Raghav Rathi

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EDUCATION

Doctor of Philosophy in Computer Science · *Florida State University* *May 2020 – December 2024*

Master of Science in Computer Science - Cybersecurity Major · *Florida State University* *August 2017 – December 2019*

Bachelor of Science in Computer Science · *RGPV, India* *August 2012 – July 2016*

TECHNICAL SKILLS

Skills: Penetration Testing, Web Application Security, Malware Reverse Engineering, Digital Forensics, Static Analysis, Dynamic Analysis, Binary Exploitation, Cyber Forensics, Steganography, IDS/IPS, SEIM, DLP, Log Analysis, Fuzzing, NIST Framework, Cyber Risk Assessment, Signal Processing, Wireless Channel Analysis, Spectrum Analysis, RF Generator

Tools & Software:
-*Penetration testing & Network Security*: Burp Suit, Nmap, Tcpdump, Wireshark, Metasploit, John the Ripper, Hashcat, Hydra, EnCase, Sleuth Kit, FTK Imager, SQLMap, Kali Linux, Commando VM, Procmon, Process Explorer, Process Hacker, Ffuf, Dirb, DirBuster, Wpscan, Active Directory Domain.

-*Reverse Engineering*: IDA pro, Ghidra, radare2, GDB, GDBpeda, PwnTools.

Programming Languages: C, C++, MATLAB, Python, Arduino, SQL, MIPS, Git.

Other Tools: PyTorch, TensarFlow, Keras, Pandas, Docker, OpenCV.

Scripting Language: JavaScript, Bash, PHP, Powershell.

PROFESSIONAL EXPERIENCE

Research Assistant | Department of Computer Science, Florida State University *August 2019 – December 2024*

- Capture signals from Starlink satellites to analyze the channel used by them. Funded by NSF
- Improved the channel capacity by 1.66x of existing LoRa networks by increasing the nof confirmed traffic in downlinks.
- Improved the packet detection capability in LoRa networks by introducing a technique to detect collided packets in uplink by 2.46× over the state-of-the-art. Funded by NSF

RESEARCH AND ACADEMIC PROJECTS

- **StarAngle: User Orientation using StarLink Beacons (Published)** *September 2023 – July 2024*
  - Built a home brewed receiver using a KU band LNB and a software defined radio to capture beacon signals transmitted by Starlink satellites. Used 2 receiver antennas to capture signal and calculated user orientation using phase information.
- **2-Pipe: Simultaneous Downlink Transmissions in LoRa (Under Review)** *April 2022 – August 2023*
  - One of the very first research work done towards improving the overall LoRa channel capacity by enabling simultaneous transmission of the Downlink messages to the respective uplink messages from end devices in a confirmed traffic scenario.
- **TnB**: **Resolving Collisions in LoRa (Published)** *November 2021 – April 2021*
  - A novel algorithm that involves implementing Thrive and Block Error Correction Code to the existing LoRa protocol resulting in significant improvement in its performance without making any change to the LoRa End Nodes.
- **Intrusion Detection Using Deep Active Learning** *August 2019 – December 2019*
  - Applying Deep Active Learning to develop a Deep Neural Network which deals with the scarcity of labeled data and then applying Active Learning Techniques to optimize the model with an end goal of dealing with the problem of class imbalance with Labeled and Unlabeled data. Which in this case will the malware signature from a regular traffic.
- **Malware Classification and Detection using Data Mining** *August 2018 – December 2018*
  - Applying Data Mining techniques like Support Vector Machines, K-Nearest Neighbors and Random Forest to classify whether a signature generated by Cuckoo sandbox on a given file.
- **Implementing MTI Key Agreement Protocol** *August 2018 – December 2018*
  - Implemented MTI key agreement protocol to perform secure key exchange of a secret key generated from Miller-Rabin's primality test which was used to perform encryption comparison on AES with CBC and AES with EBC.

ACHIEVEMENTS AND INTERESTS

- Dean's Award for excellence in research and academics, 2023.
- Ted and Syauchen Baker Award for Excellence in Student Research, Fall 2023.
- Placed 1st in CyberCorps Division in 2023 JerseyCTF competition hosted by the NJIT.
- Part of FSU Cybersecurity team (Nol3ptr), currently in the top 50 in the USA.
- Soccer: Liverpool. Football: Jaguars.