

# Prashant Aryal

+977 9840033089 - [prashantaryal07@gmail.com](mailto:prashantaryal07@gmail.com) - [Linkedin](#) - [github.com/pr-a-sh-ant](https://github.com/pr-a-sh-ant)

## EDUCATION

### Tribhuwan University - Thapathali Campus

Bachelor of Engineering in Computer Engineering

April 2022 - October 2026 (Expected)

## PUBLICATIONS

### “Wavelet-Space Representations for Neural Super-Resolution in Rendering Pipelines”

2025

Elsevier Computers & Graphics. <https://doi.org/10.1016/j.cag.2026.104591>

Prashant Aryal, Prateek Poudel, Kirtan Kunwar, Navin Nepal, Dinesh Baniya Kshatri

## EXPERIENCE

### Software Developer at MediFlow Pvt. Ltd.

October 2025 - Present

Backend Development and Healthcare Integration

Python, Node.js, Docker, OpenHIM, MySQL

- Engineer Python ETL pipelines for hospital data migration, handling extraction, schema validation, and loading into centralized repositories.
- Build OpenHIM mediators enabling standardized healthcare data exchange between hospital information systems and downstream services.
- Design and maintain centralized MySQL databases aggregating operational data from multiple hospital facilities for reporting and analytics.
- Deploy and troubleshoot containerized backend services on Docker-based VPS infrastructure, including log inspection, service recovery, and release coordination.

### Backend Intern at Swift Technology

June 2025 - October 2025

Backend Development

Express.js, TypeScript, gRPC, RabbitMQ, Redis, Socket.IO, Docker

- Built backend services in Express.js and TypeScript, contributing to core API and business logic modules within a microservices architecture.
- Designed gRPC inter-service communication using Protocol Buffers, decoupling internal services and enabling independent deployment.
- Implemented JWT authentication with Redis-backed sessions, RabbitMQ queues for asynchronous processing, and node-cron schedulers with Nodemailer notifications.
- Delivered a meeting-room booking service (Express, Sequelize/MySQL, Zod validation, timezone-aware scheduling, cron reminders) as an internship project.
- Authored Sequelize migrations and seeders, containerized services with Docker Compose, and integrated Socket.IO for real-time event notifications.

### Frontend Intern at Agragami Tech

April 2024 - June 2024

Frontend Development

Next.js, React, MapLibre, Leaflet, GitHub Actions

- Built responsive frontend interfaces in Next.js and React, supporting both desktop and mobile viewports across the product.
- Developed interactive geospatial dashboards with MapLibre and Leaflet, integrating Chart.js for layered data visualizations.
- Implemented Redux for global state management across map, filter, and dashboard components, eliminating prop-drilling and improving render predictability.
- Configured GitHub Actions workflows for automated linting and build verification on pull requests.

## PROJECTS

### Custom RAG

[github.com/pr-a-sh-ant/Simple-RAG](https://github.com/pr-a-sh-ant/Simple-RAG)

Retrieval-Augmented Generation with Measured Retrieval Evaluation Python, FastAPI, ChromaDB, fastembed, BM25, Groq

- Built a from-scratch RAG pipeline on a fully local/free stack: bge-base-en embeddings, ChromaDB vector store, BM25 lexical search fused via Reciprocal Rank Fusion, and a bge-reranker-base cross-encoder for two-stage retrieve-then-rerank.
- Designed a 59-question gold evaluation set with archived “distractor” documents so ranking quality is measurable; reranking raised hard-question Recall@1 from 0.333 to 0.583 and reached 0.818 Recall@1 / 0.897 MRR overall.

- Exposed ingestion and question answering through FastAPI (/upload, /ask) with LLM-as-judge answer scoring via Groq.

## Dhorpatan Internal Management System

DIMS-backend

Internal Management System

Express.js, TypeScript, PostgreSQL, Redis, Prisma, Docker, GitHub Actions

- Developed a secure backend system for stock usage, payroll tracking, and recharge/payment workflows.
- Implemented authentication and role-based access control for administrators and technicians.
- Used PostgreSQL, Prisma, Docker, and GitHub Actions for database management, containerization, and CI/CD.

## Issue Tracking System

[github.com/pr-a-sh-ant/issue-tracking](https://github.com/pr-a-sh-ant/issue-tracking)

Microservices-Based Issue Tracking System

Node.js, Express.js, TypeScript, gRPC, MySQL, Redis, Docker

- Built a microservices-based issue tracking system: gRPC services with generated proto types behind an Express.js API gateway, containerized with Docker.
- Implemented JWT authentication and Redis-backed session management for secure user access.
- Integrated MySQL with Sequelize for data modeling, migrations, and seeders; documented the full API in Postman.

## Wavelet-Driven Super-Sampling (WDSS)

[github.com/Prateek61/WDSS](https://github.com/Prateek61/WDSS)

Super-Resolution Framework for Real-Time Rendering

Python, PyTorch, OpenCV, Unreal Engine

- Co-developed a wavelet-space neural super-resolution method for rendered frames in a four-person research team; published in Elsevier Computers & Graphics.
- Developed the Fourier-mapped INR module for high-frequency detail reconstruction and the inference-time benchmarking harness.
- Designed the feature extraction pipeline using HR G-buffers, temporal frames, and BRDF-based lighting decomposition, with frames captured via a custom Unreal Engine plugin.

## TechCart

[tech-cart-rust.vercel.app](https://tech-cart-rust.vercel.app)

E-commerce Platform

React, Tailwind CSS, Node.js, Express.js, MySQL, JWT

- Built and deployed a full-stack e-commerce platform (React on Vercel, Express.js on Render, MySQL on Aiven).
- Designed REST APIs and MySQL schemas for product, user, and order data; implemented JWT authentication and Khalti payment integration.

## Algorithm Visualizer

[github.com/pr-a-sh-ant/Algorithm-Visualizer](https://github.com/pr-a-sh-ant/Algorithm-Visualizer)

Desktop Visualization of Maze Generation, Pathfinding, and Sorting

C++, SFML, CMake

- Team-built C++/SFML application animating maze generation, pathfinding searches, and sorting algorithms step by step, with a CMake cross-platform build.

## TECHNICAL SKILLS

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**Languages:** Python, JavaScript, TypeScript, SQL, C++

**Backend:** Node.js, Express.js, NestJS, FastAPI, REST APIs, gRPC, RabbitMQ, Socket.IO, JWT Authentication, Role-Based Access Control

**AI / ML:** PyTorch, RAG pipelines (embeddings, hybrid retrieval, cross-encoder reranking), ChromaDB, retrieval evaluation (Recall@k, MRR, LLM-as-judge)

**Databases:** PostgreSQL, MySQL, MongoDB, Redis, Prisma, Sequelize

**Linux & DevOps:** Linux usage and troubleshooting, Bash scripting, Docker, Docker Compose, Kubernetes basics, GitHub Actions, CI/CD, Git

**Frontend & Tools:** React, Next.js, CSS, Leaflet, MapLibre, Chart.js, Postman

## CERTIFICATIONS AND TRAININGS

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- **Machine Learning:** Machine Learning by Stanford University & DeepLearning.AI on Coursera
- **Deep Learning:** Deep Learning by DeepLearning.AI on Coursera