Fedi Bellakhel

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Education

Higher Institute of Information and Communication Technologies (ISTIC) — 2022 – May 2025
Bachelor's Degree in Software Engineering — *Borj Cédria, Tunisia*

Lycée Mourouj 4 Ahmed Amine — 2018 – 2022
Baccalaureate in Computer Science — *Tunis, Tunisia*

Experience

International Banking Union (UIB) — Jan 2025 – May 2025
Software Engineer Intern — *Tunis, Tunisia*

- Developed a multilingual sentiment analysis system using **FastAPI** and **HuggingFace Transformers** (CamemBERT for French, MARBERT for Tunisian Arabic) for real-time comment classification on donation platforms.
- Built a **Flutter** cross-platform donation app with **Firebase**, featuring role-based authentication, **Konnect** payment processing, and real-time data synchronization.
- Created an automated ML model retraining pipeline with **Weights & Biases** to improve sentiment analysis accuracy using user feedback.
- Designed an admin analytics dashboard with interactive charts to visualize donation patterns, user engagement, and sentiment trends.
- Integrated **PaddleOCR** for automated document processing of charity registration documents.
- Developed an AI chatbot using **Google Gemini API** for dynamic donor support and information retrieval.

National Center for Informatics (CNI) — Aug 2024
Full-Stack Web3 Developer Intern — *Tunis, Tunisia*

- Built a decentralized voting DApp using **Solidity**, **Truffle**, **Ganache**, and **React** for secure, transparent elections on a local Ethereum testnet.
- Implemented a smart contract with role-based access control for admin tasks like candidate creation, election setup, voter verification, and vote counting.
- Integrated **MetaMask** for wallet-based authentication and secure blockchain transactions.
- Developed a **React** frontend for voter registration, verification, voting, and real-time election stats/results display.
- Created RESTful services and used **web3.js** to interact with smart contracts and query blockchain state.

Quebec Center — August 2023
AI/ML Developer Intern — *Manouba, Tunisia*

- Collected, preprocessed, and labeled a diverse dataset of **offensive vs. non-offensive comments**, establishing a robust foundation for model training.
- Developed, trained, and rigorously tested a text classification model for the offensive and non offensive comments
- Engineered and implemented the trained ML model within a Flask web application, deploying RESTful APIs to facilitate seamless interaction and real-time inference.

Technical Skills

Programming Languages: Python, Dart, Solidity, JavaScript, TypeScript, Java, C, R, SQL
Frameworks: React, Next.js, Angular, Flutter , Hardhat, FastAPI, Spring Boot, Astro, TensorFlow, PyTorch
Libraries: Tailwind CSS, Bootstrap, NumPy, Pandas, Matplotlib, OpenCV, Keras, Scikit-learn, Ultralytics YOLO, EasyOCR, Shadcn, DaisyUI, Transformers, Pydantic, PaddleOCR, Seaborn,
Package Managers: npm, pip, apt, Maven, Gradle
Web Technologies: HTML5, CSS3
Tools: Git, GitHub, Docker, Postman, OpenSSL, Selenium, Google Colab, Microsoft Power BI, Weights & Biases (W&B)
Platforms: Google Collab, IBM Watson Studio, AWS Sage Maker, NVIDIA CUDA, Truffle, MetaMask, KonnectAPI
Databases: Firestore, MySQL

Projects

Don by UIB | *Flutter, FastAPI, Firebase, PyTorch, Konnect, Hugging Face, OpenSSL, W&B, GeminiAPI, PaddleOCR, camemBERT, MARBER*
- Developed a comprehensive donation management platform using Flutter for cross-platform mobile/web deployment and FastAPI backend, supporting multiple user roles (Donor, Association, Admin) with Firebase authentication and custom claims.
- Implemented real-time analytics dashboard with interactive charts using fl_chart library, providing donation tracking, performance metrics, and multi-dimensional cause analysis through radar and bar chart visualizations.
- Built AI-powered sentiment analysis system using PyTorch models for French and Tunisian dialects, integrated with Firestore for real-time comment processing and analytics reporting.
- Integrated Konnect payment gateway for secure donation processing with comprehensive transaction handling, payment result screens, and automated status tracking.
- Designed scalable Firebase architecture with Firestore collections for causes, donations, users, and analytics, supporting real-time data synchronization and role-based access control.

Votini | *React, Solidity, Ganache, Web3.js*
- Developed a decentralized voting DApp using **React** and **Ethereum** smart contracts for secure elections.
- Managed election lifecycle with **Solidity** for voter registration, voting, and tallying.
- Ensured election integrity with on-chain voter verification to prevent double voting.
- Integrated **Web3.js**/**MetaMask** for seamless blockchain interactions.

Car Detection System | *YOLOv11, PyTorch, OpenCV, EasyOCR, Selenium, Pandas, Matplotlib, NumPy*
- Developed a full pipeline for **vehicle detection, license plate recognition (Arabic/English)**, speed estimation, and driver behavior analysis for Tunisian traffic surveillance.
- Implemented real-time detection and tracking using **YOLOv11x** and **ByteTrack** with vehicle ID persistence across frames.
- Trained custom license plate detection model using **YOLOv11m** and integrated **EasyOCR** for Arabic/English text recognition from dataset scraped via Tayara.tn.
- Classified unsafe driving behavior using **YOLO classification model** for person detection and safety analysis within vehicle ROIs.
- Built automated **web scraping and image download** modules with **Selenium** processing 1542 vehicle records.

Certificates

- Big Data Engineer Certificate
- Nvidia - AI Applications for Predictive Maintenance
- Nvidia - Building Transformer-Based Natural Language Processing Models
- Nvidia - Fundamentals of Deep Learning

Languages

Arabic: C2

French: B2

English: B2