

Luís Rosa

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Aqualva-Cacém, Lisbon, Portugal

EDUCATION

Instituto Superior Técnico

Master's in Computer Science and Engineering

Lisbon, Portugal

Sep. 2025 – Present

University of Algarve

Bachelor's in Computer Engineering (Final Grade: 15/20)

Faro, Portugal

Sep. 2022 – Jun. 2025

PROFESSIONAL EXPERIENCE

Software and Web Developer (Trainee)

DigitSigma

Jul. 2022 – Aug. 2022

Loulé, Portugal

- Development of Web applications and Windows Forms (.NET).
- Database management and implementation of full-stack features.
- Technologies used: C#, PHP, JavaScript, HTML, Bootstrap, Axios, and Ajax.

PROJECTS

Permissioned Blockchain & BFT Consensus | *Java, Hyperledger Besu, Solidity, UDP*

- End-to-end development of DepChain, a highly dependable permissioned blockchain system, implementing both the consensus layer and a transaction processing engine to ensure Byzantine Fault Tolerance (BFT).
- Systematic implementation of the Basic HotStuff consensus algorithm over unreliable networks (UDP), building network abstractions such as authenticated perfect links and failure detectors to handle crash and malicious faults.
- Integration of EVM (Hyperledger Besu) for executing Solidity smart contracts, featuring a custom gas-fee mechanism and an ERC-20 token implementation redesigned to prevent Approval Frontrunning attacks.

Classification & Time Series Forecasting | *Python, Scikit-learn, ARIMA, LSTM*

- End-to-end Data Science pipeline applied to two real-world problems: predicting road accident severity and detecting flight cancellations, supporting decision-making in safety and logistics.
- Systematic implementation and comparison of multiple classification models (Naïve Bayes, KNN, Decision Trees, Random Forest, Gradient Boosting, MLP) with a focus on imbalanced class scenarios.
- Traffic volume forecasting on high-frequency time series, exploring statistical models (ARIMA) and deep learning (LSTM) to support transportation infrastructure planning.

UK Real Estate Data Warehouse & Analytics | *SQL, Pentaho (ETL/OLAP), MySQL, MDX*

- Development of a complete Business Intelligence solution for the analysis of millions of UK real estate transaction records (Price Paid Data).
- Data Warehouse design (Star Schema) and implementation of complex ETL pipelines with Pentaho Data Integration for temporal and geographical data transformation.
- Creation of OLAP cubes and strategic reports (Saiku/Report Designer) to monitor KPIs such as year-over-year growth and sales by district, enabling data-driven decision-making.

MNIST Neural Network | *Python, Multi-layer Neural Network, NumPy*

- Implementation of a Multi-layer Neural Network (MLP) for handwritten digit classification (MNIST).
- Development and application of the Backpropagation algorithm for model training and weight adjustment.
- Use of cross-validation for optimisation and evaluation of pattern recognition accuracy.

Distributed Key-Value Store | *FastAPI, Redis, RabbitMQ, CockroachDB*

- Implementation of a distributed storage solution capable of managing key-value pairs across multiple nodes.
- Resilient architecture featuring an API layer, caching, message queues, and a distributed database.
- Implementation of monitoring, autoscaling, and health checks to ensure consistency and fault tolerance.

TECHNICAL SKILLS

Languages: C#, Java, Python, JavaScript, PHP, SQL, HTML/CSS, C/C++

Frameworks/Libraries: React, Node.js, Express, FastAPI, .NET, Scikit-learn, Material-UI, Bootstrap

Data & Analytics: MySQL, Pentaho (PDI/Report Designer), OLAP, MDX, ARIMA, LSTM, Pandas, NumPy, Redis, RabbitMQ, CockroachDB

Infrastructure & Tools: Git, Docker, Arduino

Spoken Languages: Portuguese (Native/C2), English (B2)