Syed Hasan Amin Mahmood

(217) 904-0276 | hasanamin@purdue.edu | shasanamin | shasanamin

EDUCATION

Purdue University *West Lafayette, IN*
Ph.D. in Computer Science *Aug. 21 – Present*
Research Area: Artificial Intelligence, Machine Learning, and Natural Language Processing
CGPA: 4.0/4.0

Lahore University of Management Sciences (LUMS) *Lahore, Pakistan*
B.S. in Electrical Engineering *Sep. 16 – Jun. 20*
Minor: Computer Science
CGPA: 4.0/4.0

Select Courses: Advance Digital Signal Processing (Grad), Advanced Programming, Applied Probability (Grad), Artificial Intelligence, Deep Learning, Dynamic Programming & Reinforcement Learning (Grad), Embedded Systems (Grad), Information Theory & Machine Learning (Grad)

EXPERIENCE

Afiniti *Lahore, Pakistan*
Data Scientist *Oct. 20 – Aug. 21*
Work on intelligent agent-caller pairing using Bayesian statistical modeling and machine learning methods. Responsible for designing models, monitoring production, and debugging real-time issues to optimize gain.

University of Notre Dame *Notre Dame, IN*
Research Assistant *Jun. 20 – Oct. 20*
Remote work on the theme of deep learning, deep generative models in particular, in challenging time series contexts, with focus on security and health applications. Supervised by Dr. Ahmed Abbasi

TUKL-NUST R&D Center *Islamabad, Pakistan*
Research Intern *Jul. 18 – Sep. 18*
Work on "Information Retrieval from Legal Documents". Used image processing and machine learning to extract information from images of various legal documents. Supervised by Dr. Faisal Shafait.

PUBLICATIONS

[In Preparation] **S. H. A. Mahmood**, R. Khanna, "Are Deep Neural Networks Self-Explaining? Rethinking Sensitivity-based Instance Attribution".

[Under Review] **S. H. A. Mahmood**, Z. Lu, M. Yin, "Designing Behavior-Aware AI to Optimize Human-AI Team Decision Making".

[W1] **S. H. A. Mahmood**, A. Abbasi, "Using Deep Generative Models to Boost Forecasting: A Phishing Prediction Case Study," in *IEEE International Conference on Data Mining Workshops (ICDMW)*, 2020.

[C1] **S. H. A. Mahmood**, S. M. A. Abbasi, A. Abbasi, F. Zaffar, "Phishcasting: Deep Learning for Time Series Forecasting of Phishing Attacks," in *IEEE International Conference on Intelligence and Security Informatics (ISI)*, 2020.

HONORS & AWARDS

Graduation with High Distinction, LUMS *2020*
Placed on Dean's Honor List, LUMS *2017 – 2020*
Winner, Social Innovation Challenge, LUMS Envision *2018*
Winner, Data Analytics Using R, LUMS *2018*
Full Scholarship for National University of Singapore Summer Enterprise Program *2017*

PROJECTS

Designing Behavior-Aware AI to Optimize Human-AI Team Performance *Jan. 22 – Present*

- Trained "behavior-aware AI" by adjusting the AI model underlying the decision aid to account for humans' behavior in adopting AI advice, an initial realization of which was through human confidence-based instance weighting to make it focus on regions where humans consider themselves weak.
- Derived the optimal instance weighting strategy for training AI models under a threshold-based model characterizing when humans will adopt the AI advice.
- Demonstrated efficacy of our solution through systematic experimentation on synthetic datasets and randomized experiments with real human subjects.
- Investigating alternate human behavior model and complementary training strategies, with particular focus on personalization and data efficiency.

Using Black Box Predictions to Explain Black Box Predictions *May. 22 – Present*

- Investigated instance attribution methods, which attempt to select training samples that the model capitalized on to make a given test prediction.
- Analyzed shortcomings of existing methods employing sensitivity-based techniques like Influence Functions and TracIn that have been shown to be unreliable on large deep networks.
- Bridged gap between sensitivity-based methods and similarity-based ones, and proposed using prediction itself as explanation.

Generative Modeling in Challenging Time Series Contexts *Aug. 20 – Aug. 21*

- Developing deep generative models for time series lacking stationarity, seasonality, completeness etc.
- Proposed models extend inputs to utilize multimodal auxiliary information as labels and embeddings.
- Evaluated model performance and utility using rich COVID-19 and related datasets among others.

TEACHING APPOINTMENTS

Purdue University *West Lafayette, IN*
Graduate Teaching Assistant

- Data Mining (CS 573) *Fall 2023, Spring 2023, Fall 2022*
- Data Engineering I (CS 50023) *Summer 2022*
- Foundations of Decision Making (CS 50025) *Summer 2022*
- Data Science Capstone (CS 490) *Spring 2022*
- Introduction to Data Science (CS 242 / STAT 242) *Fall 2021*

LUMS *Lahore, Pakistan*

- *Graduate Teaching Assistant,* Advance Digital Signal Processing (EE 511) *Fall 2020*
- *Teaching Assistant,* Feedback Control Systems (EE 361) *Spring 2020*
- *Teaching Assistant,* Introduction to Game Theory (ECON 233 / MATH 232) *Fall 2018*

SERVICE

Journal Reviewer: IEEE Intelligent Systems (2020–Present)
Workshop Reviewer: Interpretable Machine Learning in Healthcare @ICML (2022, 2023)

SKILLS

Proficient in: Python, R, MATLAB, C/C++, SQL, LaTeX, MS Office
Familiar With: Haskell, JavaScript, Go, Verilog, C#, Modelica, Google Cloud Platform, Unity