Marawan Hassaan

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Education

Sapienza University of Rome 2022
Master's degree in Computer Science Grade: 110/110 With Honors

Alexandria University - Faculty of Engineering 2018
Bachelor's degree in Electrical Engineering Grade: Very Good

Experience

Alascom - Software engineer 2023 - Current
Milan, Italy

- **Latteria Sociale Valtellina - Warehouse and Product Aging cell Automation Process**
  - Led a cross-functional team of industrial robotics, computer vision and backend/frontend engineers to automate the process of cheese aging in dairy factories.
  - Developed software using ASP.net C# for an autonomous robotic system to facilitate mission planning for cheese washing, packaging, and storage processes, ensuring efficiency and accuracy in operations. It uses RabbitMQ as a message queue, facilitating robust and efficient asynchronous communication between robot management services.
  - Designed and developed a comprehensive database using PostgreSQL for a warehouse management system, enabling the storage and retrieval of detailed product information and precise location tracking of products racks.
  - Developed a notification system to alert operators of factory issues in real-time, ensuring prompt response and resolution to maintain operational efficiency, using RabbitMQ for messaging with C# for handling websockets for real-time communication.
- **Raccorderie Metalliche SpA - Multi-Line Production Flow Optimization System**
  - Designed and developed an algorithmic based system for combining the output of multiple production lines into a single final phase leading to significant space and equipment cost reduction. Developed web application using ReactJS for operators to create orders for each production line and display them on monitors above each line.
  - Additionally, implemented middleware using C# and ASP.net to control production flow of boxes to the correct locations, the middleware continuously read boxes dimensions and weights to ensure standards compliance, and sending signals to PLCs to allow correct pallets to proceed while discarding unfit ones.
  - The system utilize priority queues for efficiently tracking and sorting orders received, incorporating multi-threading and asynchronous programming to enhance performance and scalability.
- **Baker Hughes - PalletSwap Automation System**
  - Developed a full-stack application that enables warehouse operators to use the web application to request automated pallet exchanges through a fleet of mobile robots. The backend manages mission assignments, selects appropriate robot dropping locations based on presence sensors, and tracks mission progress.
  - The backend is implemented in ASP.net and PostgreSQL/Entity framework, while the frontend is developed using ReactJS.
- **Deloitte Italia - ArmonAI SmartAssistant**
  - Developed an internal AI company assistant tool capable of listening and responding to user commands in various situations such as: controlling LED monitors, speakers, temperature settings, and responding to user prompts.
  - It involved fine-tuning large language models (LLMs) to align with client requirements using technologies such as PyTorch, Hugging Face Transformers, and cloud platforms and Google Vertex AI. This process involved customizing model behavior for domain-specific applications, optimizing performance, and providing tailored solutions to enhance accuracy and user experience.
- **Sun Chemical SpA - Order Flow Warehouse Total Automation**
  - Designed and implemented a web application to control manufacturing orders end-to-end. It supports loading and processing product orders from SAP and visualizing them in an intuitive UI. It also manages a fleet of autonomous mobile robots for executing order assembly and processing.
  - Frontend implmented in ReactJS with Tailwind CSS and backend is implemented in Java, structured as microservices to ensure scalability, optimization, and high performance. The backend processes weekly system statistics, exporting data to Excel for record-keeping in addition to ingesting it into the company database for monitoring and analytics.
- **Enel Energia SpA - Production Automation Management with Mobile Robots Integration**
  - Developed a full stack application for monitoring and tracking the production of solar panels to streamline the plant production processes and improve efficiency.
  - It includes visualizations of various statistics collected by a low level RFID sensor protocol over TCP/IP network. The application dispatches missions to MiR autonomous mobile robots, enhancing production efficiency and agility within the plant.
  - The frontend is implemented in ReactJS with Tailwind CSS while the backend is implemented using Java to continuously read RFID sensors and execute distinct missions based on the values read, optimizing tracking and task automation.
- **Muster & Dikson SpA - Plant Production Insights and Communication Dashboard**
  - Designed and implemented an admin panel with a comprehensive dashboard, enabling managers to monitor production status and creating manufacturing statistics. Set up and managed a custom mail server using Postfix ensuring reliable email delivery for notifications and user communication.
  - The frontend is implemented using ReactJS creating an intuitive user interface with custom UI/UX design using vanilla CSS, while the backend is implemented in ExpressJS and PostgreSQL.

Contrack International, Inc - Estimation Team July 2017 - September 2017
Cairo, Egypt

- Usage of the preliminary research data to calculate the overall cost of project U.S. Consulate General Dhahran, Saudi Arabia and report back to the procurement team about the updates needed at each step.

Master Dissertation

Deep Generative Latent Models for Multidimensional Improper Signals

A state of the art machine learning generative model is created in the quaternion domain which is designed for learning and generating multidimensional signals (RGB images/ Ambisonic audio). The outcome model outperforms other models when trained on the same datasets with an average of 10% improvement in quality of generated data. Our exact solution was able to better learn the deep inter-correlations in the dataset structure and obtain superior feature understanding. The results showed that these additional interconnection reduced over-fitting.

Technical Skills

• Java • C# • ReactJS/TypeScript • Python • Apache Spark • AWS • PostgreSQL • MongoDB

Projects

Web page Search Engine /MarawanHassaan/Locality-sensitive-Hashing

- Implementation of a search engine on real estate advertisements on Kijiji.com. It starts with advertisements pre-processing with linguistic analysis of textual fields followed by building an inverted index and search engine index to perform proximity queries.
- It has the ability to perform nearest neighbours search for advertisements by keyword extraction, shingling, minimum wise hashing and locality sensitive hashing to find similar pairs to build a matching query processing system.

Quaestio /MarawanHassaan/Questions-App-Frontend

- An android application allowing users to publicly ask questions on different topics and view answers from other users. It supports different authentication ways such as creating accounts and logging in with Facebook. The backend is implemented in Ruby on Rails.

Conditionly /MarawanHassaan/IoT-Conditionly

- A suite of software applications that provides an intuitive way to remotely control users' apartments A/C in order to find the perfect temperature before you get home by using IoT and AWS. The hardware consists of a micro-controller connected to the A/C controller receiving commands from the server.

Hermes /MarawanHassaan/Hermes-application

- A cross-platform mobile application to provide users with a travel guide in different cities to give the shortest path to various directions. Additionally, It suggests points of interests with description of the activity and the possibility to book a reservation as well as general information about the city transportation system. It is implemented with Ionic/Angular.

Announcements Processing /MarawanHassaan/web-pages-processing

- This project aims at downloading apartments announcements from different web pages, parsing and analysing their description to produce a file of apartments listings and sort them based on the prices or different regions. It is able to compute number of announcements in certain areas with the average apartments prices to provide the user with the possible solutions.

Music Genre Classification /MarawanHassaan/text-classification

- A music genre classification using the lyrics of songs. It starts with feature extraction by filtering and analyzing lyric words, then building various neural networks such as fastText, RCNN and compare their results to choose the best suited model. The different networks are also compared to BERT model using transfer learning technique.

Movies Recommender System

- A MapReduce data pipeline that processes thousands of movies' ratings to be able to recommend unwatched movies to users based on their taste. The system can produce different lists such as a user's list of favourites in addition to aggregates lists such as lists of most popular/highest rated movies. It can apply collaborative filtering based on similar movies previously highly rated by the user or content based approaches to estimate user's rating based on users whose ratings are similar. The system creates a user profile to recommend new and unpopular movies.

Data Integration System

- Implementation of of a tool to integrate and merge movies information from disparate data sources (IMDB, Rotten tomatoes, Netflix) using Pentaho system to build a unified dataset with all available information such as the movie details, release year, actors, directors and genres. The system materialize the results into both a group of CSV files and a PostgreSQL database to create more inclusive set with ensured axioms for each movie.

Relevant Coursework

• Data Structures • Algorithms • Computer Network Security • Operating Systems • Linear Algebra • Computer Networks • Distributed Systems • Big Data • Large Scale Data Management • Data Mining • AI & Deep Learning