

MD. MEHERAB HOSSAIN TALUKDER

AI / Machine Learning Engineer | Computer Science & Engineering Undergraduate

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PROFESSIONAL SUMMARY

Computer Science & Engineering undergraduate (CGPA 3.52/4.00) building end-to-end AI systems across computer vision, NLP/LLMs, and time-series forecasting — First Runner-Up at three national AI competitions (bKash x NSUCEC Cybernauts Datathon, 5th National Data Science Summit, DUET AI Hackathon). Experienced across the full ML lifecycle, from large-scale feature engineering and gradient-boosted/deep models to LLM/RAG pipelines and FastAPI deployment. Targeting AI/ML Engineer, Data Scientist, and Research Engineer roles.

PROJECTS

Customer Churn Prediction Using Survival Analysis [GitHub](#)

bKash x NSUCEC Cybernauts 2026 Datathon Grand Finale — First Runner-Up

- Reframed churn as a time-to-event problem and engineered 152 behavioral features from millions of transaction records
- Calibrated a LightGBM + XGBoost + CatBoost ensemble with rigorous cross-validation to score churn risk and time-to-churn

Technologies: Python, LightGBM, XGBoost, CatBoost, Scikit-learn, Pandas

RoadVision — AI-Powered Traffic Detection & Vehicle Classification [GitHub](#)

DUET CSE Carnival 2026 AI Hackathon — First Runner-Up

- Trained a YOLO11 (Ultralytics) detector for multi-class vehicle identification on Bangladesh highway surveillance footage
- Built the augmentation and hyperparameter-tuning pipeline; delivered real-time inference evaluated with mAP@50/50-95

Technologies: Python, PyTorch, YOLO11, Ultralytics, OpenCV

Starship Safety — System Failure Prediction [GitHub](#)

Data Hackathon, 5th National Data Science Summit (NDSS) 2026, Daffodil International University — First Runner-Up

- Recovered hidden patterns from 15 obfuscated features through hex decoding, temperature parsing, and coordinate analysis
- Achieved 94.5% accuracy / 0.944 F1 (cross-validated) with an interpretable logistic-regression + ColumnTransformer pipeline

Technologies: Python, Scikit-learn, Pandas, NumPy

Multi-Agent Medical Assistant — RAG, Vision & Literature Search [GitHub](#)

- Orchestrated four specialized agents with LangChain — medical image analysis (brain tumor, chest X-ray, skin lesion), document RAG, PubMed/web search, and safety guardrails
- Implemented semantic retrieval over medical documents with Qdrant; Dockerized the service with GitHub Actions CI

Technologies: Python, LangChain, LLMs, RAG, Qdrant, Computer Vision, Docker, GitHub Actions

Bengali LLM Hallucination Detection — Kaggle Competition [GitHub](#)

- Designed a macro-F1-optimized hybrid pipeline combining rule-based validation, Bengali Wikipedia retrieval, NLI scoring (mDeBERTa), and semantic similarity (LaBSE)
- Integrated quantized LLM judges (Qwen2.5-7B 4-bit, Gemma via llama.cpp) for retrieval-augmented verification

Technologies: Python, PyTorch, Hugging Face Transformers, llama.cpp, RapidFuzz

PM2.5 Air Quality Forecasting for Dhaka — Undergraduate Thesis (Ongoing) [GitHub](#)

- Benchmarked LSTM, GRU, and ARIMA vs LightGBM, XGBoost, CatBoost for 24-hour-ahead forecasting on 2016–2022 data
- Reached $R^2 = 0.88$ (LightGBM benchmark) using chronological splits, 24-hour-mean targets, and SHAP analysis

Technologies: Python, TensorFlow, LightGBM, SHAP, Time-Series Analysis

FinNova — Financial Transaction Risk Detection [GitHub](#)

- Detected high-risk transactions under severe class imbalance with a threshold-optimized weighted ensemble of LightGBM, XGBoost, CatBoost, logistic regression, and a neural network
- Achieved ROC-AUC 0.979, AUC-PR 0.891, and F1 0.895 via systematic EDA, feature engineering, and threshold tuning

Technologies: Python, Scikit-learn, LightGBM, XGBoost, CatBoost

Office Energy Monitor — IoT Energy Intelligence Platform [GitHub](#)

- Built a real-time energy monitoring platform: FastAPI + SQLAlchemy backend, React + Chart.js dashboard, and WebSocket streaming from Wokwi-simulated ESP32 sensors
- Added room-wise analytics and a Discord alert bot for high-usage, after-hours, and long-running-device events

Technologies: Python, FastAPI, React, WebSockets, SQLAlchemy, ESP32, IoT

Additional Projects: SasthoSetu — FastAPI + PostgreSQL healthcare backend with JWT/OAuth2 ([GitHub](#)) · Vantage Robotics Simulator — robot-arm kinematics in React/TypeScript/Three.js ([GitHub](#)) · Cirrhosis Outcome Prediction — clinical ML ([GitHub](#))

ACHIEVEMENTS & COMPETITIONS

- **First Runner-Up — bKash x NSUCEC Cybernauts 2026 Datathon Grand Finale** (national datathon)
- **First Runner-Up — Data Hackathon, 5th National Data Science Summit (NDSS) 2026** (Daffodil International University)
- **First Runner-Up — DUET CSE Carnival 2026 AI Hackathon**
- 39th National Science Fair — 1st Place (Sub-district & District), national-level participant; 40th — 1st Place (Sub-district)
- Creative Talent Hunt 2019 (Math & Computer) — 1st Place (Sub-district); 41st National Science Olympiad — 3rd Place
- Also competed: BUBT AI Conquest 2025, The Infinity AI BuildFest 2026 (CloudCamp x BRAC University), IUBAT Technocrate V2 & Innovation Competition 2024

EXPERIENCE

Trainee IT Executive | CODETREE, Uttara, Dhaka | 3 months

- Provided IT support and hardware/software troubleshooting; assisted with system maintenance and basic networking

EDUCATION

B.Sc. in Computer Science & Engineering Expected 2026 · CGPA 3.52/4.00

International University of Business Agriculture and Technology (IUBAT), Dhaka

HSC (Science), Govt. Nalchity College — 2020, GPA 4.50/5.00 · SSC (Science), Nandikathi Adarsha Secondary School — 2018, GPA 4.28/5.00

TECHNICAL SKILLS

Programming: Python, C++, C, Java, JavaScript, TypeScript, SQL

Machine Learning: Scikit-learn, LightGBM, XGBoost, CatBoost, Ensemble Learning & Calibration, Survival Analysis, Feature Engineering, Cross-Validation, Imbalanced Data, SHAP

Deep Learning: PyTorch, TensorFlow, CNN, LSTM, GRU, Transfer Learning

Computer Vision: YOLO11, Ultralytics, OpenCV, Object Detection, Image Classification, Image Processing

NLP & LLMs: Hugging Face Transformers, LangChain, Retrieval-Augmented Generation (RAG), mDeBERTa (NLI), LaBSE, Qwen2.5, Gemma, llama.cpp, Prompt Engineering, LLM Evaluation

Backend & Data: FastAPI, REST APIs, WebSockets, SQLAlchemy, JWT/OAuth2, Node.js, Pandas, NumPy, Matplotlib, Seaborn, EDA, Time-Series Forecasting

Databases: PostgreSQL, MySQL, SQLite, Oracle, SQL Server, Qdrant (Vector Database)

Tools, DevOps & IoT: Git, GitHub, Docker, GitHub Actions, Jupyter, Google Colab, Kaggle, VS Code, ESP32/Arduino, Wokwi

Languages: English (Professional Working Proficiency), Bengali (Native)

TRAINING & CERTIFICATIONS [View Certificates](#)

- **Database Systems (MySQL, Oracle, SQL Server)** — EDGE Project, Bangladesh Computer Council, ICT Division (6 months)
- **The Ultimate Job Ready Data Science Course** — CodeWithHarry, 2025
- **Complete 2025 Python Bootcamp: Learn Python from Scratch** — CodeWithHarry, 2025

LEADERSHIP & MENTORING

- **Robotics Mentor — IUBAT IT Society:** mentored juniors in robotics fundamentals; guided teams through competition preparation
- **Academic Mentor, C Programming — IUBAT IT Society:** led peer debugging and problem-solving sessions

REFERENCES

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