Md. Ismail Alam Khan

DISTRIBUTED SYSTEMS | MEDTECH / CLOUD PACS | FULL STACK LEAD

Senior Full Stack & Systems Engineer | MedTech & Distributed Systems

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PROFESSIONAL SUMMARY

Hands-on **Senior Full Stack & Systems Engineer** with 5+ years of production experience architecting medical imaging pipelines, low-latency streaming systems, and fault-tolerant cloud architectures. Architected distributed microservices managing **29M+ DICOM instances** and **1M+ clinical records** with 99.99% uptime, lowering emergency triage notification latency from **24.5 minutes to 24 seconds (98% reduction)**. Led end-to-end software verification and validation (V&V) resulting in **4 successful FDA 510(k) clearances** (`K241719`, `K252954`, `K253751`) adhering to 21 CFR Part 11 and HIPAA. Deep technical breadth across **Python (FastAPI), Node.js, TypeScript, Next.js, Flutter, Supabase/PostgreSQL, Docker**, low-level OS/IPC wrappers, and real-time streaming protocols.

CORE COMPETENCIES & TECHNICAL SKILLS

DISTRIBUTED SYSTEMS & BACKEND ARCHITECTURE

Microservices & Cloud APIs: Python (FastAPI), Node.js, Express.js, Supabase, PostgreSQL, Event-Driven Architecture, High-Concurrency APIs, GraphQL, Caching, SSE & WebSockets.

FRONTEND & CLIENT ENGINEERING

High-Framerate Clients: TypeScript, JavaScript, React.js, Next.js 14+ (App Router), Flutter & Dart, Vue.js, Tailwind CSS, State Machines, Real-Time Streaming UI.

SYSTEMS & LOW-LEVEL TOOLING

OS Wrappers & IPC: PowerShell & C++ Interop, Windows Core Audio COM APIs, IPC Subprocesses, Android Debug Bridge (ADB), Linux Systems Administration, DICOM (`pydicom`).

GOVERNANCE, SECURITY & DEVOPS

Enterprise Standards: 21 CFR Part 11 Audit Trails, HIPAA Security & HITRUST CSF, FDA 510(k) V&V Protocols, IEC 62304 / ISO 13485 Principles, DICOMweb (WADO/QIDO), Docker & GitHub Actions CI/CD.

PROFESSIONAL EXPERIENCE

Team Lead & Senior Full Stack Engineer — SaveLife.AI | US-Based (Remote)

Jan 2023 – Present (3+ Years)

US medical imaging AI startup delivering real-time clinical triage and cloud PACS to 1,000+ clinicians.

- **Cloud PACS & Microservices Architecture:** Architected the diagnostic workstation and clinical findings triage pipeline for **RadioView.AI™** across a 30-microservice platform managing **29M+ DICOM instances** and **1M+ clinical records** with 99.99% operational uptime.
- **Real-Time Notification Pipeline:** Engineered high-reliability streaming conduits (SSE and WebSockets), reducing critical finding triage notification time from **24.5 minutes to 24 seconds (98% reduction)** while sustaining **99.1% abnormal finding sensitivity**.
- **FDA 510(k) Software Verification & Validation (V&V):** Built deterministic testing harnesses and automated verification suites supporting 4 FDA 510(k) clearances: **NeuroICH™** `K241719`, **MammoSightAI™** `K252954`, **CXRDetectAI™** `K253751`, and **RadioView.AI™**.
- **Regulatory Compliance & Data Security:** Designed 21 CFR Part 11 audit trails, structured multireader validation protocols, and enforced zero-trust encryption upholding **HIPAA compliance** and **HITRUST CSF certification**.
- **Engineering Leadership & Mentorship:** Lead and mentor an 8-engineer full-stack team across **Python (FastAPI), Node.js, Next.js, Flutter, and PostgreSQL/Supabase**, driving sprint planning, code review standards, and CI/CD automation.

Technical Lead & Co-Founder — InS Tech Lab | Dhaka, Bangladesh

Feb 2026 – Present

Software engineering studio delivering web, mobile, and cloud architectures for international clients.

- **Technical Architecture & Advisory:** Lead architecture and technology selection for client engagements spanning full-stack SaaS, distributed backends, and AI integrations.
- **Engineering Standardization:** Establish engineering practices, containerized deployment workflows, code quality benchmarks, and automated CI/CD pipelines across client projects.

PROFESSIONAL EXPERIENCE (CONTINUED)

Senior Full Stack Engineer (Part-Time) — QuirkyBuddy | US-Based (Remote) — Nov 2023 – Sep 2025

US social discovery platform serving tens of thousands of active mobile users.

- **Database & Infrastructure Migration:** Architected migration from Firebase NoSQL to Supabase (PostgreSQL), reducing p95 query latency by **68% (420ms to 135ms)** and cutting recurring cloud spend by **58% ($1,800/mo savings)**.
- **High-Throughput Social Microservices:** Architected scalable feed recommendation engines, real-time messaging, and multi-channel push notification pipelines in Flutter and Node.js handling **50,000+ daily events**.
- **Web Client Performance:** Developed responsive React.js web client with edge-based authentication flows, improving user onboarding completion rates by **34%**.

Mobile & Systems Engineer — S8c1al | Spain-Based (Remote) — Feb 2021 – Mar 2023

Spain-based real-time mobile social platform supporting live video streaming and media sharing.

- Built cross-platform iOS and Android applications in Flutter for a fast-scaling social media service.
- Implemented custom platform channels (Dart/C++/Objective-C) for hardware camera control and WebRTC peer-to-peer real-time audio/video streaming.

Software Engineer (Contract) — In-Tele-Health-America-LLC | US-Based (Remote) — Project-Based

US telehealth company providing cross-platform virtual consultation and billing software.

- Developed cross-platform telehealth applications spanning desktop (macOS/Windows) and mobile (iOS/Android) using Flutter.
- Integrated encrypted clinical record viewing, dynamic document rendering, and Stripe subscription workflows compliant with healthcare standards.

Full Stack Software Engineer (Contract) — World Health Organization (WHO) Initiatives | Remote — 2020 – 2021

Emergency response epidemiological surveillance and clinical data collection initiatives.

- **Fault-Tolerant Data Pipelines:** Built resilient clinical data capture systems and surveillance portals for emergency health response operations (COVID-19 and Cholera tracking).
- **High-Load Ingestion:** Built distributed ingestion pipelines processing **100,000+ daily clinical records** with offline-first caching and idempotency keys to guarantee zero data loss over unstable field connections.

OPEN SOURCE & SELECTED SYSTEMS PROJECTS

adb_ui ★ 41 — Creator & Maintainer
Desktop systems GUI for Android Debug Bridge; features native IPC subprocess wrappers, asynchronous command queueing, wireless Wi-Fi pairing protocols, and embedded scrcpy screen mirroring.

AI-Chat — Creator
Production conversational platform featuring multi-provider LLM routing, low-latency Server-Sent Events (SSE) streaming protocols, markdown/LaTeX parsers, and edge-persisted session memory.

dicom-scripts — Creator & Maintainer
High-performance imaging metadata extraction and de-identification engine; performs in-place binary tag manipulation, memory-efficient streaming anonymization, and deterministic UID generation.

GameHunter — Creator
Desktop discovery platform and local PC hardware profiler in Flutter & FastAPI; interfaces with native Windows WMI/DirectX hardware counters for real-time CPU/GPU benchmarking.

audio_switcher — Creator
Zero-overhead Windows systems utility interfacing directly with Windows Core Audio COM interfaces for sub-5ms device switching via global hotkey macros without GUI thread blocking.

Red Door Discord Bot — Creator
High-concurrency containerized Discord bot leveraging Dart event-loop concurrency; features sharded WebSocket gateway connections and zero-downtime Docker orchestration.

GOVERNANCE, SECURITY & ENTERPRISE STANDARDS

21 CFR Part 11 & FDA 510(k) Clearances
Electronic records, cryptographic audit trails & design control V&V protocols
NeuroICH (K241719) · MammoSightAI (K252954) · CXRDetectAI (K253751) · RadioView.AI

HIPAA, HITRUST CSF & Enterprise Cloud
Zero-trust architecture, end-to-end PHI encryption, DICOM-TLS & SOC2 principles
IEC 62304 / ISO 13485 Life Cycle · WADO-RS / QIDO-RS · Zero-Downtime Infrastructure