Karim Ben Amara
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Education

National School of Computer Science — **September 2020 – June 2023**
Computer Science Engineering Degree; Operations Research and AI field — *Manouba, Tunisia*
Awarded graduation prize for achieving 1st place

Preparatory Institute for Engineering Studies of Bizerte — **September 2018 – June 2020**
Preparatory Diploma in Math and Physics; Linear Algebra - Advanced Calculus - Physics — *Bizerte, Tunisia*
Ranked top 15% at the National Exam

Experience

Cognira — **July 2023 – Present**
Software Engineer: Scala - Akka - Spark - Python - Cassandra - Postgres — *Tunis, Tunisia*
- Benchmarked and analyzed the forecast engine, achieved three times more increase in load sustain.
- Built a full-stack internal app to extensively profile a remote service with negligible latency leveraging the actor model.
- Significantly enhanced the event notification workflow, decreased their latency to sub-milliseconds for real-time notifications.
- Took the initiative in building a command-line interface that also serves as an internal dev tool, assisting the team in validating, debugging and working on new features efficiently.

Cognira — **February 2023 – June 2023**
End of Studies Intern: Scala - Akka - Cassandra - Redis - Python — *Tunis, Tunisia*
- Benchmarked different caching strategies, measuring server throughput, time to first byte, latency, cache hit & miss rates, database read and write response times.
- Developed and implemented the testing app and various caching strategies, resulting into 18 different configurations.
- Used Python to implement user behavior simulator to apply different kind of workloads on the system.
- Automatic report generation and ranking justified with figures of harvested metrics during simulation.

Cognira — **June 2022 – August 2022**
Backend Team Intern: Scala - Spark - Akka Http - Html - Canvas — *Tunis, Tunisia*
- Leveraged spark lazy transformations to develop an efficient and generic hierarchy data generator.
- Accelerated the dev team implementation and testing phases by providing a web interface to easily input and validate a hierarchy configuration with the ability to download generated data.

Projects

Freelancing Platform ⏺ — **Sep 2024 – Ongoing**
Rust - Sveltekit - Postgresql - Docker - Nginx
- Studied functional requirements and designed data model of the system.
- Integrated a real-time in-app push events.
- Extracting context from job description for semantic searches.
- Setup github actions to build and deploy to a virtual private server on the cloud.

Expenses Tracker App ⏺ — **June 2023 – Sep 2023**
Flutter
- Started an open source project and implemented key features such as ability to add a new expense or income, tag an "item", view current balance, aggregate expenses by item and by month for a more statistical view, compute average daily and monthly expenses.
- Integrated firestore database to backup user's data at will.
- Added CI github workflow to build artifacts on merging.

Single Machine Scheduling Problem ⏺ — **Dec 2022 – Jan 2023**
Python
- Implemented brute-force deterministic approach for small number of jobs. Branch&Bound approach using EDD (earliest due date) with one problem constraint relaxed (EDD with job preemption as a heuristic function to limit the search space), comparing these approaches with meta-heuristic Ant Colony Optimization and Genetic Algorithm.

Artificial drone pilot ⭘   **Dec 2022 – Jan 2023**

Python - Pygame - Genetic Algorithm - Neural Networks
- Implemented a bare bone neural network optimized by a genetic algorithm.
- Implemented the simulation environment (the physics of the drone, rotation, movements, animations and collision) where the neural network was trained to manoeuvre the drone and hold still.
- Analysed different methods of the evolution (crossover, mutation...) and plotted the error variation of the average population.

Ant Colony Optimization simulation ⭘   **Mai 2022 – June 2022**

Javascript - Html
- Implemented ant colony optimization meta-heuristic approach solving particularly the Travel Salesman problem.
- Added key features for the user to extract meaningful results, ability to tune parameters and observe changes in real-time.
- Levereged the canvas html element to draw algorithm's steps in real-time. Highlighting pheromone trails, best path found yet, current and best found score.

Achievements

- Took role within the Google Developer Groups of Manouba where I helped organizing various events (Women Techmakers - Google DevFest...) and exposing newcomers to the state of the art of Google technologies specifically.
- Google machine learning course: Linear Regression – Image Classification.
- Google could badge: Create and manage cloud resources (Virtual machines, Docker, Kubernetes, Nginx).
- Completed Introduction to TensorFlow for Artificial Intelligence, Machine Learning and Deep learning on Coursera. DeepLearning.AI - Year 2021

Skills

Developer Tools: Docker - Kubernetes - Git
Areas of Expertise: Software Architecture And Development - Data Structures - System Design - Networking
Languages & Technologies: Scala - Python - Rust - - Svelte - Bash - Awk - Typescript - Spark - Flutter