

NACIRI INSAF

AI, Telecom and Radiofrequency Engineer

RF · Python · Machine Learning · LTE/5G · Full-Stack Engineering

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Professional Profile

Technical background spanning **artificial intelligence, LTE/5G systems, radiofrequency analysis, and full-stack software development**. At **NTT DATA**, developed a telecom intelligence platform integrating KPI processing, anomaly detection, root-cause analysis, and automated decision support.

Professional Experience

Master's Thesis Intern – AI and Telecom Network Engineering

Mar 2026 – Jul 2026

NTT DATA – NetSight AI Project

Morocco

- Designed and implemented **NetSight AI**, a modular platform for monitoring LTE/5G network performance, diagnosing KPI degradation, and managing telecom incidents.
- Built backend services using **Python, FastAPI, SQLAlchemy, PostgreSQL, REST APIs, and WebSockets** for measurement ingestion, storage, diagnosis, alerts, and reports.
- Processed and visualized telecom KPIs including **RSRP, SINR, throughput, latency, and packet loss**, with trend analysis and threshold-based monitoring.
- Developed a hybrid diagnostic engine combining **telecom expert rules, anomaly detection, KPI relationships, and root-cause analysis** for interference, weak coverage, congestion, and transport degradation.
- Created a Python network simulator generating normal operating data and injecting **point, contextual, and collective anomalies** for testing and validation.
- Developed an interactive monitoring interface for cell health, KPI trends, incidents, notifications, audit logs, reports, and specialist-routing recommendations.
- Organized the solution into frontend, backend, database, simulation, and machine-learning modules using **Git, GitHub, Docker, and environment-based configuration**.

Core Competencies

Machine Learning	Regression modelling, anomaly detection, feature engineering, model evaluation, explainability, and error analysis
Telecom Intelligence	LTE/5G KPI monitoring, network diagnosis, incident analysis, root-cause reasoning, and engineering recommendations
Software Engineering	Modular architecture, backend APIs, databases, real-time communication, version control, testing, and documentation
RF and Signal Systems	S-parameters, impedance matching, stability, noise figure, RF modelling, phased arrays, beamforming, and electromagnetic simulation
Engineering Thinking	First-principles analysis, constraints identification, baseline implementation, validation, uncertainty awareness, and iterative improvement

Technical Stack

Programming and Data	Python, C, C++, Embedded C, JavaScript, TypeScript, SQL, NumPy, pandas, Matplotlib
Machine Learning	scikit-learn, supervised regression, anomaly detection, feature engineering, model validation, SHAP, time-series analysis
Backend and Frontend	FastAPI, SQLAlchemy, PostgreSQL, REST APIs, WebSockets, Next.js, React, responsive dashboards, data visualization
Telecommunications	LTE/5G, RSRP, SINR, throughput, latency, packet loss, network monitoring, incident diagnosis, root-cause analysis
RF and Engineering Tools	Keysight ADS, CST Studio Suite, MATLAB, COMSOL Multiphysics, S-parameters, Smith charts, stability analysis, noise figure, phased arrays, millimetre-wave radar
Embedded and Development Tools	STM32, ESP32, PIC, UART, SPI, I ² C, ADC, Git, GitHub, Docker, Docker Compose, VS Code

Selected Engineering Projects

Automated GaAs pHEMT Modelling and Parameter Extraction

Python | MATLAB | ANN | Keysight ADS

- Automated the extraction of intrinsic and extrinsic GaAs pHEMT equivalent-circuit parameters from cold-FET and hot-FET S-parameter measurements.
- Implemented S/Z/Y matrix conversion, parasitic de-embedding, parameter calculation, ANN-assisted optimisation, and model validation against reference S-parameters.
- Exported optimised device parameters and ADS-compatible model data, replacing a lengthy manual calculation workflow with a reproducible RF modelling pipeline.

CNN-Based Traffic Sign Recognition

Python | TensorFlow/Keras | OpenCV

- Developed a CNN to classify **43 road-sign categories** from the GTSRB dataset using normalised 50×50 RGB images.
- Implemented convolution, max-pooling, dropout, dense classification, early stopping, and multiclass softmax training.
- Integrated the saved model with OpenCV for real-time traffic-sign inference from webcam and video streams.

Machine-Learning Prediction of RF S-Parameters

Python · scikit-learn · RF Modelling

- Developed regression models from electromagnetic simulation data to predict frequency-dependent S-parameters and evaluate error and generalisation across unseen RF configurations.

X-Band Low-Noise Amplifier

Keysight ADS · RF Engineering

- Designed and simulated a GaAs LNA near **10 GHz**; performed stability, impedance-matching, gain, and noise analysis, achieving about **14 dB simulated gain** with noise figure below **1 dB** in the studied configuration.

MMIC-Based Beamformer for ADAS Automotive Radar

77–81 GHz · Keysight ADS · Phased Arrays

- Developed and evaluated a front-looking radar receiver architecture using an **8×8 patch array**, LNAs, **6-bit RF phase shifters**, RF combining, and mixer/IF stages; analysed beam steering, phase quantisation, S-parameters, and insertion loss in ADS, MATLAB, and CST.

Machine-Learning Support for 5G Network Planning

Python · Regression · 5G

- Built a data-driven model considering coverage, user distribution, interference, and deployment constraints to support base-station planning decisions.

Embedded Signal Acquisition and Analysis Pipeline

ESP32 · Embedded C · Python

- Developed an end-to-end pipeline from sensor acquisition and embedded communication to processing, visualization, and data interpretation.

Education

Master's Degree – Microelectronics and Radiofrequency Engineering

Faculty of Sciences, Abdelmalek Essaâdi University

2024 – 2026

Tetouan, Morocco

Bachelor's Degree – Microelectronics and Radiofrequency Engineering

Faculty of Sciences, Abdelmalek Essaâdi University

2021 – 2024

Tetouan, Morocco

High School Diploma - Mathematical Sciences A

2021

Certifications and Languages

Training and Certifications

Cisco CCNA Fundamentals
MATLAB and Simulink
Python and C/C++
Data Analysis Fundamentals

Languages

Arabic – Native
English – C1
German – C1
French – B2
Dutch – B2