Ahmed El-Adl

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Education

Alamein International University — AIU Oct 2020 - Jun 2024
BSc. in Computer Science - Artificial Intelligence Science Program *New Alamein City, Egypt*

- **Relevant Coursework:** Data Structures and Algorithms, Prob & Stat, Linear Algebra, Deep Learning, NLP, Advanced Machine Learning, Intelligent Recommender System
- **Top 3 ranked in AIS program**
- **Full Academic Scholarship, President El-Sisi** | *Fall2020 - Fall2021*

Skills

Programming Languages: Python, Java, HTML, CSS, JavaScript, C, C++, SQL, R
Technologies: Pytorch, TensorFlow, OpenCV FastAPI, Ngrok, LangChain, HuggingFace, NLTK, Keras, Pandas, Numpy, Scikit-learn, Jupyter, Git, Flask, VsCode, AWS, Google Cloud
Concepts: Deep Learning, GANs, LLMs, Transformers, Reinforcement Learning, Natural Language Processing (NLP), Computer Vision, Model Optimization, Model Evaluation, Prompting Techniques, Fine-tunig Technique, Agile, Scrum
Languages: Arabic (Native), English (Intermediate), German (Basic).

Experience

Research and Innovation Hub - AIU Nov 2023 - Aug 2024
AI Research Scientist *New Alamein City, Egypt*

- I have had the honor of contributing as a co-author to the publication of approximately 7 research papers in the medical field utilizing AI, and two papers in the computer science field, including one as the primary author for my graduation project. These papers were published in reputable journals and presented at conferences.

Research and Innovation Hub - AIU Aug 2023 - Oct 2023
AI Research Intern *New Alamein City, Egypt*

- Applied Wavelet Transforms to process blood pressure time series and generate scalograms.
- Trained a convolutional neural network (CNN) model on the scalograms to classify healthy and sick subjects based on their blood pressure patterns.
- Used saliency maps to visualize the regions in the scalograms that have the highest influence on the CNN model's predictions and to identify the frequency peaks that are most relevant for the classification task.
- Calculated the spectral densities for each scalogram at the identified frequency peaks.
- Achieved a test accuracy of 94% in CNN classification

Information Technology Institute (ITI) Fab 2022 - May 2022
Software Engineer Intern *New Alamein City, Egypt*

- Developed a client-server application enabling authenticated users to engage in chat, displaying user statuses (Available, Offline, or Busy). Additionally, empowered users to locally save their chat session logs to a file.

Selected Projects

AIQ – RAG-based Generation of Questions for Dynamic MOOC Assessments (Graduation Project) | *AIU, Sep 2023- Jun 2024*

- Created an AI Pipeline using few-shot prompting with Llama3-70B to generate formative and summative multiple-choice questions (MCQs) from MOOC transcripts. Through a web interface, users can specify parameters such as the number of MCQs, distractors, subject, and level, with the system extracting relevant examples from the dataset. Designed a solution integrating FastAPI and ngrok on a Lambda Server Workstation to provide a responsive API for seamless user interaction.
- Built the Retriever and LLM Reader components for the RAG process, organizing MOOC datasets into a vector database for efficient retrieval. Utilized the Llama3-70B model to process retrieved content for MCQ generation and ranking. Incorporated Whisper, an open-source speech recognition model, to ensure accurate, noise-resistant text extraction from videos.

- Assessed Zero-Shot Prompting, Few-Shot Prompting, and Retrieval-Augmented Generation (RAG) systems using the RQUGE metric for MCQ relevance, finding that RAG with LLama3-70B scored highest at 4.46/5; developed an evaluation dataset critiqued on Groundness, Relevance, and Stand-alone criteria using an LLM-as-a-judge agent, and achieved 83.3% accuracy with Baseline RAG + Ranker + Reader LLM.

Improving Mistral 7B model with Attention Sinks and Parameter-Efficient Fine-Tuning | *Nov2023-Jan2024*

- Fine-tuned Mistral Instruct 7B models, based on the transformer architecture with attention sinks (1M Tokens), leveraging the Dolly 2.0 dataset.
- Implemented parameter-efficient fine-tuning techniques such as QLoRA to enhance model performance.
- Assessed the quality and diversity of the generated texts using automatic metrics like BLEU and ROUGE, with Dolly 2 serving as the reference.
- Developed an application that utilizes the fine-tuned model to dynamically generate task-specific instructions based on user inputs.

ICPC AIU Community | *Apr2023-May2023*

- Developed a database system for the ICPC Club at Alamein International University using Python and SQL, enhancing club operations by enabling efficient data management of member information, event records, and training materials.
- Designed a user-friendly GUI for the database system, facilitating easy data manipulation (addition, deletion, updating, and display) by users and improving interaction with club data.

Facebook – A Social Media Platform | *May 2021 - June 2021*

- Developed a Java-based social media platform application, enabling users to connect with friends and family, post and read messages, and access various social media features. Developed using UML diagrams, Object-Oriented Analysis, and Design principles.

Selected Publications

- Ahmed Khaled Eladl, Mohamed Soliman, Islam Elkabani, Laila Shoukry. “AIQ – RAG-based Generation of Questions for Dynamic MOOC Assessments”. In: *International Conference on Universities Artificial Intelligence Technology (2024)*.
- Moamen Ayman, Ahmed Khaled Eladl, Laila Shoukry. “MyClassBot: A RAG-based Audio Chatbot guiding Students and Faculty navigate their Schedules”. In: *International Conference on Universities Artificial Intelligence Technology (2024)*.
- Nour-Mounira Bakkar, Ahmed K. El-Adl, Abdalrhman Mostafa, Mohamed Abdelhack and Ahmed F El-Yazbi. “Age-and Sex-Specific Aberrations of Arterial Pressure Control in Prediabetes: What does Machine Learning reveal about Frequency Domain Analysis of Blood Pressure?”. In: *American Society of Pharmacology and Experimental Therapeutics 2024, St. Louis, Missouri, USA,*.
- Nour-Mounira Bakkar, Ahmed K. El-Adl, Abdalrhman Mostafa, Mohamed Abdelhack and Ahmed F El-Yazbi. “A Convolutional Neural Network Classifies Beat-to-Beat Arterial Pressure Spectrograms and Wavelet Transforms according to Age, Sex, and Metabolic State: Novel Frequencies for Cardiovascular Risk Appraisal”. In: *American Physiology 2024, USA*.
- Nour-Mounira Bakkar, Ahmed K. El-Adl, Abdalrhman Mostafa, Mohamed Abdelhack and Ahmed F El-Yazbi. “Leveraging the Power of Pretrained VGG16 for Classification of Liquid Chromatography Mass Spectrometry Heatmaps and Possible Identification of Biomarkers of Organophosphate Exposure-Associated Pathological Processes”. In: *American Heart Association Scientific Sessions 2024, Philadelphia, Pennsylvania, USA*.

Courses

Generative AI with Large Language Models from DeepLearning.AI - 16hrs | *Apr 2022 - May 2022*
Advanced Computer Vision with TensorFlow from DeepLearning.AI - 20hrs | *Mar 2024 - Apr 2024*
Introduction to Machine Learning in Production from DeepLearning.AI - 15hrs | *Feb 2024 - Mar 2024*
Natural Language Processing Specialization from DeepLearning.AI - 120hrs | *Jun 2023 - Sep 2023*
Neural Networks and Deep Learning from DeepLearning.AI - 20hrs | *Dec 2022 - Jan 2023*
Machine Learning for All from University of London - 20hrs | *May 2022 - Jun 2022*