Akib Zaman

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Human-Computer Interaction x Machine Learning

Education

Ph.D., Computer Science at *University of Texas at Arlington* *Jan 2018 - May 2024*
Advisor: César Torres • Lab: Hybrid Atelier
Bachelor of Science, Computer Science at *University of Texas at Arlington* *Aug 2013 - May 2017*

Work Experience

PhD Research Scientist, Hybrid Atelier, University of Texas at Arlington *Feb 2020 - May 2024*

- Conducted longitudinal data collection studies (user studies, crowdsourcing platforms) and research projects, presenting findings at international conferences, and publishing in peer-reviewed venues.
- Developed and implemented methodologies to dissect biases in datasets and their impacts on machine learning models.
- Designed and deployed data collection systems foundational for repairable machine learning models.
- Conducted user studies to assess usability and effectiveness of research interventions, contributing to user-centered design and informed decision-making.
- Mentored and led research workshops for over 20 undergraduate students.

Graduate Intern, Dell Technologies, Austin, TX (Remote) *May 2021 - Aug 2021*

- Developed prediction models for a hardware debugging system using natural language processing techniques.
- Worked in the Customer Experience subdivision, collaborating with stakeholders from engineering and business.

Graduate Intern, Dell Technologies, Austin, TX (Remote) *June 2020 - July 2020*

- Built an error code clustering system to predict customer sentiment from in-house telemetry database.
- Applied natural language processing and machine learning in the database domain.
- Collaborated with interdisciplinary teams in the Infrastructure Solutions Group, involving five product divisions.

Graduate Research Assistant, MIND Lab, University of Texas at Arlington *Jan 2018 - Jan 2020*

- Conducted in-depth data and image analysis of brain images (MRI, fMRI) using machine learning algorithms.
- Developed approaches to integrate multi-modal brain imaging data to understand brain structure and function.

Undergraduate Research Assistant, SMILE Lab, University of Texas at Arlington *Aug 2017 - Dec 2017*

- Implemented and fine-tuned Convolutional Neural Networks (CNNs) for the automated detection and segmentation of cell structures in medical images.

Dissertation

"Living Datasets: Towards Data-Centric AI Explainability and Bias Mitigation." The University of Texas at Arlington *2024*

Introduced the Tag-and-Release method to analyze and address biases in AI benchmark datasets, using those datasets to demonstrate its application in developing balanced and fair datasets through crowd annotation and explainable AI interventions.

Publications

[3] **Akib Zaman**, Shreyosi Endow, Nasir Rakib, and César Torres. "BraidFlow: A Flow-annotated Dataset of Kumihimo Braidmaking Activity." ACM Designing Interactive Systems (DIS). *2023*

[2] **Akib Zaman,** L. Zhang, J. Yan, and D. Zhu. "Multi-Modal Image Prediction via Spatial Hybrid U-Net." Multiscale Multimodal Medical Imaging (held in conjunction with MICCAI). [15% acceptance rate]. ***Best Student Paper Award*** *2019*

[1] L. Zhang, **Akib Zaman**, L. Wang, J. Yan, and D. Zhu. "A Cascaded Multi-Modality Analysis in Mild Cognitive Impairment." Machine Learning in Medical Imaging (held in conjunction with MICCAI). *2019*

Technical Skills

Machine Learning/AI	Image Processing (CNN, RNN, LSTM), NLP, LLM, LLM fine-tuning, Bias detection, Explainable AI
Programming	Python [Numpy, Pandas, Matplotlib, Scikit-learn, Seaborn, SciPy, PyTorch, TensorFlow, Keras, Neurokit], Websocket, HTML, Git, SQL, JavaScript, React
Data Analysis	Predictive Analysis, Data Pre-processing, Statistical Analysis, Data Visualization, Experimental Design, A/B Testing
Design	FIGMA, Adobe Photoshop, Adobe Premiere Pro, Adobe Illustrator, User-centered Design, Usability Testing
Productivity	GitHub, Slack, Google Sheets, Google Docs, MS Excel, MS Word, Keynote, Google Colaboratory, Jupyter Notebook

Research Projects/ Technical Reports

[3] *"Hum, Rattle and Purr – Ad hoc Sonic Activity Logging and Modeling for Smart Workshop Environments."*

Techniques Used: **IoT microphones, CNNs, FastAI, PyTorch, Websockets, MongoDB, Adafruit Feather microcontrollers**

- Developed a flexible audio-logging system for a glass coldworking studio, using custom IoT microphones and CNNs.
- Achieved robust deep learning models (F1 score > 0.94) through iterative testing, real-time feedback, and dynamic training.
- Enhanced workshop safety and efficiency with real-time audio streaming, classification, and a light projection feedback system.

[2] *"DuckCheck: Towards Tangible and Connected Debugging Support Tools."*

Techniques Used: **Tangible avatar, Jupyter plugin, biosignal wristband (EmotiBit), capacitive sensors, Websockets, MongoDB, Ruby**

- Created a Hybrid Debugging Environment (HDE) integrating a tangible avatar, Jupyter notebook plugin, and biosignal wristband.
- Demonstrated the system's ability to enhance engagement and reduce cognitive load through ambient and haptic feedback.
- Identified themes for embodied debugging and provided design implications for tangible interactions in debugging tools.

[1] *"LadderBot: Understanding Learner Perceptions and Behaviors with Virtual Users in Interview Training."*

Techniques Used: **Ruby on Rails, MongoDB, customized chat application, Wizard of Oz method**

- Explored the use of virtual users in interview training, utilizing Ruby on Rails, MongoDB, and a custom chat application.
- Conducted workshops and analyzed logs to identify themes in conversational flow, social cues, and cognitive load.
- Found that virtual users reduced cognitive load, highlighting the importance of designing human-like chatbots for effective training.

Other Research Activity/ Technical Communication

- MosAIc - Fine-Tuning Large Language Models for Creative Bricolage [Workshop] *2024*
- Living Datasets: Towards Data-Centric AI Explainability and Bias Mitigation [Poster] *2024*
- Flow Triggers - Designing Interactions for Inducing or Sustaining Experiences of Flow in Braidmaking Tasks [Workshop] *2023*
- BraidFlow: A Flow-annotated Dataset of Kumihimo Braiding [Talk] *2023*
- CloudMining: Building a Cloud-based, Secure, Scalable, Data Analytic Web Application [Workshop] *2021*
- Shallow Learning: Glancing into the current and future prospects of Machine Learning [Guest Lecture] *2021*
- Harmonizing the Makerspace: Envisioning Adaptive Interactive Feedback Systems [Seminar Speaker] *2021*
- Re-examining the Familiar Stranger in the Hybrid Classroom through Internet of Things Interactions [Poster] *2021*

Teaching *2018 - 2024*

Teaching Assistant/ Guest Lecturer [University of Texas at Arlington]

- CSE 6363: Machine Learning [50 students, *1 semester*]
- CSE 5334: Data Mining [45 students, *2 semesters*]
- CSE 3320: Operating Systems [50 students, *5 semesters*]
- CSE 1320: Intermediate Programming [60 students, *2 semesters*]

Lead Teaching Assistant [University of Texas at Arlington]

- CSE 3320: Operating Systems [75 students, *2 semester*]

Awards and Scholarships

- Honorable Mention, Lightning Talk [50th Anniversary of Computing at UTA] *Texas, 2023*
- Cyneta Networks Outstanding Graduate Teaching Assistant Award [Department of Computer Science & Engineering] *Texas, 2021*
- Graduate Studies Travel Grant [College of Engineering] *Texas, 2019*
- Best Student Paper Award [MMMI (held in conjunction with MICCAI)] *Shenzhen (China), 2019*
- Maverick Academic Scholarship [University of Texas at Arlington] *Texas, 2013-2017*
- ExxonMobil Computer Science Scholarship [University of Houston] *Texas, 2013*

Leadership

- Mentor [Maverick Billiards Club] *2018-2020, 2023-2024*
- Vice President [Texas Intercollegiate Badminton Association] *2017 – 2018*
- Secretary [Texas Intercollegiate Badminton Association] *2016-2017*
- Founder and President [Badminton Sport Club] *2015-2018*