# Akhil Rana
**Software Engineer**

**Bengaluru, Karnataka, India**
[akhilrana.com](akhilrana.com)

✉ [resume@akhilrana.com](resume@akhilrana.com)

○ [github.com/akhil-rana](github.com/akhil-rana)

📞 [+91 8532801000](+91 8532801000)

in [linkedin.com/in/rana-akhil/](linkedin.com/in/rana-akhil/)

Software engineer with 3+ years of total professional experience — 2 years crafting enterprise macOS / iOS apps in Swift and 1+ year building backend/full-stack systems with NestJS, React and PostgreSQL. Skilled in Docker, Linux, and Bash, with expertise in CI/CD and automation. Passionate Linux self-hoster who explores DevOps and AI through side-projects, bringing production rigour to personal innovations.

## EDUCATION

- **Manipal Institute of Technology, Manipal** — 2022 - 2024
  *Master of Technology in Computer Science and Engineering* — CGPA: 8.25

- **Sikkim Manipal Institute of Technology, Sikkim** — 2017 - 2021
  *Bachelor of Technology in Computer Science and Engineering* — CGPA: 8.56

## PROFESSIONAL EXPERIENCE

- **Juniper Networks, Bengaluru**
  *Software Engineer - 2* — June 2024 - Present
  *Software Engineer Intern* — July 2023 - May 2024

  - **Marvis Client - MacOS/iOS Development**: Maintained and enhanced [Marvis Client](Marvis Client) applications for enterprise Wi-Fi environments using SwiftUI and UIKit. Implemented telemetry collection using CoreWLAN frameworks and system profiler commands to capture network performance metrics. Built automated network onboarding workflows with SCEP certificate enrollment and credential provisioning. Developed Marvis-CLI tool for network diagnostics, log collection, non-UI based configuration and MDM integration. Created silent auto-upgrade mechanisms for BYOD devices using authenticated helper tools and privilege escalation. For iOS, implemented network onboarding using Network Extension frameworks and enterprise configuration profiles.

  - **Application Infrastructure & Packaging**: Architected comprehensive macOS application packaging infrastructure using pkgbuild/productbuild for PKG files and DMG creation. Implemented complex pre/post-install shell scripts, privileged helper tools with SMAppService for system-level operations, XPC communication for secure inter-process messaging, and launchd-based daemons. Applied macOS security architecture best practices including Hardened Runtime, entitlements configuration, SIP compliance, and Gatekeeper requirements for enterprise deployment, achieving a **99.8%** installer success rate and shrinking package size by **65%**.

  - **CI/CD & Release Automation**: Built comprehensive CI/CD pipelines across CircleCI and GitHub Actions for automated building, testing, and deployment. Implemented automated code signing with Developer ID certificates, notarization workflows using notarytool, and S3-based distribution systems. Created cross-platform build matrices supporting multiple Xcode versions with automated TestFlight/App Store releases for iOS and direct download distribution for macOS applications, reducing release cycle time from **3 hours to 10 minutes** and manual effort by **90%**.

  - **Indoor Location SDK**: Contributed to [Mist Indoor Location](Mist Indoor Location) solutions by maintaining sample applications for the Mist Location iOS SDK. Developed React Native sample applications demonstrating indoor positioning using Bluetooth Low Energy beacons. Created npm distribution packages for cross-platform location services integration and updated SDK documentation for enterprise mobile applications.

- **Squareboat Solutions, Gurugram**
  *Software Engineer* — July 2021 - February 2022
  *Software Engineer Intern* — January 2021 - June 2021

  - **Full-Stack Development**: Led development of production applications using NestJS backend with TypeScript and PostgreSQL/MySQL databases. Redesigned [Proactive For Her](Proactive For Her) platform architecture implementing microservices with 3 React-based frontends connected to a centralized NestJS API gateway. Platform served **40k** monthly active users at launch with page load times improved by **45%**. Implemented REST APIs with JWT authentication, data validation using class-validator, TypeORM integration, and Redis caching for production environments.

  - **Custom Scheduling & Payment Platform**: Architected and built custom scheduling and payment system to replace third-party solutions like Calendly, reducing SaaS spend by **80%**. Developed real-time appointment booking with conflict detection, automated notifications, and calendar synchronization. Integrated Stripe and Razorpay payment gateways with webhook handling, refund management, and subscription billing, processing over **$200 k** in transactions while cutting booking time by **70%**. Created admin dashboard with appointment analytics and real-time updates using WebSocket connections.

## PERSONAL PROJECTS

- **Pathology Algorithm Development Workbench**                                          GSoC 2020
    - Selected as one of 1,200 students worldwide for Google Summer of Code 2020 to develop a [Pathology Algorithm Development Workbench](#) for [caMicroscope](#). Enabled users to train their own ML models using an interactive UI, choose training data from pre-existing caMicroscope data or custom datasets, with an interactive interface for designing algorithms from scratch using TensorFlow.js for real-time machine learning model training and deployment.

- **virtual-bg**
    - Developed and maintained an open-source [npm package](#) with over 20,000 total downloads, providing seamless virtual background effects for video/camera input within web browsers using MediaPipe for real-time person segmentation.
    - Features include customizable background images, blur effects, edge smoothing, and optimized performance for real-time video processing, supporting multiple frameworks and demonstrating scalability in production environments.

- **Peerivate - Private p2p Audio/video calls**
    - Architected and developed a fully custom, end-to-end encrypted and anonymous peer-to-peer audio/video calling platform using WebRTC, React, and Node.js with DTLS-SRTP encryption and perfect forward secrecy.
    - Key features include real-time video/audio streaming, screen sharing, presenter mode, automatic connection recovery, and global CDN distribution optimized for low-latency communication. Try it out at [peerivate.akhilrana.com](#)

## TECHNICAL SKILLS

- **Programming Languages**: Swift, Python, JavaScript, TypeScript, Objective-C, Java, SQL, Bash, HTML5, CSS3

- **Mobile & Frontend**: SwiftUI, React.js, Next.js, UIKit, Angular, React Native, Bootstrap, Tailwind CSS

- **Backend & APIs**: Node.js, NestJS, Deno, Flask, FastAPI, Django, RESTful APIs, GraphQL, WebRTC

- **Databases & Storage**: MongoDB, PostgreSQL, MySQL, DynamoDB, Firebase, Redis, TypeORM, Prisma

- **DevOps & Infrastructure**: Linux, Docker, Kubernetes, k3s, Git, Jenkins, Proxmox, KVM, Cloudflare, Terraform, CircleCI, Github Actions, Traefik, Nginx, Prometheus, Grafana

- **Specialized Tools**: CoreWLAN, Xcode, Network Extensions, XPC, Privileged Helper Tools, MediaPipe, TensorFlow, TensorFlow.js, Keras, Portainer

## ACHIEVEMENTS

- **Published Conference Research Paper**: Co-authored ["Parallel Implementation of DNA Cryptography Encryption Scheme using MPI and CUDA,"](#) published in the proceedings of the 1st IEEE International Conference on Advances in Electronics, Communication, Computing and Intelligent Information Systems (ICAECIS 2023), Bangalore.

- **Project Mentor - Google Summer of Code 2021**: Served as a project mentor for Google Summer of Code 2021, guiding and mentoring developers in creating a [Real-time Collaborative Pathology platform](#) for caMicroscope. Provided technical guidance, code reviews, and project management support to enable multiple scientists and researchers to collaborate simultaneously on pathology analysis. Successfully delivered a collaborative platform that enhanced the research capabilities of the medical imaging community and facilitated distributed scientific research workflows.

## SIDE QUESTS

- **Infrastructure Enthusiast & Self-Hosting Advocate**: Passionate about building and maintaining personal infrastructure using Docker Compose, Proxmox virtualization, and container orchestration. Currently self-hosting a comprehensive suite of services including DNS servers, Nextcloud for file synchronization, Matrix homeserver for secure communications, lightweight mail servers, Jellyfin and Plex media centers, Vaultwarden password manager, GitLab/Gitea for repository management, and Jenkins for CI/CD pipeline automation. Experienced in network configuration, Cloudflare integration for DNS management and CDN services, and both on-premises Proxmox deployments and cloud infrastructure management, with focus on security hardening, automated backups, and reliable configurations.

- **Open Source Contributor & Community Builder**: Actively contributing to the open-source ecosystem through personal projects and collaborative initiatives. Maintain several npm packages with good adoption rates and regularly contribute bug fixes, feature enhancements, and documentation improvements to various open-source projects. Advocate for open-source principles in software development, focusing on creating accessible, well-documented, and community-driven solutions.