

# Moussa Omrane

 [werz.tech](https://werz.tech)

 [mouomrane@gmail.com](mailto:mouomrane@gmail.com)

 [linkedin.com/werz](https://linkedin.com/werz)

 [github.com/OxWerz](https://github.com/OxWerz)

## Education

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### Khan Academy

2023 - 2024

#### Mathematics

- **Relevant Coursework:** Algebra 1 & 2, Linear Algebra, Precalculus, Calculus

## Experience

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### Cabby Rentals – Maurits Autoverhuur

Jun 2024 – Present

#### Lead Software Engineer – Car Rental Platform

Amsterdam, Netherlands

- Developed and maintained the backend integration with the Tesla Fleet API, using the Partner Token authentication type and implemented a continuous token refresh system to allow users to lock and unlock their Tesla vehicles anytime. Also improved client-side error handling to make it more reliable, enabling drivers to control their Tesla vehicles more effectively.
- Led mobile development efforts using Flutter, implementing an intuitive UI/UX with complex custom widgets such as an interactive zoomable and pannable line graph with dynamic data visualization. Integrated mobile app features with backend services to provide a consistent user experience across 2 platforms (iOS and Android)
- Significantly reduced deployment, release time, and hassle by automating the CI/CD process using Fastlane and GitHub Actions, streamlining build processes, code signing, and deployment to the respective app stores.
- Addressed several significant security vulnerabilities, including one that allowed the creation of arbitrary admin users, thereby safeguarding against potential interference by malicious actors in business operations.
- Fixed the server-side user order validation logic to enforce access control for vehicle operations, mitigating unauthorized access risks.
- Secured the document name generation system and updated database records to prevent public access to sensitive files.
- Patched a critical vulnerability in user management by implementing role-based access control and input validation, preventing unauthorized elevation to admin status.
- Integrated Sentry SDK into backend services and mobile apps, configuring custom error grouping and environment-specific logging for efficient debugging.
- Provided guidance and mentorship to the flutter team developers, including pull-requests code reviews, offering advisement, and driving performance optimizations across backend and mobile codebases.

### Origify

Jan 2023 – Present

#### Founder & Software Engineer – A plagiarism detection ML model & software.

Algiers, Algeria

- Built an extensive data and web scraping system from various exam sources, and performed preprocessing including OCR and PDF-to-text conversion, to establish comprehensive datasets of educational materials.
- Compiled and published a dataset of **25,672 official exam papers** from Algeria's education system, spanning primary, middle, and high school levels.
- Developed a comprehensive text preprocessing pipeline using NLTK, including tokenization, stop word removal, and lemmatization, ensuring accurate document analysis.
- Implemented TF-IDF vectorization and cosine similarity calculations using Scikit-learn, improving plagiarism detection accuracy.
- Developed a multi-threaded data processing pipeline to handle concurrent document processing tasks, significantly reducing overall processing time by 50%.
- Designed and deployed a FastAPI backend with secure endpoints for comparing documents and managing data uploads, facilitating seamless integration and data handling.
- Created a responsive front-end interface with React Native, enhancing user experience and engagement.

- Utilized tools like Logsnag for events tracking and Sentry for performance monitoring, ensuring robust application performance and error tracking.
- Integrated continuous integration/continuous deployment (CI/CD) pipelines using GitHub Actions, automating the build, test, and deployment processes for faster and more reliable releases.
- Integrated automated testing processes, increasing test coverage and reducing defects, contributing to the overall reliability of the system.
- Led marketing efforts across social media platforms, email campaigns, and public outreach, effectively promoting the software to students and educators.

## Sonelmap

Dec 2022 – Jun 2024

*Co-Founder & Software Engineer – An electricity infrastructure GIS management.*

*Algiers, Algeria*

- Developed and designed a dynamic UI and UX front-end using React.js, Typescript, and Tailwind CSS to create an engaging user experience.
- Integrated Mapbox maps provided API for interactive map implementation, displaying Geo-spatial data effectively, and also handled various datasets for optimizing data retrieval and visualization.
- Utilized Zustand and Jotai for efficient and scalable state management, ensuring excellent data flow and optimal performance, maintaining a smooth data Flow.
- Scraped and handled a variety of GIS datasets from multiple sources using Python and Playwright to improve data efficiency and availability, (e.g., OpenStreetMap, Overpass, and Wikimapia).
- Built an admin dashboard, that enables administrators to effectively manage user accounts and keep an eye on their activity within the software.
- Implemented a robust back-end infrastructure, utilizing PostgreSQL for data storage and Redis for caching to enhance performance in managing and updating map-related data instantly.
- Optimized PostgreSQL database queries by migrating to SQL from the non-SQL joins Prisma Rust Engine, improving API response time by 25% and enhancing application overall experience.
- Developed it to a Progressive Web App (PWA) to make it mobile usable, friendly, and responsive.
- Implemented a service-worker caching system that is in sync with the Redis database to facilitate real-time and offline data flow and updates.
- Integrated Sonelmap with SCADA API systems using industry-standard protocols like MQTT and Modbus to ensure real-time monitoring and event-driven updates through synchronization with SCADA through an MQTT broker.

## Projects

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**Kreads** | *Svelte Kit, Google Drive API, Service Workers, Google OAuth, Stripe, ElevenLabs API*

- Developed a personal e-book library software application to enhance reading experiences across devices with precise progress tracking and offline syncing capabilities.
- Implemented a fully decentralized system using Google Drive storage, ensuring data security and privacy without storing user data.
- Handled various book formats like PDF and EPUB, allowing users to customize their reading experience.
- Developed mobile-friendly PWA with offline syncing using service workers, ensuring compatibility with mobile apps.
- Features included personal book uploads, public tracker overlay, progress tracking, AI TTS subscription, and more.
- Integrated Google OAuth for user authentication and Stripe for payment processing (in progress).
- Created comprehensive mobile UI for home, book upload, book search, book page, bookmark page, and profile page.
- Planned integration of ElevenLabs API for TTS functionality and other premium offers.
- Marketing strategies include social media promotion on Reddit and Product Hunt.
- Planned monetization through subscriptions for TTS and additional storage.

## Certifications

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### HackerRank Problem Solving (Intermediate)

May 2024

- Data Structures (such as HashMaps, Stacks and Queues) and Algorithms (such as Optimal Solutions).

## Badges & Achievements

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### Hackthebox Pro Hacker Badge & CTF Creator

- Mastered the exploitation of web vulnerabilities such as SQL Injection, Cross-Site Scripting (XSS), and Server-Side Request Forgery (SSRF) through real-world scenarios.
- Gained extensive experience with reverse engineering binaries, leveraging tools like Ghidra, IDA Pro, and Radare2 to deconstruct and analyze compiled executables.
- Developed proficiency in exploiting buffer overflows and format string vulnerabilities, understanding memory corruption techniques in low-level languages such as C/C++.
- Acquired hands-on experience with network penetration testing using tools like Nmap, Wireshark, and Metasploit to identify and exploit network-based vulnerabilities.
- Deepened knowledge of post-exploitation techniques, including persistence mechanisms, lateral movement, and data exfiltration in enterprise environments.

### TryHackMe Hacker Badge

- Gained comprehensive knowledge of networking fundamentals, including TCP/IP, OSI model, subnetting, and common protocols (HTTP, DNS, DHCP) through hands-on labs.
- Developed a strong understanding of operating system internals, including process management, memory allocation, and file system structures in both Windows and Linux environments.
- Acquired skills in Active Directory security, focusing on user authentication, access controls, group policies, and common attack vectors such as Kerberoasting and Pass-the-Hash.
- Enhanced capabilities in network defense techniques, implementing strategies such as network segmentation, firewalls, and intrusion detection systems to protect enterprise networks.
- Practiced incident response methodologies, including identifying, containing, and mitigating threats within virtual environments simulating real-world cyber attacks.
- Built and configured vulnerable environments to explore exploitation techniques and defensive measures, reinforcing knowledge of security best practices in system and network configurations.
- Completed challenges focused on enumeration and exploitation of Active Directory environments, utilizing tools like BloodHound and PowerView for privilege escalation and lateral movement analysis.

## Technical Skills

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**Languages:** Javascript, Typescript, Python, Go, HTML, CSS, BASH, Dart, SQL, Assembly

**Technologies:** React.js, React Native, Flutter, Preact, Flask, FastAPI, TensorFlow, Scikit-Learn, PyTorch, Tailwind, Node.js, Bun, Electron, Tauri, Git, PostgreSQL

**Concepts:** Compiler, Operating System, Virtual Memory, Cache Memory, Data Science, DOM Manipulation, Encryption, Decryption, Machine Learning, Continuous Integration / Continuous Deployment (CI/CD), Neural Networks, API, Database Normalization, Agile Methodology, Cloud Computing, Web Security

**Project management:** Asan, Slack