

TANVEER HOSSAIN MUNIM

Machine Learning Engineer • Production ML Systems

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SUMMARY

Software engineer with 5+ years of experience, including production work in document AI, computer vision, retrieval-augmented generation, and ML infrastructure. Builds evaluation-conscious systems from dataset design and model adaptation through local inference, APIs, monitoring, and human review. Strong backend foundation in Python, FastAPI, Django, PostgreSQL, Airflow, and distributed systems.

TECHNICAL SKILLS

Machine learning: PyTorch, Hugging Face, scikit-learn, QLoRA, OCR, segmentation, model evaluation

Language systems: multimodal LLMs, LangGraph, llama.cpp, hybrid retrieval, BM25, dense retrieval, reranking

ML platforms: Python, FastAPI, Django/DRF, Celery, Airflow, Redis, PostgreSQL/PostGIS, Docker, Kubernetes

Scientific & geospatial: xarray, NetCDF, GDAL, Rasterio, GeoPandas, satellite and forecast data

PROFESSIONAL EXPERIENCE

AI GeoLAB Ltd — *Senior Research Engineer*

Apr 2026 – Present

- Fine-tuned a 3B vision-language model for structured extraction from handwritten Bengali land records. On a leakage-controlled test set of 10,509 images, it reached 0.965 F1 on core fields and 0.041 character error rate on owner names.
- Designed dataset splits, normalization, and evaluation for two document schemas, including exact match, edit-distance, set-based metrics, and bootstrap confidence intervals.
- Developed *cadex*, a map-to-vector pipeline combining segmentation, watershed polygonisation, an ensemble digit reader, and assignment logic; correctly recovered and numbered 91.7% of plots across 22 held-out sheets.
- Put both models into an offline desktop workflow with local FastAPI inference, model-version checks, review and approval queues, audit history, and durable jobs.

RIMES — *Senior Software Engineer*

Jul 2024 – Jul 2026

- Built a Bengali livestock advisory assistant that runs a quantized 7B model on a 4 GB GPU and retrieves from 5,353 curated question-answer pairs using dense and lexical search, fusion, and reranking.
- Developed a fine-tuned 3B model for forecaster document generation and a grounded heat-illness advisory proof of concept for ICDDR,B.
- Owned the backend, data pipelines, and infrastructure for Timor-Leste's national meteorological platform, processing more than 1 TB/day through 11 Airflow workflows and roughly 8,000 daily tasks.
- Improved NetCDF and observation serving through storage, indexing, and caching, and designed the real-time data layer behind Bangladesh's live 15-day flood-forecast system.

Interactive Cares — *Tech Lead*

Jun 2023 – Aug 2024

- Led an eight-person engineering team as the learning platform grew from 8,000 to 100,000 users; introduced CI/CD and improved platform capacity through CDN, load balancing, and API consolidation.

Shipday, Inc. — *Software Engineer, Remote contract*

Sep 2023 – Jan 2024

- Integrated an AI support assistant and developed analytics features for a last-mile delivery platform.

Survey of Bangladesh, Ministry of Defence — *Data Engineer, Part-time*

Sep 2022 – Aug 2023

- Automated validation and transformation of geospatial data shared across 43 government departments.

Interactive Cares — *Backend Developer*

Jun 2021 – Aug 2022

- Developed core backend services and APIs for the learning platform during its early growth.

SELECTED AI SYSTEMS

SAHF Regional Climate Intelligence — *Grounded RAG decision support*

- Built a provenance-aware system for nine South Asian countries that combines live ENSO, IOD, MJO, SEAS5, and GloFAS data with verified historical reports. Added country-attribution guardrails, source-level citations, sector-scoped retrieval, and fail-soft data refreshes.

MIRA AI — *Independent product — Founder & Technical Lead*

Jul 2025 – Present

- Built a conversational sales platform with LangGraph, FastAPI, retrieval over 10,000+ products, and Redis-backed state; used by four paying enterprise customers.

SELECTED RESEARCH

- **A Free Knob: Decoupling Calibration and Predictive Skill in Threshold-Based Evaluation.** First author; ICLR 2027 submission. Studies when threshold-based benchmarks reward calibration changes rather than predictive skill.
- **Counting People with Coverage: Distribution-Free Prediction Intervals for Crowd Counting via Crop-Consistency.** First author; under review at WACV 2027. Constructs distribution-free prediction intervals for crowd counts.

OPEN SOURCE & OPERATIONAL TOOLS

- **WMO wis2downloader:** split a monolithic downloader into distributed Celery workers and moved spatial filtering ahead of queueing; merged upstream and used in production.
- **CAP 1.2 validator:** co-developed schema validation, logic checks, and signature verification used by two national meteorological agencies. Private operational software; no public repository.

EDUCATION & RECOGNITION

Bangladesh University of Engineering and Technology (BUET) — B.Sc. in Computer Science and Engineering — 2018 – 2023
ing, CGPA 3.62/4.00

Bangladesh National Science and Technology Fellowship (2026) • NVIDIA Inception Program (2025)