

MIHIRRAJ DIXIT

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OVERVIEW

A seasoned professional with 5+ years in software and security research, including 2+ years as a full-time Software R&D Engineer for cloud-native telecom applications and 3+ years as a part-time researcher in cybersecurity for Industrial IoT/Smart Grids and LTE/5G. Proven expertise in privacy, security, and software, with a track record of solving complex challenges in the cloud, AI, and big data platforms to develop innovative solutions. Published more than 4 research papers in top conferences and 3 granted patents amongst 10 published in the past 5 years.

EDUCATION

Master of Science in Computer Science (Focus: Cybersecurity) Oct 2021 - Jul 2024

Universität des Saarlandes, Saarbrücken, Germany

Thesis: Evaluating Privacy Leaks in Smartphones through Multi-Protocol Linkage

Bachelor of Technology in Electronics & Telecommunication Engineering Jul 2015 - Jun 2019

Veermata Jijabai Technological Institute (VJTI), Mumbai, India (NIRF Rank: 71st, 2020)

Thesis: Securing Critical Infrastructure Using Blockchain

TECHNICAL SKILLS

Programming: Python (4+ years), Bash/Shell Scripting (3+ years), MATLAB, C, C++, Go

Cloud & Networking: Docker, Kubernetes, Apache Airflow, Apache Spark, Swagger, Apache Kafka, RedFish API, OpenStack, Helm, RabbitMQ, Keycloak, Virtual Switches/Routers, NFV/SDN, Git, SonarQube

Web & Databases: Javascript, NodeJS, MySQL, Redis, MongoDB, Flask, Django, FastApi, Socket programming

Security Tools: Nessus, Burpsuite, Wireshark, Metasploit, Nmap, Netcat, Ettercap, GDB, Scapy, Aircrack, Hashcat

IoT & Wireless: USRP B210/X310, Amarisoft Callbox/Simbox, srsRAN, open5GS, Mitsubishi Melsec iQ-F PLC, PMU

Operating Systems: Linux (Ubuntu, Kali, ParrotOS, ArchLinux), Windows OS, MacOS, Android

WORK EXPERIENCE

RPTU Kaiserslautern, Germany (Research Assistant) Feb 2023 - ongoing

Chair of WiCON: Guide - Prof. Dr. Hans Schotten

- Investigating vulnerabilities in the O-RAN Y1 interface and *proposing a secure architecture* as per the ETSI Standards.
- Surveyed various physical layer authentication mechanisms to propose authentication schemes that surpass existing 5G schemes.

CISPA Helmholtz Center, Germany (Thesis Researcher) Aug 2023 - Jul 2024

Chair of Wireless Security: Guide - Dr. Mridula Singh | Chair of Privacy: Guide - Dr. Wouter Lueks

- Reverse engineering the LTE/5G, WiFi, and Bluetooth protocols to demonstrate multiple security & privacy vulnerabilities.
- Constructed a **Python-based software simulation toolkit**, implemented optimized algorithms, and leveraged Python/C++ libraries to analyze the privacy leakage of more than 1000 smartphone users.

DFKI & Saarland University, Germany (Research Assistant) May 2022 - Dec 2022

Chair of Business Informatics: Guide - Prof. Dr. Wolfgang Maaß

- Conducted literature reviews to guide architecture, identify key issues, develop business models, & analyze MaaS use cases in Saarland.

Rakuten Mobile, Japan (Software Research & Development - Tech Lead) Oct 2019 - Oct 2021

- Designed and developed cloud-native RAN/OSS applications* for production systems, conducting rigorous performance and scalability tests, which led to accelerated deployments and high-performance applications.
- Led the creation of an ETSI-ZSM-compliant *cloud-native data stream processing engine* with complex event processing (CEP) and multi-hierarchical closed-loop feedback for correlation and policy enforcement. Utilized an event bus for data partitioning and an in-memory database with fast caching, along with efficient Python and Rust libraries, to create a fault-tolerant, stateless, and scalable system handling 5k events/sec/core, scaling to 110,000 events/sec in tests.
- This solution, combined with a designed hierarchical life-cycle manager, enabled *closed-loop automation* for cloud-native 5G components, facilitating *real-time threat intelligence, intrusion detection & prevention, and fault management*.
- Constructed Helm charts and Docker images for production-ready systems, integrating them with CI/CD pipelines for 5G slicing.
- Created Python & shell scripts* for streamlined management of bare metal servers, covering provisioning, configuration, and life-cycle management while automating rule-based server detection and hardening OS for secure cloud deployment.
- Key contributor to the core development* of Internal Virtual Network Function Manager (IVNFM) for 4G vRAN, reducing deployment time from days to 5 minutes with a multi-tier system and implementing Keycloak for enhanced IAM security to bolster cloud-native apps.

- **Configured** network devices/firewalls/switches/routers and set up a test bed for cyber-physical critical infrastructure, significantly reducing research setup time. Conducted **penetration tests** on Industrial Control Systems (SCADA & DCS) using various security frameworks and custom scripts, showcasing security expertise to research organizations, investors, and vendors.
- **Formulated** a custom voting-based blockchain consensus algorithm for accurate decision-making in decentralized environments, enhancing threat prevention for Smart Grid and energy-efficient systems.
- **Implemented deep packet inspection** and created custom protocol decoders/Python scripts for analyzing vulnerabilities in IEEE C37.118, DNP3, and Modbus Protocol, revealing 0-day attacks in the system protocols.
- Contributed to **developing an artificial immune system** for anomaly detection in SCADA/DCS networks.

PriceWaterhouseCoopers (PWC), India (Technical Consulting Intern)

May 2018 - Jul 2018

- Engineered a Xamarin Android app with swift registration and one-tap login & built a ticketing tool, enhancing client efficiency.

Bharat Petroleum Co. Ltd., India (Security Analyst Intern)

Dec 2017 - Jan 2018

- Conducted risk assessments and vulnerability discovery and investigated SIEM systems, fostering security awareness across the organization.

ACHIEVEMENTS

- 2018 - 2019: Blockchain Hackathon (**Winner**); Siemens Hackathon (**1st Runner-up**); Mitsubishi Electric Cup (**5th rank**).
2010 - 2019: International FIDE Rated Chess Player with **ELO Rating: 1713**; Achieved victories in 50+ chess tournaments.
2009 - 2011: State Talent Search Exam (**Special Prize**) 2011; National Drawing Exam (**Grade A**) 2009 & 2011.

INNOVATIONS

Relevant Patents:

1. Non-deterministic finite automata tree structure application, **US Patent Grant No. 12040945**, 16th Jul 2024.
2. Event-driven Enhancement of Event Messages, **US Patent Grant No. 12020197**, 25th Jun 2024.
3. Static and dynamic non-deterministic finite automata tree structure application, **US Patent Grant No. 11563625**, 24th Jan 2023.
4. Correlation engine and policy manager, method and product, US Patent App No. 17575975, 20th Jul 2023.
5. Policy-driven event transformation, US Patent App No. 17574552, 13th Jul 2023.
6. Data Storage System with Power Consumption Efficiency and Methods, US Patent App No. 17455921, 25th May 2023.
7. Logic-gate based non-deterministic finite automata tree structure application, US Patent App No. 17511558, 06th Apr 2023..
8. Multi-layered correlation policy management apparatus and method, US Patent App No. 17505631, 26th Jan 2023.

Relevant Publications:

1. CrossLink: Breaking Location Privacy by Linking Device Identifiers Across Protocols (In Progress - **A* Conference** 2025)
2. Survey on Hardware-based Physical Layer Authentication in Next Generation Networks, VDE-ITG MKT, 2024.
3. A Comprehensive Study on Non-Poisoning Based Backdoor Attacks in Deep Learning, Seminar Paper, 2023.
4. Blockchain and Anomaly Detection based Monitoring System for Enforcing Wastewater Reuse, ICCCNT, **IEEE** 2019.
5. Blockchain-based Distributed Consensus for Byzantine Fault Tolerance in PMU Network, ICCCNT, **IEEE** 2019.
6. A Computational Intelligence Approach for Cancer Detection Using Artificial Immune System, **Springer** 2018.

RELEVANT COURSEWORK

Graduate Coursework: Security, System Security, Data Networks, Security Testing, Cryptography, Web Security, IT Forensics, Physical Layer Security, Distributed Systems, Machine Learning Security, Blockchain & Decentralized Finance

Undergraduate Coursework: Computer Programming, Data Structures, Statistical Theory, Digital Signal Processing, Wireless Sensor Networks, Pattern Recognition, Mobile Communication, Satellite Communication, Embedded Systems

Other Courses/Certifications: 5G Specialization, Hardware Security, Cloud Platform Fundamentals, Penetration Testing & Ethical Hacking, Machine Learning, Blockchain Specialization

LANGUAGES

English (C1, Native) • Japanese (N4) • German (A1.1) • Hindi (Native) • Marathi (Native)