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Education

- **CISPA – Helmholtz Center for Information Security, Germany**
Ph.D. in Computer Science February 2021-present
- **University of Nevada, Reno** 4.0/4.0
M.Sc. in Computer Science and Engineering December 2020
- **Bangladesh University of Engineering & Technology** 3.24/4.0
B.Sc. in Computer Science and Engineering February 2017

Selected Publications

- **The Call Graph Chronicles: Unleashing the Power Within (ESEC/FSE 2023)** Masudul Hasan Masud Bhuiyan
- **SecBench.js: An Executable Security Benchmark Suite for Server-Side JavaScript (ICSE 2023)** Masudul Hasan Masud Bhuiyan, Adithya Srinivas Parthasarathy, Nikos Vasilakis, Michael Pradel, Cristian-Alexandru Staicu
- **Be SMART, Save I/O: A Probabilistic Approach to Avoid Uncorrectable Errors in Storage Systems (IEEE Cluster 2022)** Masud Bhuiyan, Md Arifuzzaman, Engin Arslan
- **Machine learning for data transfer anomaly detection (SC 2020)** Sarah Cooper, Masud Bhuiyan, and Engin Arslan

Research Experience

- **Advancing JavaScript Call Graph Accuracy with Graph Neural Networks** Innovated Graphia, an advanced call graph generation approach utilizing Graph Neural Networks to combine structural and semantic insights, significantly boosting the performance of JavaScript call graph generation. Spearheaded the development of Graphia, enhancing program understanding and analysis in dynamic languages like JavaScript by effectively integrating code structure and context.
- **Server-Side JavaScript Benchmarking with SecBench.js** SECBENCH.JS is the first comprehensive benchmark suite for npm vulnerabilities, featuring 600 realistic exploits and fixes, significantly advancing techniques for detecting and mitigating security threats in the world's largest software ecosystem. Identified and reported 20 zero-day vulnerabilities, contributing to the enhancement of npm package security and showcasing expertise in vulnerability analysis.
- **Quantifying CPU based DoS attack in Web Servers** We proposed new metrics to quantify the effect of CPU-based DoS attacks under different attack scenarios. We tested our methodology in five different popular web frameworks and deployed our system on AWS, Azure, Heroku, and DigitalOcean.
- **Bottleneck Detection in End to End Data Transfer** In this work we developed a framework to find out the root cause of performance bottleneck in end to end transfer for HPC systems. Our framework use system, network, and storage level statistics to develop a machine learning model which can identify the source of failure.

Professional Experience

- **CISPA – Helmholtz Center for Information Security** Germany
Security Researcher February 2021 - Present
 - Developed an open-source vulnerability benchmarking test suit for Nodejs.
 - Modeled and implemented a framework to quantify and thwart CPU-based DoS attacks in popular web frameworks.
- **University of Nevada, Reno** Reno, Nevada
Graduate Research Assistant January 2019 - December 2020
 - Developed an automated module to detect bottlenecks in HPC systems in real-time.
 - Developed a probabilistic integrity verification system for end to end file transfer.
 - Developed an automated framework to detect anomalies in HPC systems by analysing system log files in real-time.

- **Ridmik Limited** Dhaka, Bangladesh
Software Engineer *September 2018 - December 2018*
 - Developed one of the flagship products of the company named “Ridmik News” as a part of the android team.
 - Contributed to the full mobile application development lifecycle from planning, requirement gathering, development, testing and launching on Google play store for beta testing.
 - Developed the database wrapper functions for data staging and modeled the data objects relevant to the mobile application.
- **REVE Systems** Dhaka, Bangladesh
Software Engineer *March 2017 - August 2018*
 - Worked as a part of android team to define and implement solutions for VOIP dialer.
 - Designed and implemented accessibility services, customized UI, referral system using Branch.io for android application.
 - Increased efficiency of the Phonebook and IM modules by almost 2x.

Projects

- **Anomaly Detection in HPC systems**
 Developed an automated framework to detect anomalies in HPC system by analysing the log files in real-time. This system analyses log files of previous transfers of a HPC center using a machine learning model.
- **Screen Reader for Visually Impaired People**
 Built a screen reader application in android operating system using custom TTS Engine. We used Google Talk Back service for our application. We developed customize applications like pdf reader, word document reader, etc with android accessibility feature.
- **Lifetime Calculation on Smart Hard Drive Data**
 Various SMART features were extracted from hard drives and used to predict the life span of a hard drive using Random Forest. The project was implemented in Python.
- **Embedding Self Signed to Remote Server**
 Developed a program that creates a self-signed certificate for a website using OpenSSL and embeds the certificate to a remote server by adding the certificate to trusted CAS list.
- **Mobile Money Transaction Automation System in Android**
 Designed and developed an automated system for mobile money transactions. Using this system users can recharge through any mobile operator or mobile wallet like bKash from the dialer. This system was implemented in android operating system.
- **Softphone Development**
 Developed customized softphone application for Reve Systems. Developed features like custom notification, custom view, battery and performance optimization, location sharing, code management, etc.
- **The Guardian Angels**
 Built a system to help women to protect themselves against violence. I worked on the mobile version of the app. Designed the UI and implemented the API functionalities. I also worked as the team leader. The system was implemented using Android, PHP, MySQL.

Skills Summary

- **Languages** Python, Java, C++, C, SQL, Bash
- **Library** Pytorch, Keras, Scikit-learn, Hugging Face, Tensorflow, Ray, Modin, Pandas, NumPy, SciPy, Matplotlib, Scikit-learn, NLTK
- **Tools** GIT, PostgreSQL, MySQL, SQLite, FTK Imager, Magnet AXIOM, Autopsy
- **Platforms** Linux, Web, Windows, Arduino, AWS, GCP

Achievements

- **1st Runner-Up** 2014
Battle of Speed, National Robotics Festival, Bangladesh
- **2nd Runner-Up** 2012
CSE Fest Robotics Championship, Department of CSE, BUET
- **Semifinalist** 2016
Telenor Youth Forum
- **Semifinalist** 2017
Urban Innovation Challenge, Brac, Bangladesh