Ahmad Abdulhameed

Senior Software & Machine Learning Engineer

Hurghada, Egypt | +201005472999 | ahameed.mst@gmail.com | www.linkedin.com/in/ahmad-ahameed

Profile

Multidisciplinary engineer with expertise in **software engineering**, **machine learning**, **computer vision** and **NLP**, as well as hands-on experience in **IoT**, **embedded systems**, and **electronics**. Skilled in designing scalable, user-centric systems and bridging the gap between software and hardware. Proficient in software architecture, ensuring robust, maintainable solutions.

Experience

SOFTWARE & MACHINE LEARNING ENGINEER | ENPPI | FULL-TIME | 2018 – PRESENT

- **NLP:** Building a Retrieval-Augmented Generation (RAG) application to manage engineering and non-engineering documents, enabling cognitive AI capabilities and boosting employee productivity.
- **Technical Leadership:** Leading technical meetings with third-party vendors, providing guidance and discussing critical technical points to ensure alignment with project goals.
- **Digital Transformation:** Facilitated business process alignment, translated models into technical requirements, and ensured clear communication between stakeholders and third-party teams.
- **Engineering-Focused Software Development:** Developed in-house software solutions for multidisciplinary engineering tasks, leveraging a mechanical engineering background to align technical requirements with business needs.

SOFTWARE & NLP ENGINEER | REMOTELY | PART-TIME | 2024 – PRESENT

- Developing and maintaining **web crawling & NLP data extraction** systems for news and **structured data**.
- Implementing **topic modeling**, clustering similar news stories, and extracting relevant news details for enhanced search.
- Designing **scalable architectures** for news aggregation, managing databases, and optimizing semantic search.
- Building **RESTful APIs** for topic-based search and automating grouping of news story threads.
- Ensuring system reliability through testing, validation, and clean code practices.

IOT& FULL-STACK ENGINEER | STARTUP | PART-TIME | 2020 – 2022

- Designed **IoT system architecture**, integrating hardware, firmware and software.
- Developed firmware for embedded systems and optimized device communication.
- Built **cross-platform application** for real-time monitoring and control.
- Implemented **cost-saving strategies**, including decentralized device communication.
- Adapted existing hardware, embedding custom microcontrollers for seamless integration.

Technical Skills & Toolboxes

- Programming Languages:
  Python (main), TypeScript, JavaScript, C/C++

- Databases & Data Management:
  PostgreSQL, MongoDB, Qdrant, SQLAlchemy, Alembic (DB Migration)

- NLP:
  Hugging Face, Ollama, Langchain, LlamaIndex, LiteLLM (LLM Proxy)

- Computer Vision:
  Detectron2, Ultralytics, MediaPipe, Torchvision

- Version Control & CI/CD:
  GitHub, GitHub Actions

- Containerization & Orchestration:
  Docker, Podman, Kubernetes

- Messaging Systems:
  Kafka, RabbitMQ, MQTT

- Python APIs:
  Flask, FastAPI, Django

- Web & Desktop Development:
  HTML, CSS, Django, React

- Data Visualization:
  PowerBI, Matplotlib, Plotly, Seaborn

- Robotics, Electronics & Simulation:
  ROS2, Gazebo, RViz, IoT Development, Embedded Systems, PCB Design

Projects

DataBrain (RAG) System | Corporate Project

Solely developing a scalable RAG-based system for collecting, processing, and retrieving documents across engineering and non-engineering disciplines, with future extensibility and maintainability in mind.

- **Document Management:** Collects and stores documents in a centralized repository, with plans for future integration into a document management system.
- **Metadata Extraction:** Extracts key metadata for structured indexing and efficient retrieval.
- **Chunking & Vectorization:** Segments documents into meaningful chunks and generates embeddings.
- **Vector Database Storage:** Stores processed chunks and metadata in PostgreSQL + ParadeDB for fast, semantic search.
- **Chat with Your Documents:** Allows users to upload documents, which the system ingests, enabling interactive Q&A with an LLM based on the document's content.
- **Intelligent Retrieval:** Enables users to find relevant documents based on embedding similarity.

Automated Web Crawling & NLP-Based Info Extraction | Remote

- Developed a **web crawler** to extract structured data from news websites.
- Built **RESTful APIs** for third-party and user interactions.
- Integrated **Redis & Celery** for background processing and scheduled tasks with **Cron jobs**.
- Used **LiteLLM** as a proxy to monitor LLM usage, with **Pydantic models** for structured validation.
- Designed using a **monolithic-first approach**, ensuring future transition to **microservices**.

Department Evaluation & Bonus Estimator | Corporate Project

- Developed a **performance tracking system** to rank employees and analyze department-wide productivity.
- Integrated **MongoDB** for database management and **Pandas** for data analysis.
- Designed a **PyQt5-based** UI for seamless user interaction.
- Planned Machine Learning integration for **data-driven parameter tuning** in performance evaluation.

Stress Analysis Critical Line List Generator | Corporate Project

- Developed a **Python-based stress analysis tool**, reducing report generation time from **2–3 days to 30 seconds**.
- Improved **accuracy and efficiency** in assessing pipeline criticality.
- Built **automated report generation** using **PyMuPDF**, with **Pandas** for data handling.
- Created a **PyQt5 GUI** for user-friendly operation.

Waqqad Smart Home | Startup-Project

- Developed an **IoT-based smart home system** for device control via mobile and web interfaces.
- Built a **Flutter-based** UI and used **Firebase** for real-time data storage.
- Programmed **ESP8266 microcontrollers** with **C/C++ (PlatformIO)** to manage device communication.
- Implemented an **intelligent dynamic master node** selection system, leveraging periodic rotation and the availability of the current master node to ensure redundancy and reduce hardware costs.
- Integrated **existing consumer devices** with embedded microcontrollers, eliminating custom manufacturing needs.

Education

B.S. IN MECHANICAL ENGINEERING | MAY 2016 | FACULTY OF ENGINEERING, CAIRO UNIVERSITY - GRADE: V.GOOD

Languages:

- **Arabic**: Mother Language
- **English**: Advanced