SHAILY ROY

Ph.D. Student, Computer Science
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EDUCATION

Ph.D. in Computer Science **2024 – Present**
Arizona State University *Tempe, AZ, USA*
Advisor: Dr. Asif Salekin, Assistant Professor, School of Biological and Health Systems Engineering

- *Research Areas:* Fairness in Machine Learning, Federated Learning, Human-Centered AI, Commonsense Reasoning, and Ubiquitous Computing.
- *CGPA:* 4.00/4.00
- Transferred Ph.D. program from Syracuse University (2022–2024).

Master of Science in Computer Science and Engineering **2020 – 2023**
BRAC University *Dhaka, Bangladesh*

- *Thesis Title:* Fairness in Human Activity Recognition from Wearable Inertial Sensor Data
- *CGPA:* 4.00/4.00

Bachelor of Science in Computer Science and Engineering **2014 – 2018**
BRAC University *Dhaka, Bangladesh*

- *Thesis Title:* Bitcoin Price Forecasting based on Historical Data
- *CGPA:* 3.89/4.00

PUBLICATIONS

Total Citations: 99 (Google Scholar)

Peer–Reviewed Conference Proceedings

2023 Manasa Kalanadhabhatta, **Shaily Roy**, Trevor Grant, Asif Salekin, Tauhidur Rahman, and Dessa Bergen-Cico. Detecting PTSD Using Neural and Physiological Signals: Recommendations from a Pilot Study. In *Proceedings of the 11th International Conference on Affective Computing and Intelligent Interaction (ACII)*, pages 1–8, 2023.

2022 **Shaily Roy** and Labeba Tahsin. Prediction of COVID-19 Severity Level Using XGBoost Algorithm: A Machine Learning Approach Based on SIR Epidemiological Model. In *Intelligent Systems and Sustainable Computing: Proceedings of ICISSC 2021*, pages 69–78. Springer, 2022.

2022 Muttaki Islam Bismoy, Fahim Shahrear, Anirban Mitra, D. M. Bikash, Ferdousi Afrin, **Shaily Roy**, and Hossain Arif. Image Translation of Bangla and English Sign Language to Written Language using Convolutional Neural Networks. In *Proceedings of the International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)*, pages 1–6, 2022.

2022 Abdullah Al Taawab, Mahfuzzur Rahman, Zawadul Islam, Nafisa Mustari, **Shaily Roy**, and Md. Golam Rabiul Alam. Detecting Self-Esteem Level and Depressive Indication Due to Different Parenting Style Using Supervised Learning Techniques. In *Proceedings of the 9th International Conference on Behavioural and Social Computing (BESC)*, pages 1–6, 2022.

2021 Sajjad Ahmed, **Shaily Roy**, and Golam Rabiul Alam. Benchmarking and Selecting Optimal Diabetic Retinopathy Detecting Machine Learning Model using Entropy and TOPSIS Method. In *Proceedings of the International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)*, pages 1–6, 2021.

2018 **Shaily Roy**, Samiha Nanjiba, and Amitabha Chakrabarty. Bitcoin Price Forecasting Using Time Series Analysis. In *Proceedings of the 21st International Conference of Computer and Information Technology (ICCIT)*, pages 1–5, 2018.

Preprints

2024 **Shaily Roy**, Harshit Sharma, and Asif Salekin. Curvature-Aligned Federated Learning (CAFe): Harmonizing Loss Landscapes for Fairness Without Demographics. *arXiv preprint arXiv:2404.19725*, 2024.

Research Experience

Graduate Research Associate & Fulton Fellow **2024 – Present**

Ubiquitous & Intelligent Sensing Lab, Ira A. Fulton Schools of Engineering–SBHSE, ASU *Tempe, AZ, USA*

- Conducting research on **Ethical and Human-centered AI**, with emphasis on subgroup fairness and equity in machine learning systems.
- Developing **Federated Learning frameworks** that mitigate disparities without relying on sensitive demographic attributes.
- Leading **multimodal stress sensing studies** using Oura Ring, UWB band, Empatica E4, thermal/RGB cameras, and audio to capture comprehensive behavioral and physiological signals.
- Exploring **personalization strategies** to adapt models to individual contexts, enhancing relevance and reliability of AI systems.
- Integrating **commonsense reasoning** to improve interpretability and robustness in ubiquitous computing environments.

Research Assistant & Graduate Fellow **2022 – 2024**

Electrical Engineering and Computer Science, Syracuse University *Syracuse, NY, USA*

- Published research on **PTSD detection** using fNIRS and Biopac signals at *ACII 2023*.
- Built scalable **HPC pipelines** for multimodal machine learning and large-scale data analysis.
- Collaborated with **Cornell University** and **UMass Amherst** on interdisciplinary sensing and privacy-preserving AI projects.

Professional Experience

Lecturer **May 2019 – Aug 2022**

Department of Computer Science and Engineering, BRAC University *Dhaka, Bangladesh*

- Taught core undergraduate courses including Algorithms, Data Structures, and Programming.
- Supervised and co-advised undergraduate projects in AI, NLP, and ML, resulting in publications at international venues.
- Developed and taught an online course on the BRAC University buX platform.
- Mentored students in competitive programming and guided senior capstone projects.
- Served as Co-Advisor of the BRAC University Computer Club; organized workshops, contests, and hackathons.
- Created educational tutorials on programming and algorithms, reaching a wider audience via YouTube.

Lecturer **Jan 2019 – Apr 2019**

Department of Software Engineering, Daffodil International University *Dhaka, Bangladesh*

- Delivered lectures on core software engineering courses and supervised student projects.
- Contributed to curriculum development and mentored undergraduate students.

Skills

English	IELTS Band 7 (LRWS: 8, 7, 6.5, 6.5).
Programming Languages	Proficient in Python, C, C++, and Java. Skilled in writing scalable, maintainable, and efficient code in Python. Contributed to team-based software development projects, collaborating with peers to design and implement solutions.
Git	Experienced in Git-based development. Utilized Git for both personal and collaborative projects, ensuring code integrity and facilitating team coordination.
LaTeX	Extensive experience in LaTeX documentation. Skilled in customizing styles, and formatting for academic papers, technical documentation, and project reports.
Operating Systems	Primary user of macOS, with Ubuntu as an alternative. Proficient in developing Bash shell scripts on Unix/Linux to automate repetitive tasks.
Scripting	Experienced in Bash/Shell scripting. Developed scripts for automating system administration, file management, and data processing.
Courses Completed	**Syracuse University:** Operating System, Computer Architecture, Algorithms, Secure Machine Learning, Ubiquitous Computing, Introduction to AI, Oral Communication. **Arizona State University:** Data Visualization, Knowledge Representation, Information Assurance and Security.

PROJECTS

Data Visualization Projects

Tools: D3.js, JS, HTML/CSS; Python for preprocessing/wrangling where applicable.

- KAN You See the Bias? – Scrollytelling viz comparing fairness/accuracy of MLPs vs. Kolmogorov–Arnold Networks on human-centric datasets.
- Fake News: Opposing Perspectives – Two side-by-side narratives from the same dataset to show how framing shapes conclusions.
- Synthetic Data Dashboard – Hierarchical Company → Dept → Employee tree with click-through to a force-directed graph.
- DC Weather Visualization – Reusable component-based charts exploring Washington, DC weather patterns.

Algorithmic and AI Projects

Tools: Python, Jupyter, `python-chess`, JS (for visual demos).

- Alpha-Chess – Chess agents and experiments (Monte Carlo Tree Search, Chess960), supporting human vs. AI and AI vs. AI modes.
- Graph Theory – Classic algorithms (BFS/DFS, Dijkstra, MST) with demo visualizations for learning and testing.

AWARDS/SCHOLARSHIPS

Academic Awards/Scholarships

Fulton Fellowship, Arizona State University	2024 – Present
Graduate Fellowship, Syracuse University	2022 – 2024
Fully Funded Graduate Scholarship, BRAC University	2020 – 2023
Merit Based Scholarship, BRAC University	2015 – 2018
Dean's List Award, Computer Science, BRAC University	2017, 2016, 2015
Vice Chancellor's List Award, Computer Science, BRAC University	2018, 2017, 2016
Education Board Scholarship in Higher Secondary, Junior, Primary level	2014, 2009, 2006

Extracurricular

Champion, NSU Inter-University Girls' Programming Contest	2018
4th Place, National Girls' Programming Contest	2017
4th Place, Ada Lovelace National Girls' Programming Contest	2017
Vice Chancellor's Certificate, awarded for academic excellence and exemplary conduct in the residential campus	2015

REFEREES

Dr. Asif Salekin
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