Ahmad Abdulhameed

Software | NLP | Computer Vision | IoT | Mechanical Engineer

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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.

Technical Skills

- **Cloud Platforms:** AWS (EC2, S3, Lambda, Firebase), Google Cloud (GCP), Beam Cloud Services (Serverless Operations)
- **Containerization & Orchestration:** Docker, Podman, Kubernetes
- **Programming Languages:** Python (main), TypeScript, JavaScript, C/C++
- **Software Development:** Cloud-native architecture, Microservices, RESTful APIs, Clean Coding, Software Architecture, System Design
- **Databases:** PostgreSQL, ParadeDB, MongoDB, Qdrant, SQLAlchemy, Alembic (DB Migration)
- **Messaging Systems:** Kafka, RabbitMQ, MQTT
- **Monitoring & Observability:** Prometheus, Grafana, OpenTelemetry
- **DevOps & CI/CD:** GitHub, GitHub Actions
- **IoT & Embedded Systems:** IoT Development, Embedded Systems, PCB Design, Device Communication Protocols
- **AI/ML/NLP:** Hugging Face, Ollama, Langchain, LlamaIndex, LiteLLM (LLM Proxy), Detectron2, Ultralytics, MediaPipe, Torchvision, MLFlow, Dagshub
- **Web & Mobile Development:** React, HTML, CSS, Flutter, PyQt
- **Data Visualization:** Matplotlib, Plotly, Seaborn
- **Robotics & Simulation:** ROS2, Gazebo

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

- Developed and maintained scalable **cloud-based** web crawling and NLP data extraction systems, ensuring high availability and performance, utilizing **Beam for serverless operations**.
- Designed scalable architectures, managing databases (e.g., PostgreSQL, Qdrant -vector database - and Supabase), and optimizing search.
- Built RESTful APIs and integrated background processing for automation.
- Ensured system reliability through testing, validation, and clean code practices.

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

- **Designed and built complete IoT system architectures**. This included connecting hardware, firmware, and **cloud software** for systems that could grow easily.
- Improved how IoT devices communicate. We developed efficient firmware for embedded systems like **ESP8266** to send data reliably to cloud platforms.
- Created and managed **cloud-based applications** for phones and web. These apps allowed real-time monitoring and control of IoT devices, making them easier to use and more efficient.
- **Saved significant costs** by making device communication more efficient. We used decentralized systems and added custom microcontrollers to existing hardware, reducing the need for new manufacturing.
- Made sure our systems were **secure and followed rules**. We designed safe ways for devices to talk to each other and handle data within the IoT system.

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 + Qdrant (vector database) 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
- **Urdu / Hindi**: Basic