

Anjir Ahmed Chowdhury, PhD

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SUMMARY

Ph.D. Candidate with 2.5 years of research experience, expected to graduate in 2028.

- Extensive experience in **Large Language Model (LLM)**, **Parameter Efficient Fine-tuning (PEFT)**, **Supervised Fine-tuning (SFT)**, **Neural Architecture Search (NAS)**, **Synthetic data creation** and model optimization for **multi-task learning**
- Advanced skills in implementing LLMs, PEFT methods, NAS frameworks, and other ML models across multiple platforms, with strong proficiency in **Python**, **PyTorch**, and **TensorFlow**. Experienced in distributed training frameworks such as **Accelerate** and **Ray**, multi-task learning, and large-scale model optimization
- Hands-on experience with open-source tools such as **Ollama** and **vLLM** for inference, and **LM Evaluation Harness** for evaluating LLMs.
- Authored/co-authored **7** journals, **3** conferences, and **2** under-review submissions, and served as a peer reviewer for over **10** conferences and more than **5** journals.

EDUCATION

University of Houston, Houston, TX

Ph.D. in Computer Science

Expected 2028

CGPA: 4.00/4.00

American International University-Bangladesh, Dhaka, Bangladesh

M.S. in Computer Science (Artificial Intelligence)

2020

US-equivalent Master's degree

CGPA: 4.00/4.00

American International University-Bangladesh, Dhaka, Bangladesh

B.Sc in Computer Engineering

2019

CGPA: 3.86/4.00

RESEARCH INTERESTS

Prompt Optimization; Instruction Tuning; LLM Fine-Tuning; Supervised Fine-Tuning; Data Generation for LLMs; Architecture Engineering for LLMs; Reasoning in LLMs; Multi-Task Learning; Parameter-Efficient Fine-Tuning

TECHNICAL SKILLS

- **Large Language Models:** Supervised Fine-Tuning, Instruction Tuning, PEFT (LoRA, AdaLoRA, Prefix Tuning), Inference (Ollama, vLLM), Evaluation (LMEval), Multi-Task Learning, Prompt Engineering & Optimization, Few-Shot/Zero-Shot Learning, & Synthetic Data Generation
- **Neural Architecture Search & Hyperparameter Optimization:** Differentiable NAS, NNI, AutoKeras, Optuna, Keras Tuner, Hyperopt, Scikit-Optimize, Hyperband
- **Distributed & Scalable Training:** Multi-GPU Training, Model/Data Parallelism, DDP, Cluster Management, Scalable LLM Training (PyTorch DDP, DeepSpeed, Accelerate, Ray Train)
- **Model Optimization & Efficient Training:** Gradient Accumulation, Learning Rate Scheduling, Regularization Techniques, Mixture of Experts (MoE), Federated Learning, Knowledge Distillation, Quantization & Pruning

RESEARCH EXPERIENCE

Intelligent Data and Systems Lab, University of Houston

Research Assistant on LLMs, Language Data Generation and Prompting

2023 - Present

Lab Head: [Dr. Feng Yan](#)

Project 1: Synthetic Data & Prompt Engineering for LLM Alignment (Ongoing)

▷ **Summary:** Developed prompt-optimized synthetic data pipelines to improve LLM alignment through instruction design, synthetic dataset creation, and multi-stage fine-tuning. Closely collaborating with Dr. Syed Zawad (**IBM Research**) as the lead student, contributing extensively across development, experimentation, and evaluation.

☆ **Contributions:** i) Designed persona-based prompts to generate **synthetic data** for reasoning, math, coding, and instruction tasks. ii) Implemented multi-stage training with iterative **SFT** updates. iii) Fine-tuned **LLaMA-3.1 8B** and **Qwen2.5 7B** using multi-GPU **distributed training**. iv) Used **Ollama** and **vLLM** for efficient inference and evaluated models with **LM Eval Harness**.

Project 2: PEML: Parameter-efficient Multi-Task Learning with Optimized Continuous Prompts

▷ **Summary:** Proposed a unified **parameter-efficient framework** for **multi-task learning**, integrating **prompt optimization** with **low-rank adaptation** to improve performance across NLP benchmarks. Working closely with Dr. Syed Zawad (**IBM Research**) and receiving support from Dr. Xiaolong Ma (**Argonne National Laboratory**). Serving as the lead student overseeing model design, training workflows, and experimental evaluation.

☆ **Contributions:** (i) Built **PEML** by integrating **PrefixNAS** for prompt search with **LoRA** adaptation. (ii) Evaluated on **GLUE**, **SuperGLUE**, and **MMLU**, achieving up to **6.67%** average gains over SOTA. (iii) Created an automated **NAS module** to optimize prompts and reduce manual tuning. (iv) Achieved efficient resource use with reduced **VRAM overhead**. [[ICLR'26](#)]

Project 3: PRENAS: A Provident and Resource Efficient System for Neural Architecture Search

▷ **Summary:** Designed and implemented a **resource-efficient NAS system** that dynamically allocates computational resources based on architecture **scalability** and **performance prediction** to accelerate neural architecture search for **LLM fine-tuning** and **CNN architectures**.

☆ **Contributions:** (i) Built the NAS framework with **RAY** and **Optuna** for scalable, distributed LLM fine-tuning search. (ii) Integrated distributed training with **Accelerate** and **multi-GPU** profiling to measure architecture scalability. (iii) Developed **PEFT-NAS-Bench**, an open-source benchmark for prefix-tuning NAS, including hyperparameter and scalability profiling. [[IEEE CCGrid'26](#)]

PROFESSIONAL EXPERIENCE

University of Houston, Houston, TX

Research and Teaching Assistant

Aug 2023 - Present

American International University-Bangladesh, Dhaka, Bangladesh

Lecturer (Teaching & Research)

Sep 2021- Aug 2023

Primeasia University, Dhaka, Bangladesh

Lecturer (Teaching & Research)

Feb 2021 - Sep 2021

Me SOLshare Ltd, Dhaka, Bangladesh

Jr. Firmware Testing Engineer

Feb 2020 - Jul 2020

Me SOLshare Ltd, Dhaka, Bangladesh

Intern (Research & Development)

Oct 2019 - Jan 2020

RECENT MANUSCRIPTS

- [ICLR'26] A. A. Chowdhury, S. Zawad, X. Ma, X. Dong, and F. Yan, "PEML: Parameter-efficient Multi-Task Learning with Optimized Continuous Prompts," *Under Review, 2025.* [[pdf](#)]
- [IEEE CCGrid'26] X. Dong, X. Ma, A. A. Chowdhury, S. Zawad, R. Kettimuthu, and F. Yan, "PRE-NAS: A Provident and Resource Efficient System for Neural Architecture Search," *Under Review.*

JOURNALS

- [PLoS One'25] A. A. Chowdhury, S. M. Hasan Mahmud, M. Palash Uddin, S. Kadry, J.-Y. Kim, and Y. Nam, "Nuclei Segmentation and Classification from Histopathology Images using Federated Learning for End-Edge Platform," [[pdf](#)]
Funding: National Research Foundation of Korea; Soonchunhyang University Research Fund.
- [JKSU CIS'23] A. A. Chowdhury, S. M. Hasan Mahmud, K. K. S. Hoque, K. Ahmed, F. M. Bui, P. Lio, M. A. Moni, and F. A. Al-Zahrani, "StackFBAs: Detection of Fetal Brain Abnormalities Using CNN with Stacking Strategy from MRI Images," [[pdf](#)]
Funding: Natural Sciences and Engineering Research Council of Canada (NSERC); Deputyship for Research & Innovation, Saudi Ministry of Education.
- [IEEE Access'22] A. A. Chowdhury, M. A. Hossen, M. A. Azam, and M. H. Rahman, "Deepqgho: Quantized Greedy Hyperparameter Optimization in Deep Neural Networks for On-the-Fly Learning," [[pdf](#)], [[code](#)]
Funding: US National Science Foundation ; US Agency for International Development.
- [Cogn. Comput.'21] K. T. Hasan, M. M. Rahman, M. M. Ahmmed, A. A. Chowdhury, and M. K. Islam, "4P Model for Dynamic Prediction of COVID-19: a Statistical and Machine Learning Approach," [[pdf](#)]
- [Cogn. Comput.'21] A. A. Chowdhury, K. T. Hasan, and K. K. S. Hoque, "Analysis and Prediction of COVID-19 Pandemic in Bangladesh by Using ANFIS and LSTM Network," [[pdf](#)]

CONFERENCES

- [ICCA'22] A. A. Chowdhury, A. Das, D. Karmaker, and K. K. S. Hoque, "Evaluation of Deep Learning models on UV ink: a Fake Money detection scheme with RPN," [[pdf](#)], [[code](#)]
- [IJCAI'21] A. A. Chowdhury, A. Das, K. K. S. Hoque, and D. Karmaker, "A Comparative Study of Hyper Parameter Optimization Techniques for Deep Learning" [[pdf](#)], [[code](#)]

AWARDS, HONORS & GRANTS

- **Vice Chancellor's Award**, MSCS Thesis, 20th Convocation
- **Summa Cum Laude Award**, MSCS Program
- **Dean's List Award**, consistently high CGPA, M.Sc Program
- **Vice Chancellor's Award**, B.Sc. Capstone Project & Thesis, 19th Convocation
- Bangladesh Sweden Trust Fund (2025, Research Support)
- Texas Public Education Grant (2025, Graduate Studies)

REFERENCES

Dr. Feng Yan
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University of Houston
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Dr. Syed Zawad
Research Scientist
IBM Research
szawad@ibm.com

Dr. Sen Lin
Assistant Professor
University of Houston
slin50@central.uh.edu