

# MIHIRRAJ DIXIT

*Design, Build, Hack, Repeat*

@ [mididi00001@stud.uni-saarland.de](mailto:mididi00001@stud.uni-saarland.de)  
☎ +49-1520-961-0208

📄 [github.com/MihirrajDixit](https://github.com/MihirrajDixit)  
in [linkedin.com/in/mihirraj-dixit](https://www.linkedin.com/in/mihirraj-dixit)

📍 Saarbrücken, Germany  
🌐 <https://mihirrajdixit.me>



## ABOUT ME

Skilled researcher with 4+ years of diverse experience in Industrial IoT, Telecommunications, & Computer Science, complemented by another 2+ years as a strategic planning in a professional environment. Possesses a strong background in OT security, LTE Physical Layer Security, Big Data Processing Platforms, Cloud & Software Development Lifecycle.

## EDUCATION

### Universität des Saarlandes

*Master of Science in Computer Science: Specialization in Cybersecurity - Sem 5*

(Major Affiliations of University: CISPA (Hemholtz), MPI-INF, MPI-SWS, DFKI)

Saarbrücken, Germany

*Oct 2021-ongoing*

### Veermata Jijabai Technological Institute (VJTI)

*Bachelor of Technology in Electronics and Telecommunication Engineering*

(Institute Ranked **71st** by NIRF, Govt. of India, 2020)

Mumbai, India

*Jul 2015 - Jun 2019*

#### POSITION OF RESPONSIBILITY:

- Mentor at VJTI IEEE Council 2017-2018, VJTI, Mumbai
- Event Manager (Chess) at Enthusia 2016-2017, National Level Sports Festival, VJTI, Mumbai

### PACE Science Junior College(HSC) - *Intermediate*

*Maharashtra State Board of Higher and Secondary Education — Percentage: 91.54%*

Mumbai, India

*Passing: 2015*

### Balmohan Vidyamandir(SSC) - *Matriculation*

*Maharashtra State Board of Higher and Secondary Education — Percentage: 91.27%*

Mumbai, India

*Passing: 2013*

## SCHOLASTIC ACHIEVEMENTS

### • Hackathons:

- **Winner(1<sup>st</sup>)** amongst 200+ Teams in Global WRC Blockchain Hackathon by World Bank Group, 2019
- **2<sup>nd</sup> Runner Up** amongst 300+ Teams in Siemens MakeIT Real Hackathon, 2018
- **5<sup>th</sup> Appreciation Prize** of 200 Teams in 3rd Mitsubishi Electric Cup, National Level Automation Competition, 2018 [🔗](#)

### • Sports Activities:

- International FIDE Rated Chess Player with **Rating: 1713** [🔗](#): Won prizes in more than 100+ Tournaments
- Achieved San QUE, Brown 3<sup>rd</sup> Belt through GO-JO-RYU of KARATE, from Fudoshin Martial Arts School, Mumbai.

### • Academic:

- Passed 日本語 NAT-5Q exam with first class grade, 2020 — Completed JLPT N3 Training, 2021
- Secured **98.50 percentile** in Joint Entrance Examination Mains (B.Tech) '15 out of 1.4 million candidates conducted by CBSE under Ministry of Education
- Qualified for Award for Scholarship for Higher Education (SHE) under Innovation in science pursuit for Inspired Research (INSPIRE), 2015
- Awarded **Special Prize** in Maharashtra Talent Search Examination by Center for Talent Search and Excellence, 2011.
- Awarded **Certificate of Merit** in Dr. Homi Bhabha Bal Vaidnyanik Competition conducted by Mumbai Teachers' Association held in 2009 & 2011.
- Awarded **Grade A** in Elementary(2009) & Intermediate(2010) Grade Drawing Examination by Government of Maharashtra.
- **Silver Medalist** in Maths Pradnya Examination conducted by Maharashtra Ganit Adhyapak Mandal held in 2007 & 2010.
- Amongst **top 10 ranking** in Maharashtra State Scholarship conducted by Maharashtra State Board Pune held in 2007 & 2010

## RESEARCH EXPERIENCE

---

### Wireless Security Group

Master Thesis Student - Chair of Dr. Mridula Singh [🔗](#)

CISPA, Saarbrücken

Jul 2023 - ongoing

#### Key Projects:

- **Privacy leakage in LTE:** Dec 2023 - ongoing
  - \* To identify linkability in data obtained by sniffing LTE signals and to reveal privacy vulnerabilities in the mobile network.
- **Study of timing manipulation attacks in cellular networks:** Jul 2023 - ongoing
  - \* To understand the vulnerabilities that come with time & frequency-based synchronization in cellular networks and appreciate the implications of exploiting these vulnerabilities.
  - \* **TechStack:** USRP B210, USRP X310, srsRAN, Open5GS, LTESniffer

### Wireless Communication & Navigation(WiCoN) Team

Research Assistant - Chair of Prof. Dr.-Ing. Hans D. Schotten [🔗](#)

RPTU, Kaiserslautern

Feb 2023 - ongoing

#### Key Projects:

- **6G-ANNA(Access, Network of Networks, Automation & Simplification) [🔗](#):** Feb 2023 - ongoing
  - \* Project concept: To develop a holistic design for the sixth generation of mobile communications that includes a closed end-to-end architecture, network inter-connectivity with focus on security and resilience.
  - \* My tasks in present phase typically include designing authentication and encryption mechanisms on physical layer to minimize the current overhead and offer superior alternatives to existing 5G schemes.

### Smart Service Engineering Team

Research Assistant - Chair of Prof. Dr. Wolfgang Maaß [🔗](#)

DFKI & UdS, Saarbrücken

May 2022 - Dec 2022

#### Key Projects:

- **INTE:GRATE [🔗](#):** May 2022 - Dec 2022
  - \* Project concept: Researching the mobility data space in Saarland in order to realise the intelligent and sustainable concept of MaaS for the region.
  - \* My tasks for the work package typically included literature review for the system architecture, problem identification and business models, finding use-cases for analysis of mobility data.

### Centre of Excellence (CoE) in Complex Nonlinear Dynamical Systems(CNDS)

Research Assistant under Guide: Prof. Dr. Faruk Kazi [🔗](#)

VJTI, Mumbai

Apr 2017 - Jun 2019

#### Key Projects:

- **Blockchain based monitoring system for enforcing wastewater reuse [🔗](#):** Jan 2019 - Jun 2019
  - \* Designed and developed a token based system that incentivizes the amount of wastewater reused by industries.
  - \* Used Hyperledger Fabrics & Composer blockchain framework to store the data securely.
  - \* **TechStack:** Python - Flask (WSGI), scikit-learn; Hyperledger Fabric, VueJS Web Framework
- **Blockchain in Smart Grid Infrastructure (Undergraduate Thesis Project):** Jul 2018 - Jan 2019
  - \* Utilized the immutable ledger in blockchain technology for preventing tampering of data in Load Dispatch Centres.
  - \* Developed a custom voting based consensus algorithm utilizing smart contracts to take correct decision in presence of malicious user in energy efficient systems in a decentralized fashion.
  - \* **TechStack:** Ethereum, Docker, Apache Kafka, Javascript
- **Ladder Logic Malware Detection using Vulnerability Scanning:** Dec 2017 - Mar 2018
  - \* Analyzed Mitsubishi's MELSEC Communication protocol using Deep Packet Inspection (DPI), identifying vulnerabilities like MITM in the HMI-PLC(Programmable Logic Controller) communication channel.
  - \* Created an NodeJS based Intrusion Detection System which monitors the network in realtime, generates alerts and displays the statistical data. Also, developed fuzzer using ladder logic programming.
  - \* **TechStack:** Python(Scapy), Ladder Logic Programming, NodeJS, HTML, CSS, BootStrap
- **Securing IIoT infrastructure for resilient energy network:** Jul 2017 - Nov 2017
  - \* Analysed Industrial Network Protocols/SCADA Protocols like Modbus, DNP3, Profinet, IEEE C37.118, etc.
  - \* Developed custom Python scripts to perform Man-in-the-Middle attacks, injecting false data, and implemented End-to-End encryption between Phasor Measurement Unit (PMU) and Phasor Data Concentrator (PDC) to mitigate vulnerabilities.
  - \* **TechStack:** Python(Scapy, Socket Programming)
- **Anomaly Detection using Artificial Immune System:** Apr 2017 - Jun 2017
  - \* Created a Artificial Immune model which can be further implemented for securing cyber-physical system.

## PROFESSIONAL EXPERIENCE

---

### Rakuten Mobile Inc (楽天モバイル株式会社) - (RCP Orchestration Team)

Tokyo, Japan

#### Strategic Planning

Oct 2019 - Oct 2021

Designing and developing cloud-native applications to support production-grade systems, testing the integrity of the application, carrying out rigorous performance tests to assess the performance metrics and scalability of the application.

#### Key Projects:

- **Correlation & Policy Engine (E2EO):** *Dev Lead & NEDO Researcher, Jun 2020 - Oct 2021*
  - \* Explored, implemented, bench-marked various data processing systems like Apache Spark, Kafka Streams, PNDA, etc.
  - \* Designed and developed **fully cloud-native data stream processing solution from scratch** featuring complex event processing(CEP) and multi hierarchical close-loop feedback correlation which competes with existing bigdata CEP engines like Apache Flink and Siddhi.io.
  - \* Designed and developed a custom data structure that supports permutation as well as ordered pattern matching with data aggregation for flat, topology-based, cross-domain, and multi-layered correlation.
  - \* Utilized event bus system for data partitioning, in-memory database with fast caching along with efficient python, rust(WASM) libraries that compete with C, C++ to create a fault-tolerant, stateless and horizontally scalable system which enables **5k events/sec/core** with preliminary scale tests going to **110,000 events/sec**.
  - \* Designed and latched policy templates onto FastApi ASGI based Policy Manager which stores policies that are utilized by various micro-services comprising of data collection, data analysis, decision & execution entities in the processing system.
  - \* This solution along with hierarchical life-cycle manager enables close loop automation for various cloud-native 5G components to envision **full autonomous network** which can be further extended to non-telecom use cases.
  - \* This production ready system was being utilized for 5G Network Slicing and Service Management for 5G vRan healing, scaling & close loop use-cases under NEDO Research Project, Japan.
  - \* **TechStack:** Python - FastAPI(ASGI), orjson; Tech - Apache Kafka, Kubernetes, Redis, MongoDB
- **Bare Metal as a Service (BMaaS):** *Software Engineer, Apr 2020 - Jun 2020*
  - \* Developed python and shell scripts for managing bare metal servers which involves provisioning, configuration, and life cycle management of hardware and software components on the server.
  - \* Scripts involved automation of rule-based bare metal server detection, checking required hardware specifications before installing an operating system(OS), Kubernetes cluster, OS hardening.
  - \* **TechStack:** Python - Redfish, Shell scripting, **Cloud Platform** - Kubernetes
- **Configuration Management as a Service(CMaaS) for 4G:** *Software Engineer, Feb 2020 - Apr 2020*
  - \* Developed python scripts which fetch and correlate between the old configuration data from backed-up zadara object storage and the latest configuration data of the 4G network elements like HSS, HLR, MME, etc.
  - \* Differences between the configuration data were stored in database and notified to the user via email and user interface. This process was automated using time based scheduler in workflow engine.
  - \* **TechStack:** Airflow, Zadara, Python scripts
- **Internal Virtual Network Function Manager (IVNFM):** *Software Developer, Oct 2019 - Mar 2020*
  - \* Integral part of core dev team in developing IVNFM for 4G virtualized Radio Access Network(vRAN) that helped the company cutting down the cost of purchasing software from other companies.
  - \* Reduced deployment time for 4G vRAN applications from days to approximately 5 minutes by developing scripts for Workflow Engine (WFE) to execute lifecycle operations on NF & NS within Openstack VM Clusters.
  - \* Configured and deployed Keycloak as an Identity and Access Management (IAM) solution to fortify IVNFM & provided essential support for testing and production deployment across all IVNFM components (LCM, WFE, Databases, Security).
  - \* **TechStack:** Python - Airflow(WFE), Flask(WSGI); **Cloud Platform** - Openstack

## INTERNSHIPS

---

- *Summer Trainee, PricewaterhouseCoopers (PWC), Mumbai, India* *May 2018 - Jul 2018*
  - ★ Developed Retail Experience Android App for customer having features like quick registration, one tap login, easy checkout.
  - ★ Developed ticketing tool system that features CRUD operations, status tracking, customized tags.
  - ★ **TechStack:** ASP.NET, Rest API, Xamarin, .Net Framework
- *Winter Intern, Bharat Petroleum Corporation Limited, Mumbai, India* *Dec 2017 - Jan 2018*
  - ★ Conducted risk assessment, vulnerability discovery, and explored Security Information and Event Management (SIEM) systems for BPCL systems and applications.

## KEY COURSES UNDERTAKEN

---

### Graduate Coursework:

- Security, System Security, Data Networks, Security Testing, Cryptography, Web Security, Digital Currencies & Smart Contracts, IT Forensics, Physical Layer Security, Distributed Systems, Clock Synchronization, Machine Learning Security, Automated Debugging

### Undergraduate Coursework:

- Computer Programming, Data Structures, Telecom Network Management, Numerical Techniques, Statistical Theory, Digital Signal Processing, Wireless Sensor Networks, Pattern Recognition, Mobile Communication, Satellite Communication, Embedded Systems

### MOOC Courses:

- 5G Specialization [↗](#), Hardware Security [↗](#), Cloud Platform Fundamentals [↗](#), Penetration Testing & Ethical Hacking [↗](#), Machine Learning [↗](#), Microsoft Certified: Azure Fundamentals [↗](#), Front End Development [↗](#), Blockchain Specialization [↗](#)

## INNOVATIONS

---

### Patents:

#### GRANTED

- **MN Dixit**, SS Lamba, A Sharma, “Static and dynamic non-deterministic finite automata tree structure application apparatus and method” - United States Patent [Grant No. 11563625](#), issued on 24<sup>th</sup> Jan, 2023

#### PUBLISHED

- J Bose, **MN Dixit**, SS Lamba, A Sharma, “Correlation engine and policy manager, method and computer program product ” - United States Patent pending under Application [#17575975](#), Publication No. 20230229461, 20<sup>th</sup> July, 2023
- J Bose, **MN Dixit**, SS Lamba, A Sharma, “Policy driven event transformation” - United States Patent pending under Application [#17574552](#), Publication No. 20230222099, 13<sup>th</sup> July, 2023
- J Bose, **MN Dixit**, SS Lamba, A Sharma, “Pluggable Data Adaptor” - United States Patent pending under Application [#17644592](#), Publication No. 20230195673, 22<sup>nd</sup> June, 2023
- J Bose, **MN Dixit**, SS Lamba, A Sharma, “Event-driven enhancement of event messages” - United States Patent pending under Application [#17644590](#), Publication No. 20230196257, 22<sup>nd</sup> June, 2023
- J Bose, **MN Dixit**, SS Lamba, A Sharma, “API server for correlation engine and policy manager, method and computer program product” - United States Patent pending under Application [#17644600](#), Publication No. 20230195543, 22<sup>nd</sup> June, 2023
- R Atri, K Takeuchi, M Luthra, P Devadiga, S Kita, **MN Dixit**, SS Lamba, A Sharma, “Data Storage System With Power Consumption Efficiency and Methods of Operating the Same” - United States Patent pending under Application [#17455921](#), Publication No. 20230161398, 25<sup>th</sup> May, 2023
- **MN Dixit**, SS Lamba, A Sharma, “Logic-gate based non-deterministic finite automata tree structure application apparatus and method” - United States Patent pending under Application [#17511558](#), Publication No. 20230104304, 06<sup>th</sup> Apr, 2023
- SS Lamba, **MN Dixit**, A Sharma, B Rathinam, R Atri, “Non-deterministic finite automata tree structure application apparatus and method” - United States Patent pending under Application [#17505635](#), Publication No. 20230059360, 23<sup>rd</sup> Feb, 2023
- SS Lamba, **MN Dixit**, A Sharma, B Rathinam, R Atri, “Multi-layered correlation policy management apparatus and method” - United States Patent pending under Application [#17505631](#), Publication No. 20230022787, 26<sup>th</sup> Jan, 2023

### Publications:

- S. Iyer, S. Thakur, **Mihirraj Dixit**, R. Katkam, A. Agrawal and F. Kazi, ”Blockchain and Anomaly Detection based Monitoring System for Enforcing Wastewater Reuse,” 2019 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kanpur, India, 2019, pp. 1-7, doi: [10.1109/ICCCNT45670.2019.8944586](#).
- S. Iyer, S. Thakur, **Mihirraj Dixit**, A. Agrawal, R. Katkam and F. Kazi, ”Blockchain based Distributed Consensus for Byzantine Fault Tolerance in PMU Network,” 2019 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT), Kanpur, India, 2019, pp. 1-7, doi: [10.1109/ICCCNT45670.2019.8944881](#).
- Keni N., Suradkar N., **Dixit M**, Siddavatam I.A., Kazi F. (2019) A Computational Intelligence Approach for Cancer Detection Using Artificial Immune System. In: Verma N., Ghosh A. (eds) Computational Intelligence: Theories, Applications and Future Directions Vol I. Advances in Intelligent Systems & Computing, vol 798. Springer, Singapore, doi: [10.1007/978-981-13-1132-1\\_36](#)

## LANGUAGES

---

English(Native, C2) • Marathi(Native) • Hindi(Native) • Japanese (N4) • German(A1.1) • Sanskrit(Native, A2)