Syed Hasan Amin Mahmood

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EDUCATION

Purdue University *West Lafayette, IN*
Ph.D. in Computer Science — ***GPA: 4.0/4.0*** *Aug. 21 – Present*

Select Courses: Algorithms (A+), Data Mining (A+), Statistical ML (A), Computation & Learning on Graphs (A), Natural Language Processing (A+), Interpretability in ML (A), Database Systems (A), Probabilistic Causal Inference (Au), Cognitive Psychology (A+), Social Psychology (Au)

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

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

PUBLICATIONS

[W2] **H. Amin**, R. Khanna, "On the Support Vector Effect in DNNs: Rethinking Last Layer Sensitivity-based Instance Attribution," in *NeurIPS Workshop on Attributing Model Behavior at Scale*, 2023.

[W1] **H. Amin**, Z. Lu, M. Yin, "Give Weight to Human Reactions: Optimizing Complementary AI in Practical Human-AI Teams," in *ICML Workshop on AI & HCI*, 2023.

[C2] **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 (ICDM) Workshops*, 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.

TEACHING APPOINTMENTS

Purdue University *Fall 2021 – Present*
Data Mining (CS 573), Data Engineering I (CS 50023), Foundations of Decision Making (CS 50025), Data Science Capstone (CS 490), Introduction to Data Science (CS 242 / STAT 242)

LUMS *Fall 2018 – Fall 2020*
Advance Digital Signal Processing (EE 511), Engineering Laboratory (EE 100), Feedback Control Systems (EE 361), Circuits II (EE 242), Introduction to Game Theory (ECON 233 / MATH 232)

HONORS & AWARDS

Summer Research Grant, Purdue University *2023*
Graduation with High Distinction, LUMS *2020*
Winner, Social Innovation Challenge, LUMS Envision *2018*
Full Scholarship for National University of Singapore Summer Enterprise Program *2017*

SKILLS

Proficient in: Python , R, MATLAB, C/C++, SQL, LaTeX, MS Office
Experience With: Haskell, JavaScript, Go, Verilog, C#, Mojo, NoSQL, Modelica, GCP, Unity

PROJECTS

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

- Formulated a novel AI training paradigm to account for humans' behavior in adopting AI advice.
- Derived optimal training strategy under a threshold-based model, and demonstrated efficacy through systematic experimentation on synthetic datasets and randomized experiments with real human subjects.
- Investigating alternate human behavior models and complementary training strategies, with particular focus on personalization and data efficiency.

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

- Analyzed instance attribution methods that find influential training instances for particular prediction(s).
- Proposed Support Vector Effect to explain previously observed unreliability of popular techniques.
- Work in progress on bridging sensitivity and similarity-based methods, an extreme of which is to leverage model prediction itself as explanation.

How Large Language Models Are Transforming Database Systems *Sep. 23 – Present*

- Investigated how LLMs are, or will, generally influence database (management) systems.
- Analyzed impact of different LLMs, finetuning and in-context learning strategies on text-to-SQL tasks.
- Explored prompt engineering and prompt learning techniques to improve text-to-SQL performance.

Analyzing Robustness of NLP Models to (Adversarial) Noises *Jan. 23 – Apr. 23*

- Conducted a comparative study on robustness of NLP models to varied noises and adversarial attacks.
- Highlighted vulnerabilities of transformer-based models and advantages of non-attention based models.

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

- Developed deep generative models for time series lacking stationarity, seasonality, completeness etc.
- Proposed models leveraging multimodal auxiliary information for enhanced performance.

Deep Generative Models to Enhance Predictive Power *Jun. 20 – Dec. 20*

- Developed a framework to boost predictive power for various standard time series forecasting models.
- Integrated DGMs with base predictors through novel ensembling strategy for enhanced regularization.

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.

SERVICE

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