Samiul Alam

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"Perpetually Convalescent: Learning & Evolving"

RESEARCH INTERESTS

On-Device AI, Foundation Models, Federated Learning, Distributed ML, Large Language Models.

WORK EXPERIENCE

Ohio State University *Columbus, Ohio*

Graduate Research Assosiate *Aug 2023 - Present*

- Formulating novel techniques for on-device AI, model compression, and quantization.
- Formulating novel retrieval system using token merging and hierarchical clustering.
- Collaboration with Meta's Surreal Team for making efficient Multimodal LLM.

Google *Mountain View, California*

Software Engineering Intern *May 2025 - August 2025*

- Worked on aligning synthetic data generated using large language models to real user data and using it for creating personalized recommender systems.

Michigan State University *East Lansing, Michigan*

Research Assistant *Jan 2022 - Aug 2023*

- Built novel heterogeneity aware distributed federated learning systems.
- Published 5 papers to top conferences/journals (NeurIPS, SenSys, ICASSP, InterSpeech, DMLR).

University of Houston *Houston, Texas*

Research Assistant *May 2021 - Dec 2021*

- Worked on deconvolution, State space modeling, and Bayesian Filters

Samsung Research and Development Institute, Bangladesh *Dhaka, Bangladesh*

Engineer I, Mobile Applications *Apr 2018 - May 2021*

- Extended BLE interfacing for Samsung's Wearable Apps (iOS and Android).
- Developed Samsung's cloud service SDK.
- Earned Samsung Software Certification (Top 10% of developers).

Bengali.AI *Dhaka, Bangladesh*

Co-Founder *Jan 2018*

- Co-founded Bengali.AI, a non-profit for open-source Bengali datasets and benchmarks for speech and text.

EDUCATION

Ohio State University *Columbus, Ohio*

PhD in Computer Science and Engineering *Aug 2023 - Present*

- Transferred to OSU from MSU with lab. Currently in **4th year**.
- Major in AI, Minor in **Vision/AR** and **Graph Theory**
- Awarded prestigious OSU University Fellowship.
- Graduation in Fall 2026/Spring 2027

Michigan State University *East Lansing, MI*

MS. in Computer Science, GPA: 3.86 *Jan. 2022 - Aug 2023*

- Thesis focused on federated learning on heterogeneous distributed edge systems.

Bangladesh University of Engineering and Technology (BUET) *Dhaka, Bangladesh*

B.Sc. in Electrical and Electronic Engineering, GPA: 3.67 *Feb. 2013 - Sept. 2017*

- Major in Electronics; Minor in Communication
- Awarded Dean's List Distinction in session 2012-2013

COURSES TAKEN

Deep Learning, Distributed Systems, Computer Vision, Natural Language Processing, Data Visualization, Network Programming Introduction to Cybersecurity

PUBLICATIONS

Deep Learning and Generative AI

- Cheng, Z., Wohnig, S., Gupta, R., **Alam, S**, et. al."Benchmarking is Broken - Don't Let AI be Its Own Judge" 39th Conference on Neural Information Processing and Systems (NeurIPS 2025)
- Yang, C., **Alam, S.**, et al. "Reading Recognition in the Wild". 39th Conference on Neural Information Processing and Systems (NeurIPS 2025). [Paper]
- Wang, X., **Alam, S.**, Wan, Z., Shen, H., Zhang, M. "MTL-SVD: Minimizing Singular Value Truncation Loss for Large Language Model Compression. NAACL 2025
- I. Siam, H. Ahn, L. Liu, **S. Alam**, H. Shen, Z. Cao, N. Shroff, B. Krishnamachari, M. Srivastava, and M. Zhang. "Artificial Intelligence of Things: A Survey". ACM Transactions on Sensor Networks 2024
- X. Wang, Z. Wan, A. Hekmati, M. Zong, **S. Alam**, M. Zhang, and B. Krishnamachari, "IoT in the Era of Generative AI: Vision and Challenges". IEEE Internet Computing 2024.
- Wan, Z., Wang, X., Liu, C., **S. Alam**, Zheng, Y., Qu, Z., Yan, S. et al. "Efficient Large Language Models: A Survey." Transactions on Machine Learning Research (2024).
- Zhang, T., Feng, T., **S. Alam**, Dimitriadis, D., Zhang, M., Narayanan, S. S., Avestimehr, S. "GPT-FL: Generative Pre-trained Model-Assisted Federated Learning" arXiv:2306.02210v3.

Federated Learning Systems

- G. Maolin, L. Li, **S. Alam**, L. Liu, L. Liu, M. Zhang, and Z. Cao. "GeoFL: A Framework for Efficient Geo-Distributed Cross-Device Federated Learning" Proceedings of the IEEE International Conference on Computer Communications 2025.
- **Alam, S.**, Zhang, T., Feng, T., Shen, H., Cao, Z., Zhao, D., Ko, J., Zhang, M. "FedAIoT: A Federated Learning Benchmark for Artificial Intelligence of Things." Journal of Data-centric Machine Learning Research (2024).
- Zhang, T., Feng, T., **S. Alam**, Lee, S., Zhang, M., Narayanan, S. S., Avestimehr, S. "FedAudio: A Federated Learning Benchmark for Audio Tasks" 2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
- **S. Alam**, Liu, L., Yan, M., Zhang, M. "FedRolex: Model-Heterogeneous Federated Learning with Rolling Sub-Model Extraction" 36th Conference on Neural Information Processing and Systems (NeurIPS 2022). [Paper] [Code]
- Sun, J., Li, A., **S. Alam**, Zhang, M., Li, H., Chen, Y. "FedSEA: A Semi-Asynchronous Federated Learning Framework for Extremely Heterogeneous Devices" 20th ACM Conference on Embedded Networked Sensor Systems. (SenSys 2022).

State Space Modelling

- **S. Alam**, S. Khazaei, Faghih, R. T. "Unveiling productivity: The interplay of cognitive arousal and expressive typing in remote work using multi-state filtering" PLOS ONE 19(5): e0300786.
- M. R. Amin, **S. Alam**, S. Khazaei, H. Fekri Azgomi and R. T. Faghih, "Skin Conductance Response Artifact Reduction: Leveraging Accelerometer Noise Reference and Deep Breath Detection," IEEE Access, vol. 12, pp. 68208-68231.

- **S. Alam**, Amin, M. R., Faghih, R. T. "Sparse Multichannel Decomposition of Electrodermal Activity with Physiological Priors," IEEE Open Journal of Engineering in Medicine and Biology.
- Al-Hussaini, I., Humayun, A. I., **Alam, S.**, Foysal, S. I., ..., Haque, M. A. "Predictive real-time beat tracking from music for embedded application." 2018 IEEE Conference on Multimedia Information Processing and Retrieval (MIPR 2018).

Datasets

- Rakib, F.R., Dip, S.S., **Alam, S.**, Tasnim, N., Shihab, M.I.H., ..., A., Humayun, A.I. "OOD-Speech: A Large Bengali Speech Recognition Dataset for Out-of-Distribution Benchmarking". Proc. INTERSPEECH 2023.
- **Alam, S.**, Reasat, T., Sushmit, A. S., Siddique, S. M., Rahman, F., Hasan, M., Humayun, A. I. "A Large Multi-Target Dataset of Common Bengali Handwritten Graphemes". International Conference on Document Analysis and Recognition.
- **Alam, S.**, Reasat, T., Doha, R. M., Humayun, A. I. "NumtaDB - Assembled Bengali Handwritten Digits". arXiv e-prints, arXiv:1806.02452.

Presentations

Meta Aria Summit *Redmond, WA*
Research *Feb. 2024*
- Presented my work on AR data collection.

Master's Thesis Defence *East Lansing, Michigan*
Thesis *Apr. 2023*
- Presented my work for my MS thesis

Neural Information Processing and Systems 2022 *New Orleans, LA*
Poster Presentation *Dec. 2022*
- Presented my paper at one of the most prestigious venues for computer science

Google Workshop on Federated Learning *Remote*
Poster Presentation *Jul. 2022*
- Presented my work on Federated learning at Google's Workshop

AWARDS

2024 Best Paper Award *Aug, 2024*
IEEE Internet Computing *AIoT-MLSys Lab*
Awarded 2024 Best Paper Award from IEEE Internet Computing for the paper "The Internet of Things in the Era of Generative AI: Vision and Challenges," by the IEEE Computer Society Publications Board. [Link]

July 2022 Community Competition Creator Prize *July, 2022*
Kaggle *Bengali.AI*
Awarded the Community Competition creator prize by Kaggle for collecting data and organizing the speech transcription competition 'DL Sprint' collaboratively with BUET CSE department.

SEMI FINALIST *MARCH 26, 2017*
International Future Energy Challenge 2017 *Team BUET*
Designed, simulated and prototyped a high efficiency, high density DC/DC converter as part of International Future Energy Challenge 2017(IFEC 2017) with a 7-member team. [Link]

HONORABLE MENTION *MARCH 5, 2017*
IEEE Signal Processing CUP 2017 *Team Impulse*
Designed a real time musical beat tracking system in Raspberry Pi and tested various methods including dynamic programming and neural networks as part of IEEE Signal Processing Cup 2017 (SP-Cup 2017) with an 8-member group. [Link]

CATEGORY WINNER *NOVEMBER 11, 2016*
IEEE MAKER PROJECT 2016
Built a 3D- scanner with the purpose of enabling young innovators to learn 3D design and printing. Became category winner under **'Education'** in IEEE Maker Project 2016. [Link]

SKILLS

Hardware Platforms Jetson, Raspberry Pi, Mobile, Meta Aria Glasses.

Data Visualization Bokeh, Altair, WandB, Dash.

Software Development Android, iOS., Python

Libraries Transformers, Pytorch, Jax, LangChain, LLamaIndex, Beam.

PROJECTS

LLM based AR assistant *Ph.D. Thesis*
AIoT-MLSys Lab@OSU *Jan 2025 - Present*
Developing a virtual assistant that uses a on-device retriever to index and search AR device data and retrieve relevant segments for use by a multimodal LLM on the cloud.

Aria Eye Tracking Dataset *Ph.D. Research*
AIoT-MLSys Lab@OSU *Nov 2024 - May 2025*
Developing multimodal LLM benchmark and dataset for eye tracking enhanced video understanding applications.

SVD-LLM Model Compression *Ph.D. Research*
AIoT-MLSys Lab@OSU *Aug 2023 - Jan 2024*
Worked on a singular value decomposition-based model compression technique for deployment on Jetson devices as well as on mobile devices utilizing ONNX runtime, MLC LLM, and TVM compiler.

Federated Learning for Heterogeneous Edge Devices *MS. Research Project*
MLSys Lab led by Prof. Mi Zhang at MSU *2022 - 2023*
Lead a project on developing a federated learning framework to enable model-heterogeneous federated learning on IoT devices with heterogeneous networking bandwidth as well as computational and memory resources.

Predicting Generalization in Deep Learning *NeurIPS Workshop*
PGDL Competition, NeurIPS *2020*
Developed a method to predict generalization in neural networks. More details about the competition can be found here and the leaderboard can be seen here

5G Smart Router Interfacing *Commercial Project*
Samsung Research *2020*
Worked on interfacing for 5G smart router project and developed its AR capabilities that included showing mesh network strength and optimum router placement.

Hand Gesture Recognition System *Daffodil Univesrity*
IEEE Project Show *September, 2016*
Hand gesture recognizer, uses spatial & central moments of convex hull of a hand [Code]

Industrial Robotic Arm Prototype *EEE 402*
Control System I Laboratory *2015-2016*
Built a prototype robotic arm as control systems lab project. Arm had a parallel delta structure and was modeled after similar arm structures used in pick and place machines.[Video] [Code]