

PROFILE

Hands-on CTO who sets the technical direction for a **16-person engineering team** and still ships code across the stack. My sweet spot is where **software meets physical devices**: ROS robots, Bluetooth mesh wearables, biometric terminals, EV chargers and printers. Around that I build the platforms they need — multi-tenant SaaS backends, mobile apps, real-time multiplayer, LLM and data pipelines, media streaming — and the DevOps that keeps them running.

10+

enterprise systems delivered

16

engineers led & hired

10+

industries served

Web · Mobile · IoT

end-to-end ownership

TECH STACK

Languages	PHP, TypeScript / JavaScript, Python, Dart, C / C++, SQL, Bash	IoT & protocols	ROS 2 (rosbridge, Gazebo), BLE Mesh (Nordic nRF, DFU), MQTT, OCPP, ZKTeco ADMS / Push SDK, serial / ZMODEM, ESC/POS
Backend	Laravel (Octane + Swoole, Horizon, Reverb), Node.js / Express, FastAPI, Flask, REST, WebSockets	Real-time	WebRTC P2P, STUN / TURN, WebSockets, Cloudflare Workers / PartyServer, Web Push
Frontend	React, Next.js, Vite, Tailwind CSS, Three.js, Konva, Blockly, PWA	AI & data	OpenAI & Gemini APIs, embeddings / pgvector, speech-to-text, LLM pipelines, Apify scraping, pandas, OptaPlanner
Mobile & desktop	Flutter (BLE, Riverpod, FFI / NDK, native audio), Capacitor, Electron, Android TV, Python desktop	Databases	PostgreSQL, MySQL, MongoDB, Redis, Supabase, PowerSync, SQLite
Payments & growth	Stripe, Apple Pay, RevenueCat, PhonePe, Fonepay, AdMob, PostHog	Cloud & DevOps	AWS, Azure (Functions, Blob, Key Vault), GCP, Docker, Coolify, GitHub Actions, Cloudflare, OTA updates, JMeter

EXPERIENCE

Co-Founder & Chief Technology Officer

2023 - PRESENT

MarginTop Solutions · Kathmandu, Nepal · software partner for startups and enterprises

- Technical direction** — own architecture, stack choices and code standards for every engagement: in-house Laravel / React / Flutter boilerplates, RBAC, linting, reviews and a monolith-first rule.
- Hardware-facing products** — led robot control software, clinical-wearable apps, biometric access control and EV-charger integrations, writing the protocol layers myself (details overleaf).
- Platforms & data** — architected a multi-tenant SaaS, fintech order books, ERPs and CRMs, and LLM-driven recommendation and media pipelines.
- Infrastructure** — run containerised deployments on Coolify across AWS, Azure and GCP, with GitHub Actions CI, self-hosted STUN / TURN and Supabase, and JMeter load testing.
- Team & business** — grew the company from fully remote to a Kathmandu office of 16. Lead hiring and intern mentoring, and moved from third-party sourcing to direct clients.

Freelance Engineer & Higher-Secondary Teacher

2023

Independent · Nepal

- Taught computer science while delivering freelance web projects with a co-founder. A funded client asked us to incorporate, and that became MarginTop Solutions. I also designed Python courses for school students.

DOMAINS

Robotics & automation

HealthTech, clinical & rehab care

Fintech & capital markets

Biometrics & access control

EV charging

EdTech & school ERP

Marketplaces & recommendations

Media streaming & AI dubbing

Gaming

Travel & booking

Recruitment & CRM

Commodity pricing

SELECTED ENGINEERING WORK

Autonomous mobile-robot control suite

ROS 2 · roslib · React / TypeScript · Konva · Blockly · Electron · Flutter · Python · Gazebo

- Web control app for industrial AMRs with live map rendering, mapping and navigation modes, routes, waypoints, restricted zones, joystick teleop and run stats.
- Visual Blockly programming with custom robot blocks, so operators can build missions without writing code.
- Leading its migration to a DDD + Clean Architecture modular codebase in TypeScript, using a strangler pattern.
- Electron desktop configurator for the robot controller over USB serial, with custom ZMODEM / XMODEM file transfer, YAML configs, i18n and auto-update.
- Flutter provisioning app plus Ubuntu-side Python services (hotspot creator, Wi-Fi scanner API) to put robots on site networks.

Connected clinical wearable

Flutter · BLE Mesh (nRF) · DFU · Supabase · PowerSync · Docker

- Companion apps for a therapy device: mesh provisioning, opcodes, firmware updates and long-running background sessions.
- Offline-first data sync with self-hosted Supabase + PowerSync, plus a Laravel / React admin.

Biometric access & EV charging

ZKTeco ADMS / Push SDK · fingerprint SDKs · OCPP · Node.js · React

- Device-management backend that speaks the terminals' HTTP push protocol (commands, attendance logs, enrolment) with mobile and tablet apps.
- OCPP integration so the platform can manage and monitor EV chargers.

AI & data pipelines

Python · OpenAI / Gemini · pgvector · Apify · FastAPI · Next.js

- Marketplace deal engine: scrape → LLM extraction → fair-value scoring → embedding match against buyer profiles.
- Speech-to-text, context-aware LLM dubbing and auto-generated knowledge bases.

Platforms, media & infrastructure

Laravel Octane · PostgreSQL · Redis · FFmpeg / HLS · S3 · Azure Functions

- Multi-tenant SaaS with a database per tenant and subdomain routing. Fintech order book with DB-level audit trails.
- Adaptive HLS transcoding pipeline, and Azure Functions log analytics for compliance reporting.

INDEPENDENT PRODUCTS

Real-time 3D sports games

Three.js · Next.js · WebRTC · Cloudflare Workers · Capacitor · Jest

- Custom physics engine (spin / Magnus effect, drag, bounce) and a CPU opponent for table tennis and badminton.
- P2P multiplayer over WebRTC, with TURN credentials, leaderboards and telemetry served from the edge.
- Shipped to iOS and Android with OTA updates, PostHog analytics and a motion-design system.

Universal printer app

Flutter · Bluetooth LE / Classic · mDNS · ESC/POS · RevenueCat

- One adaptive app for Android, iOS, Windows, macOS and Linux that discovers and prints to thermal, receipt and label printers.
- Connects over BLE, Wi-Fi and USB, with subscriptions and ads for monetisation.

Other builds

- API-testing platform: OpenAPI import, dependency-aware test chains, RBAC (TypeScript, Express, MongoDB).
- Hearing-assist app: real-time audio DSP in C through Dart FFI and Oboe.
- Route and schedule optimisation with OptaPlanner and constraint solvers.
- Study-abroad advisor: scraping and LLM knowledge pipeline into a Next.js site.

EDUCATION

Bachelor of Computer Engineering

IOE, Pashchimanchal Campus, Pokhara · 2018 – 2023

- Robotics Club: built the club website on a Google Sheets-backed CMS.
- Hackathons: AI smart-farm monitor, CNN emotion-recognition app.
- Started the MarginTop brand through college programs and competitions.

Languages · Nepali, English, Hindi**Interests** · Swimming, running, cycling · video editing, graphic design

SELECTED WRITING

- Laravel Octane + Swoole for Concurrent Load
- The Hidden Cost of Premature Microservices
- Security Basics Before Fundraising
- Hiring Engineers as a First-Time CTO
- How AI Coding Tools Changed Our Velocity

More at roshan-kc.com.np/blog