

EDUCATION

M.S. in Information Security **Carnegie Mellon University** **Aug 2022 – Dec 2023**

Coursework: Introduction to Comp Systems, Secure Software Development, Network Security, Mobile and IoT Security.

B.E. in Electronics **BITS Pilani** **Aug 2018 – May 2022**

Coursework: Network programming, Data Structures & Algorithms, 2 Research Publications.

Extra-curricular: Hockey Team Left Half, Volunteer Teacher, Punjab Cultural Association, Bhangra Team.

SKILLS

Forte: Systems, Networking, Machine Learning, Deep Learning, Security, Server Design,

Languages: C, C++, Python, MATLAB, LaTeX, HTML, Assembly language.

Tools: MobSF, Metasploit, WireShark, Tensorflow, Scikit-Learn Git, GitHub, Snort, VScode, Jupyter.

TECHNICAL EXPERIENCE

Network and Systems Intern **Samsung R&D** **July 2021 – Jan 2022**

System Automation and ML Log Analysis

- Worked on **ML-based log analysis** for **system fault detection** and post-mortem **root cause analysis**.
- Designed an **anomaly detection** system to monitor system background information and take pre-emptive action before hard failure. **Saved service teams 20 hrs/week** and completed implementation in stipulated 2 months deadline.

Research Project Assistant **BITS Pilani** **Jan 2021 – June 2021**

Mitigating DoS/DDoS Attacks in SDN Data Planes

- Surveyed and analyzed methods used to **detect and mitigate** Denial-of-Service (**DoS**) and Distributed Denial-of-Service (**DDoS**) attacks at **Data Plane** level in Software Defined Networks (SDN) using P4 language.
- Identified **limitations of P4** for attack detection and mitigation such as: No support for loops and for complex functions, and minimal support for mathematical analysis.

Research Project Assistant **BITS Pilani** **Jan 2021 – June 2021**

Intrusion Detection Systems for IoT (Link to Paper)

- Designed and implemented **network IDS for IoT** to overcome few design flaws of existing IDS. This design can detect 22 types of attacks with help of 3 ML based modules using **Random Forest, ANN, Decision Tree, and XGBoost**.
- Central Module used for attack detection & classification with F1 Score **94.41%**. One among two edge modules used for only attack detection at IoT edge with F1 scores of **99.98%** and **99.87%**.

PROJECTS

Ultra-fast URL Port Scanner **Link to Project**

- Scans URL open ports up to **10X faster** than traditional scanners by using up to 100 child scanners **concurrently**.
- The scanner also **lists all IPv4 and IPv6 addresses** allotted to each URL.

Concurrent TFTP Servers **Link to Projects**

- Created a TFTP single process server to handle multiple clients using **listen** call on multiple FDs. Speed: **~25 Mbps**.
- Created a TFTP **multi process server** to handle clients by spawning a child server for each client. Speed: **~50 Mbps**.

Simple Hadoop Implementation

- Replicated a simple of **Google File Storage** by creating client, data server and meta-data server. Client uploads files in chunks and **distributed data servers** stores 3 copies of each chunk to ensure **availability** in case of a server crash.
- All inter process communication for download, upload, permissions, and security is facilitated by the **meta-data server**.

Ultra Fast Trace-route **Link to Projects**

- A concurrent traceroute server for multiple domains to give results within **3 secs – 10X** faster than standard traceroute.
- A TCP client runs on a separate window to find **longest common routing path** among a given set of domains.