Amr Breekaa

Remote | amrbreekaa@gmail.com | +20-1025728822 | Portfolio | amrbreekaa | amrbr

Summary

Software Engineer specializing in Machine Learning and data-driven systems. Experienced in building end-to-end ML pipelines and scalable backend APIs. I apply a research-led approach to develop high-impact, secure software and am dedicated to bridging the gap between technical research and production-ready products.

Projects

Archery Score Detector */Score-Detection*

- Trained a custom YOLO26s object detection model on a self-labeled dataset of 500+ archery images to automatically detect arrows and target components with 87.5% mAP50 on unseen data.
- Built a computer vision scoring pipeline combining HSV-based perspective correction, ellipse fitting, and Euclidean distance geometry to calculate scores against official World Archery ring ratios.
- Tools Used: Python, PyTorch, Ultralytics YOLO, OpenCV, Roboflow

Reverse Dictionary */Reverse-Dictionary*

- Designed and benchmarked five NLP architectures for Arabic reverse dictionary retrieval, progressing from TF-IDF and FastText to fine-tuned Transformers and LLMs, achieving 39.8
- Built a custom Arabic preprocessing pipeline using CAMeL Tools covering diacritics removal, orthographic normalisation, and morphological lemmatisation, and implemented a two-layer evaluation system distinguishing raw string matching from morphological matching to fairly assess model performance on an inflection-rich language.
- Deployed a RAG pipeline using ChromaDB and multilingual-e5-base embeddings on a 76,000-entry vector index, improving LLM Top-1 accuracy by 13 percentage points over zero-shot inference while running entirely on local Apple Silicon.
- Tools Used: Python, PyTorch, Hugging Face, LLMs, RAG, FAISS, ChromaDB, CAMeL Tools, MLX

Adversarial Attacks on Deep Learning Models */Adversarial-Attacks*

- Investigated vulnerabilities in Arabic NLP models using Char-level (shuffle, flip, special characters, space) and Word-level (BERT) adversarial attacks.
- Conducted experiments to evaluate model robustness and analyze model performance under adversarial conditions.
- Implemented reproducible Python workflows to run and test attacks on Arabic datasets.

Experience

Data Engineer *Riyadh, SA*
Ejada Systems *Aug 2023 – Present*

- Developed a full-stack enterprise app with React, Spring Boot, and Apache Solr, deployed on different DBs.
- Built real-time streaming platform using Apache Flink with Kafka and HDFS integrations.
- Owned and enhanced a Java + MVEL rule engine, ensuring robust, maintainable business logic.
- Managed deployments across multiple environments and collaborated with clients for issue resolution.

Deep Learning R&D Intern *Remote*
Alexandria University *Jul 2022 – Sep 2022*

- Fine-tuned pre-trained Transformer to detect programming languages in files, implemented in PyTorch and Python.

Education

Alexandria University, Egypt *Sept 2018 – July 2023*
Bachelor of Engineering in Computer and Communication

Technologies

Languages: Python, Java, SQL, JavaScript, Rust

Technologies: PyTorch, Docker, Flink, Kafka, Spring Boot, FastAPI