technology and Innovation, Pokhara University.

RESEARCH PROJECTS

Grid-Wise Flood Risk Monitoring, Bharatpur, Nepal Bachelor's major project, 2026

- Integrated GIS terrain features with live rainfall and river-level data to classify 2,434 grid cells into four flood risk levels.
- Tuned XGBoost reached 96.9% accuracy and 0.897 macro F1 on a held-out year; identified and fixed evaluation leakage before final testing.
- Delivered as an operational monitoring platform (FastAPI, SQLAlchemy, React and Leaflet, Docker Compose). Code: github.com/AbiralGtm/flood-risk-monitoring-system

Urban Heat Exposure Mapping with GeoAI, Kathmandu Valley Independent project, Oct 2026

- Built a Python data pipeline and Random Forest model reaching R^2 0.90 under spatial cross-validation.
- Used SHAP to explain model predictions and published results as an interactive web map. Code: github.com/AbiralGtm/urban-heat-geoai

Satellite Crop Classification, Rupandehi, Nepal Independent project, 2026

- Google Earth Engine pipeline classifying crops from satellite imagery, served through a FastAPI and Next.js dashboard with job tracking and GeoTIFF export. Code: github.com/AbiralGtm/crop-classification-dashboard

RESEARCH AND PROFESSIONAL EXPERIENCE

Chloroleaf Technologies Pvt. Ltd. Oct 2022 – Aug 2026

Full Stack Developer

- Developed machine learning workflows on Google Earth Engine to classify land cover and crops from satellite imagery.
- Integrated external APIs and reference datasets, including the Google Earth Engine API and ESA WorldCereal.
- Built a web dashboard and back-end services (FastAPI, JavaScript) with job history and GeoTIFF export.

- Built data-heavy platforms including a school result-processing system handling complex academic records and grading rules, an in-house CMS (Laravel, Filament) and a business management information system.

ProActive Web Developers, Kathmandu, Nepal Jul 2019 – Sep 2022

Full Stack and Mobile Application Developer

- Built and maintained 15+ web applications covering database design, REST APIs and admin interfaces (1,000+ commits across 19 repositories).
- Developed a bilingual (Nepali/English) multi-site CMS for public-sector websites and a public welfare application system with SMS notifications.
- Built real-time systems, including an IoT queue management system synchronised with networked LED displays, and containerised legacy applications with Docker.

Freelance Mobile Application Developer Mar 2018 – Jul 2019

- Designed and delivered mobile applications for clients, working directly with stakeholders on requirements.

TECHNICAL SKILLS

Languages: Python, JavaScript, TypeScript, PHP, SQL

Back end: FastAPI, Laravel, SQLAlchemy, REST APIs

Front end and mobile: React, Next.js, Vue.js, React Native, Leaflet

Databases and tools: MySQL, MSSQL, SQLite, Firebase, Docker, Git/GitHub, Linux

Geospatial and ML: Google Earth Engine, QGIS, GeoPandas, Rasterio, scikit-learn, XGBoost, TensorFlow/Keras, SHAP

AWARDS AND TRAINING

- Winner, Locus Hack-A-Week (2018, 2019); Winner, Kathmandu University IT Meet V8.0 Hackathon (2019); First Runner-Up, Yomari Code Camp, Locus (2018).
- Cloud and DevOps Technology workshop, 30 hours (AWS, CI/CD, containerisation), Pokhara University, Apr 2026.

LEADERSHIP AND OUTREACH

- **Club Coordinator**, Cybersecurity for All (CS4ALL) Student Club, Pokhara University, 2025 – 2026 (Erasmus+ co-funded project). Organised and delivered digital-safety sessions for secondary-school students and community residents.
- **Executive Head**, Tech Club of Pokhara University, 2025. Led club operations and annual planning; organised and mentored a 3-day Git and GitHub workshop.
- **Program Coordinator**, Innosphere 1.0, Pokhara University, Jun 2025. Coordinated a technology fair with 200+ participants and 700+ visitors.

References available on request.