TANVEER HOSSAIN MUNIM

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Sole architect of a UN GCF-funded national meteorological platform (Timor-Leste) and of CAP v1.2 emergency alert infrastructure deployed across two countries (DNMG Timor-Leste; BMD Bangladesh). Domain-mobile senior engineer shipping production systems across geospatial ML, document AI, and conversational AI. Incoming Erasmus Mundus GeoAI MSc (autumn 2026, fully funded).

TECHNICAL SKILLS

ML & AI
PyTorch, LangGraph, vLLM, Ollama, llama.cpp, Q4_K_M quantization, Qwen2.5/Qwen3-VL fine-tuning, hybrid RAG (BGE-M3 + BM25 + RRF + reranking)

Backend & Distributed
Django/DRF, FastAPI, Celery, multi-server Apache Airflow, uvicorn (async SSE), Redis, MQTT

Languages
Python, JavaScript/TypeScript, Java, C++, SQL

Infrastructure
AWS (EC2, S3, Lambda, RDS), Docker, Kubernetes (RKE2 from scratch), HPC, CI/CD, PostgreSQL/PostGIS (GiST), MongoDB, ChromaDB

Geospatial
xarray, GeoPandas, GDAL, Rasterio, NetCDF, COG, Martin (vector tiles), TiTiler (raster tiles), Deck.gl

Standards
OASIS CAP v1.2, WMO WIS2, OGC

PROFESSIONAL EXPERIENCE

AI GeoLAB April 2026 – Present
Senior Research Engineer

- Designed and shipped **Khatian VLM cascade** for Bengali land-record extraction at Bangladesh government scale: fine-tuned Qwen3-VL-2B/8B with sibling lookup + symbolic verifier + conformal prediction, achieving **98.9% JL precision @ 94% auto-accept** and **96.7% plot precision @ 92% auto-accept** at 1.83s/image on a 396,802-image corpus across 6 regions. Targeting ICDAR 2027.

Regional Integrated Multi-Hazard Early Warning System (RIMES) July 2024 – August 2026
Senior Software Engineer

- **Sole architect & engineer** for **GCF Timor-Leste CDIS** — the country's national meteorological platform serving DNMG, part of UNEP's USD 21.7M Green Climate Fund project. Live production at **97.64% task / 96.20% DAG success rate** over 1.4+ years, processing **1TB+/day** across 5 NWP models (GFS, ECMWF-IFS/AIFS, ICON, UK Met Office) and 2 satellites (Himawari-9, GK2A).
- Designed **3-node multi-server Airflow cluster** (∼8K task executions/day, 11 production DAGs); 3-tier backend (Django REST + Martin + TiTiler) on PostgreSQL/PostGIS, Redis, Docker, HPC.
- **Sole architect of CAP v1.2 emergency alert infrastructure** deployed in two countries: DNMG Timor-Leste (production) and Bangladesh Meteorological Department via Grameenphone for population-scale automated alerting. Stack: pycap-validator (sole-author Python package), Django RSS backend, n8n multi-channel orchestration.
- **Optimization:** NetCDF random reads **30s → 80ms (375×)** via re-chunking + zlib + tiered caching; observation queries **4s → 800ms (5×)** via window-function-to-aggregation rewrite exploiting append-only invariant; gunicorn → uvicorn migration enabling async SSE.
- **Diagnosed/fixed production incidents:** 15GB+ Redis memory exhaustion (root cause: layering inversion); GFS upstream rate-limiting (multi-tier resilience with cross-server queue failover); database connection pool exhaustion (resolved via pgbouncer).

- Built **NLAS** (multilingual hybrid RAG livestock advisory for Bangladesh DLS, Qwen2.5-7B Q4_K_M with BGE-M3 + BM25 + RRF + cross-encoder reranking, 71% beta satisfaction) and **Cirrus AI** (Qwen 3B fine-tuned via frontier-model distillation for forecaster document generation).

Interactive Cares 2021 – 2024
Tech Lead (Jun 2023 – Aug 2024) · Backend Developer (Jun 2021 – Aug 2022)

- Scaled platform **13**× (8K → 100K users) and **8**× DAU; designed geo-distributed CDN, load balancer, API consolidation. Co-led **Accelerating Asia** victory (Top 9 of 500+ global startups, $100K investment).
- Grew engineering team **2** → **8**; introduced CI/CD that cut deployment time 60%.

Survey of Bangladesh, Ministry of Defence Sept 2022 – Aug 2023
Data Engineer (Part-time) — NSDI Project

- Engineered geospatial automation pipeline reducing manual processing **80%** (saved 2,400+ person-hours/year); validation system processing **50GB+/month** for 43 government departments.

SELECTED PROJECTS & OPEN SOURCE

MIRA AI — Conversational Sales Agent June 2025 – Present
Founder, CEO & Lead Architect · NVIDIA Inception 2025

- Multi-channel conversational sales AI on LangGraph + FastAPI + RAG over 10K+ products; system designed for 100K end-users, currently serving 4 paying enterprise customers.

wis2downloader (WMO) & pycap-validator 2025 – Present
Open Source

- **wis2downloader:** Refactored monolithic to distributed Celery + async + spatial filtering; **∼4hr → 130ms**; merged upstream, adopted by national meteorological agencies. **pycap-validator:** Sole-author Python package for OASIS CAP v1.2 schema enforcement and digital signature verification; production use at DNMG and BMD.

EDUCATION

Lund University — Erasmus Mundus Geoinformatics & AI MSc (incoming) August 2026 – August 2028
Track 3: Geospatial Developer (Lund → ITC Twente → thesis)

Bangladesh University of Engineering and Technology (BUET) April 2018 – September 2023
B.Sc. in Computer Science and Engineering

SELECTED PUBLICATIONS, TALKS & RECOGNITION

Publications:

- **Munim, M. T. H.**, Hashem, T. (2025). "Breaking the Statistical Similarity Trap in Extreme Convection Detection" *arXiv:2509.09195*. Under preparation for ICLR 2027. Supervised by Dr. Tanzima Hashem (Professor, BUET CSE; PhD, University of Melbourne).
- Eliza, I. J., Urmi, M. A., Anan, M. T. T., **Munim, M. T. H.**, et al. (2024). "eDakterBari." *Heliyon*, 10(1), e23308.

Invited Talks: "Climate–Agriculture Risk Modeling: Sri Lanka," South Asian Hydromet Forum, Malé, Apr 2026 | "SCDR for Agrometeorology," National Center of Meteorology, UAE, 2025.

Awards: Bangladesh National Science and Technology Fellowship (2026) | NVIDIA Inception (2025) | Accelerating Asia Winner (2023, Top 9 of 500+, $100K) | Champion, Bangladesh Mathematical Olympiad (2016, IMO shortlist).