Mohammad Shamim Ahsan

PhD Student, College of IST, Pennsylvania State University
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Education

2024 - 2028 (expected) **Ph.D., Informatics, The Pennsylvania State University,** University Park
Dissertation: *...(in progress)*
Advisor: Dr. Peng Liu

2018 – 2023 **B.Sc. Computer Science, Bangladesh University of Engineering and Technology (BUET)**
Thesis title: *Detecting Smart Home Device Activities Using Packet-level Signatures from Encrypted Traffic*
Supervisor: Dr. Shohrab Hossain, BUET
Co-supervisor: Dr. Anupam Das, NC State

Research Interests

- IoT Network Security
- Adversarial Machine Learning
- Cyber-Physical System Security

Appointments

2024 – present **Graduate Research Assistant.** Department of Information Sciences and Technology, The Pennsylvania State University, University Park

2023 – 2024 **Lecturer.** Department of Computer Science and Engineering, United International University (UIU), Dhaka, Bangladesh

2022 – 2023 **Undergraduate Research Assistant.** Department of Computer Science and Engineering, Bangladesh University of Engineering and Technology (BUET)

Work-In-Progress

- [*Submitted*]: Mohammad Shamim Ahsan, Minghui Zhu, and Peng Liu, "Bayesian Network-based Reasoning for Assisting the Differentiation between Cyberattacks and Undetected Faults in DER Systems"
- [*Submitted*]: Mohammad Shamim Ahsan, Mohiuddin Ahmed, and Al-Sakib Khan Pathan, "Investigating Efficacy of Real-Time Intrusion Detection Systems on Ambiguous Traffic: An Empirical Analysis in Industrial IoT Networks"
- [*Submitted*]: Mohammad Shamim Ahsan and Peng Liu, "Uncovering and Understanding FPR Manipulation Attack in Industrial IoT Networks"
- [*Submitted*]: Mohammad Shamim Ahsan, Haizhou Wang, Venkateswara Reddy Motakatla, Minghui Zhu, and Peng Liu, "Differentiation Between Faults and Cyberattacks through Combined Analysis of Cyberspace Logs and Physical Measurements"

Research Publications

Journal Articles

1. Mohammad Shamim Ahsan, S. Islam, and S. Shatabda, "A systematic review of metaheuristics-based and machine learning-driven intrusion detection systems in IoT," *Swarm and Evolutionary Computation*, vol. 96, p. 101 984, 2025. DOI: 10.1016/j.swevo.2025.101984.

2. Mohammad Shamim Ahsan and A.-S. K. Pathan, "A comprehensive survey on the requirements, applications, and future challenges for access control models in IoT: The state of the art," *IoT*, vol. 6, no. 1, p. 9, 2025. DOI: 10.3390/iot6010009.
3. M. S. Rahman, Mohammad Shamim Ahsan, C.-W. Chen, and V. Varadarajan, "A census-based genetic algorithm for target set selection problem in social networks," *Neural Computing and Applications*, 2025, ISSN: 1433-3058. DOI: 10.1007/s00521-025-11480-3.
4. Mohammad Shamim Ahsan, M. S. Islam, M. S. Hossain, and A. Das, "Detecting smart home device activities using packet-level signatures from encrypted traffic," *IEEE Transactions on Dependable and Secure Computing*, pp. 1–12, 2024. DOI: 10.1109/TDSC.2024.3424299.

Conference Proceedings

1. S. N. Ahmed, M. S. I. Sajib, N. Ahmed, *et al.*, "AI and RBAC enhanced security system for hospitals in Bangladesh," in *Proceedings of the 3rd International Conference on Computing Advancements*, 2024, pp. 169–176.
2. Mohammad Shamim Ahsan, A. R. Ahmed, and M. Saidur Rahman, "Randomized algorithm for online k-server problem on a line," in *International Conference on Information and Communication Technology for Competitive Strategies*, Springer, 2024, pp. 371–381.
3. M. A. Uddin, S. H. Sonali, M. S. Rahman, and Mohammad Shamim Ahsan, "Deep learning for agile malware detection," in *2024 IEEE Region 10 Symposium (TENSYMP)*, IEEE, 2024, pp. 1–6.

Notable Academic Projects

- *TCP CERL: Congestion Control Enhancement over Wireless Networks* (Network Simulator 3, C, Python) — Explored the TCP-CERL technique to enhance congestion control, a sender-side modification of TCP-Reno. Implemented this technique in NS3 which was not done before (authors used NS2). Tested on two wireless networks: Wi-Fi and LR-WPAN using various performance metrics such as throughput, end-to-end delay, and packet delivery ratio.
- *Image Caption Generator using CNN and LSTM* (Python, Flickr8k dataset) — CNN was used to extract features from an image. Then, LSTM used these features to help generate a caption of the image. Implemented Greedy and Beam search strategies, and evaluated the accuracy of generated captions using metrics like BLEU, and METEOR.
- *Spacey: Online Space Rental Platform* (MongoDB, Express.js, React.js, Node.js, CSS) — Developed an online space (both personal and business) rental platform with a team of 3 people. Designed BPMN, Mock UI (using Figma), Class, ER, Sequence, and Collaboration diagrams. Used MERN stack for development and Stripe gateway for mobile banking payment methods.
- *SEED-LABS Attacks* — Implemented some SEED-LABS attacks such as Buffer overflow, CSRF, XSS, SQL injection, and Morris worm attacks.
- *Bangla Handwritten Character Recognition using CNN* — Implemented CNN model from scratch using Python and tested on the NumtaDB dataset.

Skills

Security Tools	Joern, Frida
Network Analyzers	Wireshark, Tshark
Languages	C, C++, Java, Python, ShellScript, JavaScript, SQL
Frameworks	Django, React.js, Express, Node.js
Databases	Oracle, MongoDB
Web Technologies	HTML, CSS, Bootstrap

Skills (continued)

Others Graphviz, NS3, XV6, Docker, OpenGL

Teaching

Courses • Computer Security (CSE 4531) • Structured Programming Language Lab (CSE 1112) • Discrete Mathematics (CSE 2213) • Data Structure and Algorithms I Lab (CSE 2216) • Data Structure and Algorithms II Lab (CSE 2218) • Cloud Computing (CSE 4587)

Mentoring • Supervised a group of undergraduate students to conduct research, leading to *two* conference papers from the "Computer Security (CSE 4531)" course

Achievements

Honors and Awards

2025 – **Elected Full Member (Student)**, Sigma Xi, The Scientific Research Honor Society

2022 – 2023 **Dean's List Award**, Bangladesh University of Engineering and Technology

2018 – 2022 **National High School Merit Scholarship**, Government of Bangladesh

2015 – 2017 **National Elementary School Merit Scholarship**, Government of Bangladesh

Certifications

2023 **Certified Participant**. Awarded by IEEE Computer Society Bangladesh Chapter Summer Symposium (IEEE CS BDC SS) [Topic: *Randomization in Double Coverage Algorithm on a Line for Online k-Server problem*]

Professional Activities

External Reviewer (Conference)

2025 • USENIX Annual Technical Conference (ATC)
• 55th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), Naples, Italy

2024 • 3^{rd} International Conference on Computing Advancements (ICCA), AIUB, Dhaka, Bangladesh

Reviewer (Journal)

2024 - • Cluster Comput. • Peer-to-Peer Netw. & Appl. (P2PNA) • Neural Comput. & Appl. (NCAA) • Springer Nat. Comput. Sci. (SNCS) • Int. J. Comput. & Appl. (IJCA) • Int. J. Comput. Sci. & Eng. (IJCSE) • Int. J. Found. Comput. Sci. (IJFCS)

References

Available on Request