Dhruv Rauthan

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Research Interests

Software Defined Networking, Network Security

Education

Georgia Institute of Technology, Atlanta   Aug. 2023 – Present
Master of Science in Computer Science   4/4 GPA

Birla Institute of Technology and Science Pilani   Aug. 2019 – June 2023
Bachelor of Engineering in Computer Science   8.7/10 CGPA

Research Experience

Real-time Darknet Detection | *Prof. A. Dainotti* ↗   Oct. 2023 – Present

- Modified FreeBSD's IPFW kernel files to to automatically identify inactive addresses within a network-including the functionality of addition, lookup and deletion of individual network addresses in dynamic rules
- Translated SDN controller code for IPv4 and IPv6 inactive packet detection to C++ using BareFoot Runtime APIs, improving performance by 90%

Assessing Georgia Tech's Network Vulnerabilities | *Prof. P. Pearce* ↗   Oct. 2023 – Dec. 2023

- Conducted Nmap port, service and application version, OS and protocol scans on the university network to identify active open services and known existing vulnerabilities
- Collected data from external Censys scans and compared findings with internal scans

**SiegeBreaker2** | *Prof. S. Chakravarty* ↗ , *Prof. V. Naik* ↗   Feb. 2022 – Aug. 2023

- Designed improvements over an existing SDN decoy routing system which included setting up a SmartNIC on a CDN edge server, utilising the new Encrypted ClientHello and using Docker instances to relay requests between the user and a blocked website
- Developed a custom proxy with stunnel to encrypt and encapsulate TCP segments

Thesis: Covert Channels in SD-WANs | *Prof. S. Schmid* ↗   Aug. 2022 – Jan. 2023

- Worked as a research intern at Technische Universität Berlin
- Set up an open-source SD-WAN flexiWAN on AWS and exploited timing differences in branch authentications and tunnel reconfigurations to exchange covert information between hosts in separate LANs

Sugamyata | *Prof. S. Joshi* ↗   Jan. 2022 – May 2023

- This project aims to contribute to the work of accessibility education in India
- Involved in preparation of academic and industry surveys to gauge the importance given by professionals to accessibility related topics
- Analyzed data taken from a software engineering course to understand the impact of accessibility education on student outcomes

Evaluation of Cloud Storage on Edge | *Prof. A. Trivedi* ↗ , *Prof. V. Naik* ↗   Jan. 2022 – Nov. 2022

- Deployed a Cassandra node cluster in a collection of virtual machines using an open-source framework
- Analyzed the effect of changing latency between network links during read/write operations to the database while also varying Cassandra's replication factor and consistency level

Offline Payment Protocol | *Prof. V. Naik* ⌞   Aug. 2021 – Jan. 2022
- Developed software which enables point-to-point monetary (CBDC) transactions with the use of authorised hardware (TEE) in mobile devices
- Implemented the Registration and Transaction protocols in the Offline Payment System "untrusted" framework through an Android application
- The purpose of the app was to provide an offline payment functionality which allowed users to make transactions even in the absence of the internet, by connecting to a local hotspot

Privacy in SDN based Networks | *Prof. V. Naik* ⌞   Jan. 2021 – May 2021
- Built software using Apache2 and OpenSSL to circumvent censorship agencies' firewalls by using ESNI and the concept of domain hiding
- Set up a proxy website on an Apache2 server used to relay requests between the user and a blacklisted domain

Professional Experience

Software Developer Intern   May 2022 – July 2022
NVIDIA ⌞   Pune, India
- Part of the CUDA Profiling Tools Interface (CUPTI) software team
- Optimized the CUDA Profiling Tools Interface library , improving performance by 10% in Activity, Callback and Event API callbacks
- Programmed automated performance benchmark tests using Docker container scripting, increasing the testing process efficiency for CUPTI overhead

Software Developer Intern   June 2021 – July 2021
Village Book Builders ⌞   Remote
- Built a Google Meet bot to automatically join, record and transcribe organization meetings, containerized and hosted on an AWS EC2 instance
- Created a browser extension to perform real-time translation in meetings using Microsoft Azure APIs
- Defined remote management protocols and guidelines for organization computers using SSH and Powershell

Android Developer   Apr. 2020 – Aug. 2020
Indiahaat ⌞   Delhi, India
- Developed end-to-end e-commerce Android app, which has been published in Google Play Store
- Implemented user authentication and cloud storage using Firebase, and local database with Room
- Integrated Google Maps API for displaying maps and routes in-app, and Razorpay API for payment processing

Teaching Experience

Graduate Teaching Assistant   Jan. 2024 – Present
CS 3251 Computer Networking

First Degree Teaching Assistant   Jan. 2023 – May 2023
CS F364 Design and Analysis of Algorithms

First Degree Course Mentor   Sep. 2022 – Dec. 2022
CS F314 Software Development for Portable Devices

Volunteer Experience

Project Lamani | *Teacher*
Took part in an initiative of Abhigyaan, a volunteer organization, and taught under-privileged primary school children in slums

Publications

P. Loganathan*, **D. Rauthan***, A. Trivedi and V. Naik, "Performance Measurement of Distributed Storage on Edge Devices" 2023 15th International Conference on COMmunication Systems & NETworkS (COMSNETS), Bangalore, India, 2023, pp. 841-846, doi: 10.1109/COMSNETS56262.2023.10041319

Awards

Research Scholarship Assistance | *Alumni Relations Cell* ⬈   2023

One of the three awardees of the scholarship for publishing an excellent research paper in a journal/conference. The applicants go through 2 rounds of screening to select the final awardees.