Asadullah Hill Galib

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As a Ph.D. candidate in Computer Science (ML), I offer a strong background in Software Engineering coupled with a proven track record of multi-disciplinary research collaboration. (Link: Explore the avenues of Machine Learning and AI I have worked on)

Education

Ph.D. in **Computer Science** *August 2020 - July 2024 (Expected)*
Michigan State University, MI, USA
Advisor: Pang-Ning Tan, Predictive and Generative Modeling, Time Series/Spatiotemporal ML, Representation Learning

M.Sc. in **Software Engineering** *January 2019 - December 2020*
University of Dhaka, Dhaka, Bangladesh
Thesis: Significant Features Analysis For Android Malware Detection Using Machine Learning Techniques [Manuscript][Code]

B.Sc. in **Software Engineering** *November 2014 - December 2018*
University of Dhaka, Dhaka, Bangladesh

Technical Skills (* Proficient)

AI/ML Key Skills*: Generative AI, Representation Learning, Forecasting, Timeseries/Geospatial/Spatiotemporal ML, Data Mining, Interpretable/Explainable AI, Large Language Models (LLMs), NLP, Stable Diffusion, OpenAI API, Adversarial ML

AI/ML Tools: PyTorch*, Lightning*, Captum*, SK-learn*, Pandas*, NumPy*, Matplotlib*, Anaconda*, MATLAB, Keras

CS Skills: Python*, Java, C*, PHP, JavaScript, Android*, GCP*, MySQL, SQLite, React Native, Laravel, Selenium, Agile, SRS*

Experience

Researcher (Internship), *Frontier Development Lab (FDL) 2022 by NASA and the SETI Institute* *June 2022 - August 2022*
- Carried out a statistical analysis that shows promising links between major earthquakes and ionospheric perturbations.
- Created the first machine learning-ready dataset and statistical tool comprising spatiotemporally varying seismic precursors.
- Built machine learning models for forecasting and detecting earthquakes from heterogeneous multivariate time series data.
- Designed a probabilistic model to learn the spatial variability of ionospheric observations around seismic locations.
- Research outcomes: 3 AGU abstracts, 2 papers, 1 technical memo, and 1 NASA NTR.

Graduate Research Assistant, *Michigan State University (CSE)* *January 2022 - Present*
- Developing novel deep learning algorithms addressing extreme events within spatio-temporal and time series data.

Graduate Teaching Assistant, *Michigan State University (CSE)* *August 2020 - December 2021*
- Lead classes and labs of 260+ students in *CSE 102: Algorithmic Thinking and Programming (Python)*

Software Engineer & Executive Assistant (Internship), *Brain Station 23* *January 2018 - June 2018*
- Developed from scratch and maintained a web application and a mobile application, using Laravel Framework, PHP, MySQL, React-Native, Redux-Saga, Android Studio, Postman, and proper version-controlling (Git, SourceTree).

Selected Publications (Full list)

Authored **9** peer-reviewed publications, leading as the first author on **6** of them. Presented findings at prestigious international conferences including **KDD, NeurIPS, IJCAI (twice), ICDM** and **AGU**. Selected publications:

- **SimEXT (ICDM 2023)**: A representation learning framework for time series extremes that enhances representation learning performance by 1.1%-8.2% and improves the downstream prediction performance by **1.7%-11.6%**. [Manuscript]
- **Self-Recover (IJCAI 2023)**: A novel self-supervised learning framework for data fusion and imputation in time series data, boosting forecasting performance by **2.5%-10.5%**. [Manuscript]
- **DeepExtrema(IJCAI 2022)**: A novel framework for forecasting time series extremes with uncertainty estimations that integrates extreme value theory with deep learning techniques, significantly enhancing forecasting performance by **6.5%-16%**. [Manuscript]

Academic and Research Projects (Full list with details)

- **On the Susceptibility and Robustness of Time Series Models through Adversarial Attack and Defense:** The vulnerability and robustness of several time series models are investigated through adversarial attacks and defense. [Manuscript][Code]
- **Image-to-Image Translation using Conditional GAN:** It generates colored images from sketches using a generative model - Conditional GAN. It incorporates the architecture and guidelines proposed by a CVPR 2017 study (Isola et al.). [Manuscript][Code]
- **Predicting GitHub Issues Lifetime using Machine Learning and Topic Modeling (LDA):** It outperforms the previous approach with a high precision and f1- measure. It extracts distinguishable and comprehensible topics from issues. [Manuscript].
- **Pre-birth Factors in the Early Assessment of Child Mortality using Machine Learning Techniques:** It achieves an AUC score of 0.947 which outperforms the clinical standards. Also, it assesses the relative importance of the factors. [Manuscript].
- **LifeBlood:** A GPS-based blood donor finder android app that searches and sorts nearer blood donors. [Technical Report][Code]