

Nafis Neehal

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Machine Learning | Deep Learning | Large Language Models | Generative AI | AI in Healthcare

EDUCATION

Rensselaer Polytechnic Institute <i>Ph.D. (Candidate), Computer Science</i> GPA: 3.74/4.00	Aug 2019 – May 2025 (Expected) Troy, New York
Rensselaer Polytechnic Institute <i>M.S., Computer Science</i> GPA: 3.68/4.00	Aug 2019 – May 2021 Troy, New York

EXPERIENCE

Graduate Student Researcher (Team Lead) <i>IBM-RPI Research Collaboration Projects</i>	Feb 2022 – Present Troy, NY
<ul style="list-style-type: none">Building TrialBrain - a Multitask/MoE LLM for automating clinical trial design tasks.Developed hallucination-adjusted LLM pipeline using RAG-based few-shot learning and dynamic prompting in clinical trial baseline feature prediction task - achieved 48.5% accuracy improvement over baseline. [Arxiv'24], [Git]Released four specialized Llama models (PEFT, 4-bit quantized) fine-tuned on 65k+ clinical trials for baseline feature prediction task in clinical trial design [Model + Data]Engineered modular framework leveraging novel ML-based patient recommendation in clinical trials - improved treatment effect accuracy by 75-80% and demographic equity by 96-99% while potentially reducing recruitment costs by 25%. [RecSys'24], [AMIA'23], [SCT'23 (Best Poster Award)], [Git]	
Graduate Student Researcher <i>CDPHP-RPI Industrial Research Collaboration Projects</i>	May 2020 – Jan 2022 Troy, NY
<ul style="list-style-type: none">Developed and deployed a novel T2D health management analysis system processing 9M+ patient records, incorporating Deep-Autoencoder models for patient matching (35% faster matching, 40% reduced memory for patient trajectory representation) and multi-stage survival analysis; optimized PySpark/AWS implementation achieving 60% faster processing and 10x computational efficiency. [HIMS'22]Engineered a hybrid ML framework for heterogeneous treatment effect analysis of 350K+ patients, combining nearest-neighbor matching and PCM clustering algorithms to automatically identify 3 distinct treatment-response subpopulations in pre-diabetes intervention program. [IEEE BIBM'22]Engineered ML-based patient risk prediction system processing 22.5M+ healthcare records with 87-dimensional features, implementing PCA-based preprocessing pipeline (200x efficiency gain) achieving 95% alignment with physician diagnoses and 30% early detection rate for high-risk cases despite 0.5% positive class ratio. [IEEE BIBM'21], [Git (Non-Proprietary)]	

OPEN-SOURCE PROJECTS (SELECTED)

- BanglaLLM:** Contributing to developing fine-tuned open-source LLMs for reasoning and factual analysis in Bengali Language. [[HuggingFace](#)]
- MAMA-gpt:** Built GPT-4 powered Bengali voicebot integrating real-time Speech-to-Text, Text-to-Speech, and bidirectional English-Bengali translation capabilities. [[Git](#)]
- Trade-Mind:** Implemented end-to-end MLOps pipeline for hourly Bitcoin closing price prediction with Hopsworks feature store, automated data ingestion and model train/deploy through GitHub Actions (CI/CD). [[Git](#)] [[Live Demo](#)]
- ChanBOT:** Fine-tuned Llama3.1-8B using PEFT and 4-bit quantization to mimic Chandler from FRIENDS, implementing WebUI and cloud deployment. [[Git](#)]
- Machine Translation:** Built Seq-to-Seq neural machine translation models (RNN, GRU) for French-English translation with BLEU and TER score evaluation. [[Git](#)]
- Fake Image Generation:** Implemented DCGAN in PyTorch for generating synthetic celebrity images trained on CELEBA dataset. [[Git](#)]

TECHNICAL SKILLS

Programming Language and Database: Python, R, SQL, Cypher, C++, Google Firestore, Neo4j, MySQL
ML/DL: PyTorch, DDP, TensorFlow, Scikit-Learn, AutoML, OpenCV, Spacy, Langchain, LlamaIndex, HuggingFace
LLM Experiences: Fine-Tuning (SFT/PEFT), Quantization, Prompt Engineering, RAG/GraphRAG, Benchmarking
MLOps & Tools: MLflow, Docker, Axolotl, Unsloth, ChromaDB, Comet, Opik, PySpark, Hopsworks
Cloud & Deployment: AWS (SageMaker, Lambda, EC2, S3), Git Actions (CI/CD), HopsWorks, HF Space, Heroku
Data Visualization: Tableau, Streamlit, Gradio, R-Shiny