

ZAED RIZWAN

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PROFILE SUMMARY

M.Tech student focused on Cryptography and Post-Quantum Cryptography, with research experience in designing and implementing post-quantum secure cryptographic protocols and applying formal verification techniques. Currently developing authentication and dynamic membership protocols for military UAV swarms using NIST-standardized post-quantum primitives. Hands-on experience in web application security, with broader research interests in protocol design, formal verification, and next-generation cybersecurity.

MS THESIS

Post-Quantum Secure Dynamic Membership of Autonomous Military UAV Swarms using Merkle Patricia Trie (*Under Review*)

National Institute of Technology Karnataka, Surathkal, Mangalore

- Designed a post-quantum secure authentication and dynamic membership protocol for military UAV swarms using a Merkle Patricia Trie, supporting join, leave, and revocation with forward/backward secrecy via NIST-standardized primitives (ML-KEM, ML-DSA).
- Verified protocol security across three independent layers - computational proofs, BAN logic, and Tamarin Prover.
- Implemented and benchmarked the protocol on embedded hardware and simulated UAV swarm network behaviour using ns-3, validating feasibility for real-time UAV deployment under realistic communication conditions.

EDUCATION

National Institute of Technology Karnataka, Surathkal

Aug 2025 - Jun 2027

Master of Technology in Information Technology

CGPA: 8.59 / 10.0

Dayananda Sagar College Of Engineering, Bangalore

Jul 2020 - Jun 2024

Bachelor of Engineering in Computer Science Engineering

CGPA: 7.66 / 10.0

RESEARCH PROJECTS

Knowledge-Aware Graph Prompt Learning System for Cross-Domain Recommendation [Link](#)

- Built a cross-domain recommender using PyTorch/DGL with TransE and GAT, introducing adaptive prompt scaling and scalable training over 923K+ nodes.

Real-Time Attack Detection and Priority-Based Synchronization Control for Networked Systems Under Cyber Threats [Link](#)

- Designed a cyber-attack detection and synchronization control system for dynamical networks using ODEs, graph theory, and LMI-based optimization.

Semantic Video Shot Detection and Keyframe Extraction using CLIP Embeddings [Link](#)

- Developed a CLIP-based video understanding pipeline for shot detection and keyframe extraction using embedding similarity and clustering methods.

Skin Lesion Classification using Deep Learning with Attention Mechanisms [Link](#)

- Built a CNN-based skin lesion classifier on the HAM10000 dataset using CBAM attention and Focal Loss to achieve robust multi-class classification across 7 disease types.

Adaptive Multi-Tier Compression Middleware for MPI Collectives [Link](#)

- Built an MPI middleware with adaptive compression and pipelined communication overlap, reducing network overhead and accelerating collective operations in HPC clusters.

PROFESSIONAL/INDUSTRY EXPERIENCE & INTERNSHIPS:

Teaching Assistant, National Institute of Technology Karnataka, Surathkal, Mangalore

Aug 2025 - Present

- Assisting faculty in conducting tutorials, grading assignments, and guiding students in coursework
- Supporting laboratory sessions and helping students understand core concepts in Information Technology.

Project Intern - IBM, India

Jan 2023 - March, 2023

- Worked on the SSH Password-less Authentication project under the IBM mentors.
- Utilized Shell scripting, RSA key-pairs, and a Bash script to enable user login to a remote server without password authentication.

Cybercrime Investigator Intern - Slytherin Edutech Pvt. Ltd., Ranchi, Jharkhand

Oct 2022 - Nov 2022

- Performed digital forensics using tools such as Magnet AXIOM, FTK, Volatility, Wireshark, and Autopsy for evidence acquisition and analysis.

- Conducted mobile, image, and location-based forensic investigations, including analysis of real-world OTP fraud cases through log and network tracing.

CERTIFICATES & COURSES

- TryHackMe Jr. Penetration Tester (2023)
- NPTEL Ethical Hacking (2023)
- TCM Security Practical Ethical Hacking (2023)
- Udemy Complete Full-Stack Web Development Bootcamp (2026)
- Udemy Learn Bug Bounty Hunting & Web Security Testing from Scratch (2023)

ACADEMIC ACHIEVEMENTS

- Secured 3rd place in the Quantum-Safe RF Communication Hackathon at the 515 Army Base Workshop, competing on secure communication and cryptography-focused challenges. (4th Apr 2026)
- Ranked within the top 2% globally on TryHackMe through consistent performance in cybersecurity and hands-on security challenges. (Dec 2023)
- Achieved 59th rank among 22,000+ participants in the GET SET HACK Hackathon organized by RISE. (28th Aug 2022)

TECHNICAL SKILLS

- **Programming:** C/C++, Python, SQL, Bash, Java
- **Cryptography & Security:** ML-KEM, ML-DSA, Tamarin Prover, Burp Suite, Wireshark, Magnet AXIOM, FTK, Volatility
- **Machine Learning & Data Science:** CNN, GATs, CBAM, TransE, PyTorch, CLIP
- **Systems & Development:** PostgreSQL, Git, Linux, MPI, NS-3