Md. Ahsan Ayub

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EDUCATION

Tennessee Tech University   Cookeville, TN
Ph.D. Student in the Department of Computer Science. CGPA 3.93/4.00.   *Aug 2018 – Dec 2022*

EXPERIENCE

Graduate Research Assistant   Aug 2018 – Present
Cybersecurity Education, Research & Outreach Center (CEROC)   *Cookeville, TN*
- Contributed experiential research in both static and dynamic malware analysis for ransomware to propose multi layered endpoint protection by incorporating Data Science, Machine Learning, and Reverse Engineering techniques.
- Collaborated with the external security researchers in industry, U.S. national labs, and other universities to initiate as well as review the scope of research, perform experimentations, observe its progress, and analyze the empirical findings.

Graduate Teaching Associate   Aug 2021 – Present
Department of Computer Science, Tennessee Tech University   *Cookeville, TN*
- Instructed a class of 75+ students to teach Introduction to Problem Solving and Programming in C++ in Fall 2021.
- Developed class materials, exam/quiz questions, and programming assignments/challenges; initiated automated programming assessment with online judging tool; and managed online quizzes and grading.

Software Project Manager   Feb 2017 – July 2018
Appinion BD Limited   *Dhaka, Bangladesh*
- Led the software development and UI/UX team to a successful launch of a sales force learning app (Android & Web) with 1,500+ users, for one of the renowned Bangladeshi pharmaceutical companies, *Renata Limited* (Operated by Pfizer until 90s).
- Partnered with the largest NGO in the world, *BRAC*, to automate the business process of *Human Rights and Legal Aid Services*; conceptualized the software development scope to facilitate nationwide adaptation of digitization.

PROJECTS

Static Analysis of Ransomware to Find Similarities on PE File Metadata   Nov 2020 - Jul 2021
- Identified a unique list of suspicious indicators on the generated Portable Executable (PE) file metadata of 727 active ransomware samples based on the exploratory data analysis tasks and our domain knowledge.
- Applied One-Class Classification techniques on several feature spaces, including Imports, Libraries, and PE Sections, to find out the similarities and achieved 10.04% of testing error with the Local Outlier Factor algorithm.

I/O Request Packet (IRP) Logs Driven Ransomware Detection   Mar 2020 - Sep 2020
- Extracted data-driven encryption patterns through IRP, a low-level file system I/O logs, to detect unseen ransomware samples within 15 mins of execution (testing error of 6.25%) by using One-Class SVM algorithm.
- Constructed Neural Networks architecture using Keras to effectively detect IRP logs of 21 ransomware families and achieved accuracy, precision, recall, and F_1 scores in the range of $99.7\% \pm 0.2\%$.

Adversarial Machine Learning on network-based Intrusion Detection System   Sep 2019 - Jan 2020
- Developed a Multilayer Perceptron (MLP) using Keras for an improved intrusion detection system (target) to launch the model evasion attack by sending adversarial network packets, crafted from the Jacobian-based Saliency Map method.

Parallelization of RSA Encryption Algorithm in High Performance Computing   Jun 2019 - Aug 2019
- Demonstrated significant performance improvements of the parallel implementation of RSA algorithm by using the OpenMP library comparing with its serial implementation (achieved 4.4 speed up with 8 threads).

SKILLS

Proficient with: Python, Object Oriented Program, Full Stack Web Development, Git, Agile, Problem Solving in C/C++, MySQL, SQLite, Matplotlib, Scikit-learn, Network Analysis, and Software/Technical Documentation.
Familiar with: Android App Development, PHP, RESTful API, Software Design Patterns (e.g., MVC), and Cloud Computing.

HONORS AND AWARDS

- Best poster in the 2021 Student Research and Creative Inquiry Day (CS Graduate Track) at Tennessee Tech University.
- Represented (50+) Graduate Students in the Computer Science Strategic Planning Core Group during Spring 2021.

LEADERSHIP

President of the Computer Science Graduate Student Club at Tennessee Tech   Sept 2019 – Aug 2021
- Organized bi-weekly seminars to promote research environment and enable the club members to network and exchange ideas.

CERTIFICATION

- **Data Analysis and Visualization (Python)**, issued on Jun 2020 by Udemy.
- **Sequences, Time Series, and Prediction**, issued on Jun 2020 by DeepLearning.AI.
- **Neural Networks and Deep Learning**, issued on Feb 2020 by DeepLearning.AI.
- **Machine Learning A-Z: Hands-on Python & R in Data Science**, issued on Jun 2019 by Udemy.