Md. Mehedi Hasan Shuvo

AI Engineer

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Portfolio | GitHub | LinkedIn | Google Scholar | ORCID

Professional Summary

Results-driven AI Engineer who **designs, builds, and deploys** intelligent systems across Computer Vision, Machine Learning, and LLM-powered automation. Engineered 20+ production-grade projects end-to-end — from annotating datasets and training deep learning models to containerising inference APIs with Docker and orchestrating automated workflows with n8n. Proficient in Python, PyTorch, FastAPI, LangChain, LangGraph, and RAG-based architectures. Spearheaded research that produced **5 peer-reviewed IEEE publications** at internationally ranked conferences, demonstrating the analytical rigour and problem-solving depth that informs every engineering decision. Evaluated and critiqued cutting-edge AI manuscripts as an **IEEE Conference Reviewer** for two international venues. Final-year BSc CSE candidate at AIUB (CGPA 3.75/4.00, Expected 2026), eager to contribute, collaborate, and deliver impact within a high-performing AI engineering team.

Technical Skills

Languages: Python (Primary), C#, Java, C++, R, JavaScript, HTML5, LaTeX

AI / ML: PyTorch, TensorFlow, Keras, Scikit-learn, HuggingFace Transformers, XGBoost, LightGBM

Computer Vision: YOLOv11, YOLOv12, CNN, Vision Transformer (ViT), OpenCV, Object Detection, Transfer Learning

LLM & Agents: LangChain, LangGraph, CrewAI, OpenAI API, Ollama, RAG, Tool-Calling Agents, Prompt Engineering

NLP: BERT Fine-tuning, Sentiment Analysis, Semantic Search, Word2Vec, GloVe, Text Classification

Deployment & APIs: FastAPI, Docker, Redis, REST APIs, Git, GitHub, n8n, Streamlit, Jupyter

Databases: MySQL, SQLite, SQL, ChromaDB, Pinecone, Milvus (Vector DBs)

Selected Projects

Bangladeshi Taka Note Detection API
YOLOv11 · FastAPI · Docker · Redis · PyTorch

- Trained a custom YOLOv11 model on 1,490 annotated real-world images of Bangladeshi currency notes and coins, achieving **97.16% mAP@0.5** across all 11 denominations — from 2-Taka coins to 1,000-Taka notes.
- Wrapped the model inside a production FastAPI microservice containerised with Docker Compose and Redis caching, sustaining low-latency inference under concurrent load.
- Exposed clean REST endpoints returning denomination labels, bounding-box coordinates, and confidence scores, enabling seamless integration with any web or mobile front end.

Multi-Tool AI Agent — Bangladesh Data
LangChain · LangGraph · SQLite · OpenAI API

- Architected a stateful LangGraph agent that autonomously decides — per query — whether to interrogate a local SQLite database, invoke a live web search tool, or combine both sources before formulating a response.
- Implemented dynamic SQL generation at runtime using LangChain tool-calling, eliminating hardcoded query logic and allowing the agent to handle arbitrary Bangladesh-specific data questions.
- Integrated persistent conversation memory and structured prompt pipelines so the agent maintains context across multi-turn sessions and produces consistently formatted reports.

LLM Article Analysis Pipeline
n8n · FastAPI · OpenAI API · Streamlit · Google Sheets · Gmail

- Built a zero-touch document analysis workflow: a user uploads a file through the Streamlit UI, FastAPI handles ingestion and preprocessing, n8n orchestrates the multi-step pipeline, the LLM extracts structured insights, and outputs are automatically pushed to Google Sheets and delivered via Gmail.
- Demonstrated practical n8n low-code AI automation wired across five independent services through REST API calls — directly applicable to enterprise document processing and automation use cases.

Amar Passport AI Agent
CrewAI · LangChain · Groq · Llama 4 · Python

- Designed a four-agent CrewAI system to guide Bangladeshi citizens through the e-passport application process: Agent 1 verifies eligibility, Agent 2 calculates the exact 2026 government fee, Agent 3 generates a personalised document checklist, and a coordinator agent assembles a bilingual English/Bangla final report.
- Leveraged Groq-hosted Llama 4 for low-latency open-source LLM inference, showing how local-market AI products can be built without dependency on closed-API providers.

BERT Fine-Tuning for QA and NLP Benchmarking
BERT · HuggingFace · PyTorch · SQuAD v1.1

- Implemented a complete bert-base-uncased fine-tuning pipeline on SQuAD v1.1 — covering tokenisation, span-prediction head design, training loop with AdamW, and EM/F1 evaluation — attaining **71.15% Exact Match** and **80.97% F1**.
- Ran a parallel comparative study benchmarking TF-IDF, Word2Vec, BERT Embeddings, and fine-tuned BERT on 50K IMDB reviews, producing a clear accuracy-vs-compute trade-off analysis across classical and transformer NLP approaches.

Customer Churn Prediction
Scikit-learn · XGBoost · Pandas · NumPy

- Delivered a full ML pipeline on IBM Telco churn data (7,043 records): exploratory data analysis, missing-value imputation, feature engineering, SMOTE class balancing, and stratified cross-validation.

- Compared Logistic Regression, KNN, Decision Tree, and Random Forest under identical conditions; Random Forest achieved the best result at ~**80% accuracy** and **0.84 ROC-AUC**, with feature-importance analysis identifying top churn drivers.

Experience

AI Research & Engineering   *Jan 2024 – Present*
Computer Vision · Deep Learning · LLM Systems · AI Automation   *Dhaka, Bangladesh*
- Designed, trained, and deployed 20+ AI systems independently — spanning Computer Vision APIs, multi-agent LLM applications, automated ML pipelines, and REST API backends, each taken from problem definition through to a working, testable deliverable.

- Published **5 peer-reviewed IEEE conference papers** at internationally ranked venues — AICCSA 2025 (CORE-ranked), ECCE 2025, RAAICON 2025, and ICCIT 2025 — validating the technical depth behind the engineering work.

IEEE Conference Reviewer   *2025 – Present*
IEEE 3ICT 2025 & IEEE FET 2026   *International*
- Evaluated and critiqued research submissions in deep learning, Computer Vision, intelligent systems, and applied AI for two IEEE-affiliated international conferences — assessing technical rigour, novelty, experimental validity, and clarity of contribution against IEEE publication standards.

Senior Tutor & Coaching Centre Co-Manager   *2019 – Present*
Mathematics, Physics, Chemistry, Computer Science   *Dhaka, Bangladesh*
- Instructed students across O Level, A Level, SSC & HSC programmes for **6+ years**; co-managed a centre with **500+ enrolled students**, overseeing curriculum planning, scheduling, and individual progress tracking. Recognised as a **5-Star Rated Tutor** on the CareTutors platform, reflecting consistent student satisfaction and teaching excellence.

IEEE Publications

[1] "Deep Learning Based Real-Time Hand Detection Using First-Person Egocentric Perspectives," *IEEE/ACS AICCSA 2025* **(CORE Ranked)**.
DOI: `10.1109/AICCSA66935.2025.11315447`

[2] "A Deep Learning-Based Framework for Accurate Detection and Classification of On-Road Vehicles Using Improved YOLOv11," *IEEE ECCE 2025*.
DOI: `10.1109/ECCE64574.2025.11013964`

[3] "DBNet: Automated Driver Behavior Analysis for Road Safety Using Vision-Based Systems," *IEEE RAAICON 2025* **(First Author)**.

[4] "TOM-YOLO: Tomato Leaf Disease Detection Using Enhanced YOLOv12 Framework," *IEEE RAAICON 2025*.

[5] "An Enhanced YOLOv11 Framework for Automatic Lumbar Spine Level Detection," *IEEE ICCIT 2025*.

Education

American International University–Bangladesh (AIUB)   *2026 (Expected)*
B.Sc. Computer Science & Engineering — Major: Information Systems   CGPA: **3.75**/**4.00**   *Dhaka, Bangladesh*
Relevant courses: Artificial Intelligence, Machine Learning, Computer Vision & Pattern Recognition, NLP, Data Warehousing & Mining, Algorithms, Software Engineering, Database Systems

Govt. Keshab Chandra College, Jhenaidah   *2020*
Higher Secondary Certificate (HSC) — Science   GPA: **5.00**/**5.00**

Garagonj High School   *2018*
Secondary School Certificate (SSC) — Science   GPA: **4.67**/**5.00**

Certifications & Memberships

- **IEEE Student Member** & **IEEE Computer Society Member** — IEEE (2023)

- **IEEE Conference Reviewer** — 3ICT 2025 & FET 2026 (2025)

- **IT Essentials** — Cisco Networking Academy (2022)

- **Certified 5-Star Rated Tutor** — CareTutors Platform (2025)

References

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