AHSAN IQBAL

AI Engineer · Agent Harnesses · Multi-agent Systems · Cited RAG

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SUMMARY

Founding AI Engineer at BuildMarshal Technology Corp., building **Marshal**, a production multi-agent harness where agents behind one orchestrator read a team's email, calls, meetings and tens of thousands of documents, answer with paragraph-level citations, read CAD/BIM drawings and LiDAR scans, and act only after a person approves. Ten years of engineering before that, including nearly six years on **e-GP**, Bangladesh's largest government web service, and leading a 10+ engineer team on national GIS and AI platforms. Strong in harness design, cited retrieval, agent memory, human-in-the-loop safety and LLM cost engineering.

SKILLS

Agents & LLMs: LangGraph, LangChain, OpenAI API (structured outputs, Batch API, Realtime voice), MCP, Playwright, multi-agent orchestration, human-in-the-loop approval, agent memory, context engineering, prompt caching

Retrieval & documents: hybrid search (vector, keyword, knowledge graph), pgvector, Docling, OCR + multimodal LLM extraction, ColPali / MUVERA

Languages & backend: Python, Java, Spring Boot, microservices, REST APIs

Data & infrastructure: PostgreSQL, PostGIS, MS SQL Server, Docker, Azure, AWS (SageMaker, Lambda), on-prem GPU clusters

Spatial & 3D data: CAD/BIM (DXF, IFC, STEP), LiDAR scans, satellite remote sensing (Landsat-8, Sentinel-2), GIS (PostGIS, GeoServer)

ML & vision: PyTorch, CNNs, YOLOv4, multimodal LLMs

EXPERIENCE

Founding AI Engineer | BuildMarshal Technology Corp. **Oct 2025 to Present**

Remote (company based in Whistler, Canada)

- Building **Marshal** (buildmarshal.ai), with many action agents and read/write services behind **one orchestrator** that runs them through a separate control plane (start, pause, resume, edit or retry with more context), on web, iPhone and Mac, for project managers in construction and prefab.
- **Ambient pipeline** continuously reads email (Gmail, Outlook), calls, messages, meeting recordings and company documents, including decades-old scans, matches each item to its project, classifies it (RFI, submittal, change order, delay, safety, payment) and extracts respond-by dates.
- **Voice agents** integrated OpenAI's realtime voice APIs into Marshal, with handoff from the voice layer to the orchestrator and its agents.
- **Cited RAG** over tens of thousands of documents with vector, keyword and knowledge-graph search. Answers carry paragraph-level citations that open the exact PDF page or drawing, and the system answers a clear "not found" when it cannot cite.
- **Approval-gated actions.** Every write (task, reply draft, schedule change, Procore or QuickBooks update through MCP and Playwright connectors) is proposed as an approval card with iPhone push. Nothing changes until a person approves, and writes are idempotent, so an approved action never runs twice. Tasks are tracked across projects, team members and subcontractors with shared, role-based access.
- **Agent memory** nightly consolidation of project, people, vendor and company memory, plus caching and compaction, so each conversation starts with current decisions and open items.
- **CAD/BIM, LiDAR and site imagery** vision over drawing PDFs, DXF, IFC and STEP files read as walls, rooms and prefab lists, LiDAR room scans with on-device relocalisation, checked against drawings to flag mismatches, and GPS-matched site photos with progress estimates and escalation.
- **Cost engineering** small-model skip gates, fingerprint deduplication, prioritised processing lanes, batch embeddings and Batch API backfill, and capped structured outputs keep per-item model cost low at scale.
- Researching **ColPali** and **MUVERA** document retrieval for deployment on edge devices.

Software Architect | Tiller **Sep 2022 to Oct 2025**

Dhaka · Software Architect, Jun 2024 to Oct 2025 · Senior Software Engineer (Team Lead), Sep 2022 to Jun 2024

- Led a team of **10+ engineers** building microservice, AI/ML and GIS platforms for the Government of Bangladesh and donors including the **Gates Foundation** and **GIZ**.

- **National Sanitation Dashboard (Sanboard).** Led design and national scale-up of a GIS dashboard for faecal sludge and solid waste management (client DPHE, funded by the Gates Foundation). The programme won the **Water Technology Excellence Award (Digital Technology), Asian Water Awards 2026**.
- Built Spring Boot APIs behind a React PWA and mobile app that collect geospatial, survey, FGD and KII data nationwide.
- Wrote the procurement, reporting and grant documents that secured funding from AIT-GWSC, ITN-BUET and the Gates Foundation, and co-authored a paper at the IWA Water and Development Congress 2025.
- **Planning Information System (GIZ, Ministry of Planning).** A GIS platform for appraising development projects, aggregating data from **30+ government agencies** into one-click policy-compliance checks across environment, land use, flood and masterplan layers.
- **AI services.** LLM services with LangChain and Whisper, YOLOv4 traffic analytics with a custom CNN for local vehicles, and Landsat-8 and Sentinel-2 models for crop yield and road surveys on AWS SageMaker and Lambda.

Senior Software Engineer | Dohatec New Media **Oct 2016 to Aug 2022**

Dhaka · Senior Software Engineer, Jul 2021 to Aug 2022 · Software Engineer, Oct 2016 to Jun 2021

- Nearly six years on **e-GP** (eprocure.gov.bd), Bangladesh's largest government web service, with hundreds of thousands of users and over a million tenders, run end to end from publishing and pre-tender meetings to opening, evaluation, award and contract management.
- Built the National Tenderers' Database, Contract Management and Audit modules of Bangladesh's **e-Government Procurement (e-GP)** system (World Bank-funded, built in Java, Spring and MS SQL Server).
- Led development of **International Competitive Bidding**, Bangladesh's first international government e-procurement, with tenders often above **USD 10 million**.
- One of two lead developers who designed the migration of e-GP from a monolith to **microservices** (Spring Boot, JPA, Docker).

SELECTED PROJECTS

- **nagorik.one.** A geospatial platform for analysing Bangladesh election results (year-on-year comparison, district filters, map swipe), built in about two days.
- **Mobile coding platform.** Write, run and deploy live websites from an iPhone. Visitors can connect their own Gmail or Slack, with generated code kept apart from token handling.
- **AutoDroid.** An Android app builder that runs entirely on the phone for non-programmers. Apps are data executed by a single in-app runtime.

COMMUNITY & SPEAKING

- **Author, Harness Engineering post series** (English and Bangla) on building AI harnesses. A Retrieval Engineering deep-dive on cited RAG at scale is in preparation.
- **Founder & Organiser, Dhaka AI Paper Club,** an AI research reading community for engineers and researchers in Bangladesh and the diaspora.
- **Host, The Technologist podcast, on** AI, ICT policy and the digital divide in Bangladesh, with guests from Amazon technical managers to the interim government's Special Assistant for ICT (Minister of State rank).
- **Judge,** Brain Station 23 × Poridhi AI Engineering Hackathon 2025, and **trainer** on generative AI tools for government policymakers, Bangladesh Institute of Management.

PUBLICATIONS

- Sanitation Data Reformation in Bangladesh: Challenges, Coordination Mechanisms, and Sustainable Solutions. IWA Water and Development Congress, AIT Thailand, Dec 2025 (with Gates Foundation and DPHE).
- AI-Assisted Prognostic Classification in Breast Cancer Using Deep Neural Networks. 7th ICMCSI, Purvanchal University, Nepal, Jan 2026.
- Smart Home Appliance Control System for Physically Disabled People Using Kinect and X10. ICIEV 2016, IEEE Xplore (DOI 10.1109/ICIEV.2016.7760129).

CERTIFICATIONS

- AWS Certified Machine Learning Engineer – Associate (MLA-C01), Feb 2025
- AWS Certified AI Practitioner (AIF-C01), Jan 2025
- Oracle Certified Associate, Java SE 8 Programmer (1Z0-808), Apr 2021

EDUCATION

B.Sc. Engineering in Computer Science & Engineering, Khulna University, Bangladesh **2015**

Languages: English, Bangla