MD. TAUFIQUL HAQUE KHAN TUSAR

AI/ML RESEARCHER · NLP ENGINEER · BACKEND DEVELOPER

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🏠 https://taufiq-ai.github.io/ | 🎓 scholar.google.com/citations?user=fhbEomUAAAAJ

Research Interest

My research interests span large language models, natural language processing, edge AI, and responsible ML. Specifically, I work on: (a) AI/ML applications in business, healthcare, and other complex domains; (b) security and privacy of AI systems for confidential data; (c) deployment in resource-constrained settings such as IoT and consumer devices.

Industry Experience

NLP Engineer & Backend Developer   *May 2023 - present*

LaLoka Labs   *Tokyo 110-0016, Japan (Remote)*

- Engineered and maintained LLM pipelines and backend systems for **KAFKAI V3**.
- Optimized LLMs efficiency using fine-tuning, PEFT, Quantization, RAG, etc.
- Streamlined GPU utilization and deployment workflows to support scalable LLM inference.

Machine Learning Intern   *July 2022 - Sept 2022*

Shadhin Lab LLC   *Dhaka 1219, Bangladesh*

- Developed NLP-based data classification and clustering models for an internal SaaS application.
- Automated data collection and labeling pipelines to accelerate large-scale web dataset preparation.

Research Experience

Research Engineer   *Feb 2023 - Mar 2023*

AIMS Lab, United International University   *Dhaka 1212, Bangladesh*

- Developed the backend for a multi-modal AI receptionist integrating face, voice, and speaker recognition.
- Implemented the referenced research work (doi.org/10.1109/ETCCE54784.2021.9689831) into a real-world application.

Research Assistant   *Dhaka 1216, Bangladesh*

City University (Supervisor: Md. Touhidul Islam)   *Dec 2020 - Nov 2022*

- Conducted machine learning research in healthcare (leukemia, Parkinson's, CKD) and NLP applications.
- Trained and fine-tuned deep learning models; co-authored four peer-reviewed publications.

Teaching Experience

Assistant Teacher   *Gazipur 1750, Bangladesh*

Milton English & Math Academy   *Nov 2019 - Mar 2020*

- Taught Physics and Information & Communication Technology to secondary and higher-secondary students.
- Mentored students in fundamental computational and problem-solving concepts.

Education

Bachelor of Science (B.Sc.) in Computer Science & Engineering   *Apr 2018 – Nov 2022*

City University   *Dhaka 1216, Bangladesh*

- **Thesis:** "Automated Detection of Acute Lymphoblastic Leukemia Subtypes from Microscopic Blood Smear Images Using Deep Neural Networks," doi: 10.48550/arXiv.2208.08992
- **Research Focus:** Natural Language Processing, Healthcare AI, and Accessible AI.
- **Research Achievements:** 4 peer-reviewed publications (1 journal, 3 international conferences).
- **CGPA:** 3.21 / 4.00

Research & Publications

Journal: 1 • **Conference:** 3 • **Pre-print:** 1 • **Citations:** 150+ • **h-index:** 5

[1] **M. T. H. Khan Tusar** et al., "An Intelligent Telediagnosis of Acute Lymphoblastic Leukemia using Histopathological Deep Learning," Journal of Computing Theories and Applications (JCTA), vol. 2(1), pp. 1–12, 2024. doi: 10.62411/jcta.10358.

[2] J. Hossain, M. T. Islam, and **M. T. H. K. Tusar** "Streamlining Brain Tumor Classification with Custom Transfer Learning in MRI Images," 2023 IEEE Smart Information Systems and Technologies (IEEE SIST), Astana, Kazakhstan, 2023, pp. 522-526, doi: 10.1109/SIST58284.2023.10223507.

[3] **M. T. H. Khan Tusar**, M. T. Islam, and A. H. Sakil, "An experimental study for early diagnosing Parkinson's disease using machine learning," Pre-print, 2023. doi: 10.48550/arXiv.2310.13654.

[4] **M. T. Haque Khan Tusar**, M. T. Islam and F. I. Raju, "Detecting Chronic Kidney Disease (CKD) at the Initial Stage: A Novel Hybrid Feature-selection Method and Robust Data Preparation Pipeline for Different ML Techniques," 2022 5th IEEE International Conference on Computing and Informatics (ICCI), New Cairo, Cairo, Egypt, 2022, pp. 400-407, doi: 10.1109/ICCI54321.2022.9756094.

[5] **M. T. H. K. Tusar** and M. T. Islam, "A Comparative Study of Sentiment Analysis Using NLP and Different Machine Learning Techniques on US Airline Twitter Data," 2021 IEEE International Conference on Electronics, Communications and Information Technology (ICECIT), Khulna, Bangladesh, 2021, pp. 1-4, doi: 10.1109/ICECIT54077.2021.9641336.

Technical Projects

Python Buddy 🔗
- Fine-tuned a small language model (Qwen2.5-coder-1.5-instruct) for code assistance, worked on low-resource training and inference.
- Achieved 7–12 tokens/s inference speed with 8-bit quantization on Snapdragon 685.
- **Tools:** HuggingFace Transformers, Llama.cpp, Python

Inference API Server 🔗
- Developed a lightweight Python API server for local/self-hosted LLM inference.
- Supports GGUF models with both string-based and role-based prompts, returns OpenAI-compatible responses.
- **Tools:** Python, HuggingFace Hub, Llama-cpp-Python

Privacy-Aware RAG 🔗
- Designed a privacy-preserving RAG system for internal confidential info retrieval.
- Implemented three modules: routing (query categorization), extraction (metadata fusion), and verification (data leakage prevention).
- **Tools:** ChromaDB, LangChain, Transformers, Commercial APIs

Bengali AI Receptionist 🔗
- Developed an AI receptionist Flask app integrating face recognition, speech-to-text, and text-to-speech.
- Verifies registered users and answers user queries using semantic similarity search.
- **Tools:** OpenCV, Sentence-Transformers, Flask, gTTS

Blood Cancer Stage Detection App 🔗 ↗
- Built a deep learning web app for acute lymphoblastic leukemia (ALL) stage detection.
- Finetuned and evaluated 4 CNN architectures; MobileNetV2 achieved 98% accuracy across 3 leukemia subtypes.
- **Tools:** TensorFlow, Flask, OpenCV, Gunicorn, Render

Chronic Kidney Disease Diagnosis App 🔗 ↗
- Built a Flask-based ML app for early chronic kidney disease detection.
- Used LOF for outlier removal, SMOTE for imbalance handling, and Random Forest achieved maximum accuracy on test data.
- **Tools:** Scikit-learn, Flask, Gunicorn, Joblib

Technical Blogs

- PyBuddy: A Local-First LLM Coding Assistant for Everyone 🔗
- Turn Your Android Device into a Remote Linux Server in 30 Minutes 🔗
- Hacks to use Google Colab Free GPU on Local VS-code for Inference 🔗
- EXAONE-3.5-2.4B: A Ultra-lightweight but High Performing LLM on Just 6GB GPU 🔗
- Batch (Offline) Learning and Incremental (Online) Learning in Machine Learning 🔗
- Optimizing Cost Function Through Hill Climbing Algorithm & Random Restart Variant 🔗

Technical Skills

Programming	Python, C/C++, Bash, SQL, HTML/CSS
Large Language Models	Hugging Face Transformers, PEFT, Chroma, llama.cpp
Large Language Models APIs	OpenAI, Anthropic, Perplexity, JinaAI, Linkup, Guardrails, etc.
Machine Learning	PyTorch, TensorFlow, Keras, NLTK, OpenCV, Sklearn, Scikit-multiflow
Data Analysis	Pandas, Numpy, Matplotlib, Seaborn, Plotly
Backend	Django, Flask, Celery, Docker, Nginx, REST APIs
Database	PostgreSQL, SQLite, MySQL, Mapper: SQLModel, SQLAlchemy
Production	AWS (EC2, Lightsail, S3), Render, Heroku, Sentry
Miscellaneous	Linux, Multipass, LaTeX (Overleaf), Git & GitHub

Conference Activities

- **Invited Speaker,** PyCon ID 2025, Jakarta, Indonesia (14-15 December 2025).
- **Reviewer,** EuroPython 2025, Prague, Czechia (14-20 July 2025).
- **Reviewer,** 3rd International Conference on Computing and Information Technology (ICCIT), 2023, Tabuk, Kingdom of Saudi Arabia.
- **Technical Committee Member,** International Conference on Electronics, Information and Industrial Engineering, 2024, Wuhan, China
- **Presenter,** 5th International Conference on Computing and Informatics (ICCI), 2022, Cairo, Egypt.
- **Presenter,** International Conference on Electronics, Communications and Information Technology (ICECIT),2021, Khulna, Bangladesh.

Community Involvement

Community Lead *March 2025 - Present*

AI/ML Professional Community Bangladesh *Bangladesh*

- Coordinate community research programs with 25+ active contributors across LLMs, healthcare AI, and edge computing projects.
- Mentor early-career practitioners in project development and career pathways.
- Organize technical webinars and hands-on workshops on state-of-the-art AI/ML applications.

Community Organizer *Jan 2025 - Present*

Python Bangladesh *Bangladesh*

- Organize tech meetups and collaborative events for Python developers across Bangladesh.
- Lead initiatives to restart PyCon Bangladesh, serving as the liaison between Python Asia and the local community.

Artificial Intelligence Mentor *June 2022 - March 2023*

The Empty Brain *Dhaka 1212, Bangladesh*

- Led technical teams in a startup incubator, ranked at top 25 in StartKoro Season 3.
- Mentored 20+ undergraduates in python, machine learning, and research methodologies.

JR. Machine Learning Engineer *Dec 2022 - Feb 2023*

Omdena *CA 94301, USA (Remote)*

- Enhanced a real-time Smart Traffic system with computer vision to reduce congestion on urban motorways.
- Collaborated with a global team (50+ members) to collect and process traffic image data.

Data Science Mentor *Sept 2021 - Oct 2021*

AI Planet (Formerly DPHI) *Hyderabad, India (Remote)*

- Supported the core team in running the data science boot-camp.
- Guided participants on Exploratory Data Analysis, created and evaluated final assessments.

Achievements

•	**Best Paper Award,** 2023 IEEE International Conference on Smart Information System and Technologies	*2023*
•	**Merit Scholarship,** City University, Bangladesh	*Summer 2020*
•	**Junior School Government Scholarship,** Ministry of Education, Bangladesh	2012
•	**Primary School Government Scholarship,** Ministry of Primary and Mass Education, Bangladesh	2009

Extracurricular Activities

- **Member**, IEEE Computer Society — 08/2022 - 12/2022
- **Student Member**, Institute of Electrical and Electronics Engineers | IEEE — 08/2021 - 12/2022
- **Executive Member**, City University Computer Club — 12/2020 - 10/2022
- **Chapter Influencer**, Google Crowdsource — 09/2021 - 06/2022
- **V-Force Volunteer**, United Nation Volunteer — 08/2021 - 09/2021
- **Cadet**, Bangladesh National Cadet Corps | BNCC — 08/2015 - 01/2017
- **Scout**, Bangladesh Scouts — 01/2008 - 12/2009

Training & Certifications

- **IEEE Young Professionals Career and Leadership Aid Program**, IEEE view — *Sep 2021*
- **Training on Livestock, Fishery and Agriculture**, Bangladesh Ministry of Youth and Sports view — *Jun 2019*
- **Battalion Training Exercise 2 (Bangladesh Army)**, Bangladesh National Cadet Corps view — *Oct 2015*
- **National Skill Standard Basic Course Examination**, Bangladesh Technical Education Board view — *Mar 2013*

References

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