



## Work Experience

**Centre for Development of Telematics (DoT, GoI) – Scientist 'B' (Software Developer and Architect)**

Jun'24 - Present

### National Scale Packet Processing Solution

- **Designed and developed** high-performance Data Plane Development Kit (**DPPDK**) & Vector Packet Processor (**VPP**) based **packet processing application (C based)** in single-box solution sustaining **400 Gbps Rx/Tx** at ISP gateway edges for **national network security enforcement** reducing rack-space cost.
- **Implemented DPI (C based)** to surface **eSNI** within UDP flows by parsing Initial ClientHello and TLS extensions via **nDPI** and integrated a **two-phase stateful pipeline** (a fast-path stateless step, followed by a deep inspection stage), maintaining per-flow state to **correlate packets** and trigger actions with minimal latency.
- Engineered end-to-end **DPI strategy and architecture**, expanding application coverage by **200%** leading to PoC acceptance by an **Inter-ministerial committee (GoI)**.
- **Optimized packet processing code** to leverage NIC offloads, pre-built packets, and batched Tx; achieving **10x throughput uplift** and **15x reduction** in CPU utilization.

### Corporate Security & Threat Intelligence

- **Deployed DNS Response Policy Zone (DNS RPZ)** across corporate DNS infrastructure in Delhi & Bangalore, blocking **thousands** of requests to blacklisted domains and known/listed C&C servers improving **corporate security posture**.
- **Designed and developed** highly optimized, large-scale crawlers for **Telegram** and **Reddit** using **Playwright/Python** (**70% improvement** over previous solution) to gather multi-format data for **threat intelligence** on various Darknet marketplaces enhancing cyberspace awareness.

**York University (Toronto, Canada) – MITACS Research Intern (AI-ML and Cybersecurity Researcher)**

Jun'23 - Aug'23

### Automated Intelligence-Driven Malware Detection and Analysis

- Implemented **Artificial Intelligence & Machine Learning techniques** like **information-gain selection** and **three-layer Random Forest** architecture plus **weighted score fusion core** for multi-source behavioural analysis over network flows and memory dump features.
- Developed an automated **Python + QEMU testbed** where one Windows 10 VM per sample (8 vCPU/8 GB RAM) is “aged” for one week to defeat sandbox evasion, then 2000 malware samples are executed across 8 families, generating a **17TB database** of pcaps and memory dumps.
- Performance: L1 (network binary) macro **P/R/F1 ≈ 0.96/0.96/0.95**; L2 (network family) **macro F1 = 0.98** with ~15% Unknown; L3 (memory family) **macro F1 ≈ 0.98**.

### VolMemLyzer-V2

- **Designed and developed** a feature extractor tool - **VolMemLyzer(V2)** (**Python based**) with **250+** supported **Memory Analytics Features** (compared to <75 in V1) using **Volatility3** framework to provide in-depth memory forensics capabilities.
- **Implemented** modular pipeline which reduces processing duration of stored memory snapshots by **20–30%**, and producing CSVs for downstream **Machine Learning**.

**WhizHack Technologies – Security Consultant (Cybersecurity Intern)**

Nov'22 - Dec'22

- Contributed to the **Operational Technology (OT)** security module by implementing **standards (RFC 5424/5425)** for their next-gen SIEM system, TRACE.
- Designed and deployed **3 customized honeypots** for increased efficacy using **CONPOT**, implemented within **containerized Docker environments**.

**Microsoft Cybersecurity Engage 2022 – Mentee (Cybersecurity Intern)**

May'22 - Jul'22

- **Ranked 1st (All India)** on the program leaderboard based on performance in assignments and final project on defending **Critical Infrastructure** (chose **Delhi SLDC**, Electricity DISCOM Infrastructure) from Stuxnet-like cyber-attacks.
- Conducted **OSINT** and identified 10 most probable **attack vectors**, proposing a comprehensive **Solution Architecture** with 15 **security controls/policies** to minimize the attack surface and implement Defence-in-Depth/Zero Trust principles, alongside incident response and legal considerations.
- Presented 5 functional prototypes/PoCs, including **Machine Learning model** to detect botnet attacks, building **enumeration tools** from scratch, etc.

## Technical Skills, Corporate Trainings & MOOCs

		♦ Corporate Trainings	♦ MOOCs
Programming/Scripting	C/C++, Python, Bash, PowerShell, JAVA, MATLAB		♦ Hacking Android, iOS, and IoT apps by example by c0c0n
Cybersecurity Tools/ Application Security	Volatility, Metasploit, Wireshark, NMap, YARA, BurpSuite, Autopsy, Splunk, Suricata, Frida, Magisk, Xposed, JadX, R2	Trainings/ MOOCs	♦ High Perf. Computing & Linear Prog. by IISc Bangalore*
AI-ML Techniques	CNN, RNN, Random Forest, XGBoost, SVM, KNN, PCA		• Introduction to Digital Forensics by Security Blue Team
Network Software Development	Data Plane Development Kit, Vector Packet Processor, nDPI, BGP, DNS RPZ, QUIC, TCP, DNS, ICMP, OSI Model	CI/CD Tools	• Data & Tools for Defense Analysts by Splunk STEP
			* Under Training

## Education & Certification

Degree	Institute	Grade	Remarks	Year
B. Tech. (CSE)	Indian Institute of Technology, Jodhpur	7.88/10.0	Institute Silver Medal	2020-2024
AISSC (Class XII)	Army Public School, Birpur	93.80%	Top 0.1% nationally	2018-2019
AISSE (Class X)	Army Public School, Birpur	10.0/10.0	School Topper	2016-2017
Certifications		Issuing Body	Year	
Certified Ethical Hacker v13 (Training Completion Certificate)		EC Council	2026*	
CompTIA Security+ (SY0-701)		CompTIA	2025	
Certified in Cybersecurity		ISC2	2024	
Google Professional Cybersecurity Certificate		Google	2023	

\*Employer Sponsored (Exam Pending)

## Publications

[Unveiling Evasive Malware Behavior: Towards Generating a Multi-Sources Benchmark Dataset and Evasive Malware Behavior Profiling Using Network Traffic and Memory Analysis](#) | The Journal of Supercomputing (Springer)

## Achievements

- Received **Student Distinguished Services Award** and **Institute Silver Medal** for my contributions to Student Senate IITJ in AY 2022-23.
- Contingent Leader of 150 IIT-J students in the 55<sup>th</sup> INTER IIT SPORTS MEET 2022; personally led Runner-Up awardee **Best Marching Contingent** at IIT Delhi.
- Achieved **All India Rank 1** in Microsoft Cybersecurity Engage 2022.
- **State Rank 3** (Uttarakhand) in NSTSE-2019 conducted by Unified Council.

## Position of Responsibilities/Recognition

C-DOT	• Led the core <b>DPI track</b> (3 members including interns) of National Scale Packet Processing Solution. • <b>Highest KRA</b> points of all <3 YoE team members in National Scale Packet Processing Solution Team.
IIT Jodhpur	• Vice-President of <b>Board of Student Sports</b> (Highest student position in sporting fraternity of IITJ); headed investments and events worth <b>2.1 Cr (INR)</b> successfully with 95% budget utilization expanding from just 9 to 15 societies/clubs, which <b>tripled</b> student engagement. • Spearheaded successful events like <b>VARCHAS</b> (Inter-College), <b>KRIDANSH</b> (Inter-Hostel), etc; leading 100s of students hierarchically. • Bagged <b>4<sup>th</sup> position</b> out of 23 IITs; leading a team of 4 members in INTER IIT TECH MEET 12.0 in Cybersecurity PS at IIT Madras.