Ahmed Hammad

Cairo, Egypt

📞 +201002191222   ✉ ahmed.mustafa@ejust.edu.eg   💼 ahmedhazab

Summary

A passionate researcher specializing in Natural Language Processing (NLP). I obtained my MSc degree from E-JUST in NLP, my work centers on developing Text-to-Speech systems for Egyptian Arabic using cutting-edge models. Recognizing language's importance in communication, I am driven by curiosity about empowering machines to understand its nuances. With acceptance to present at ICINCO and finalist recognition, I am eager to apply my NLP expertise to real-world challenges.

Education

Egypt Japan University for Science and Technology   March. 2021 – May. 2024
Master of Science in Computer Engineering   *Alexandria, Egypt*

- Collected a high-quality dataset for Egyptian Arabic so it can be used to train TTS model.
- Designed a TTS synthesis model for Egyptian Arabic.
- Implemented the designed model on authentic texts and recorded the results.
- Compared the model's results with other models based on MOS (Mean Opinion Score).

Faculty of Engineering, Assiut University   Sep. 2015 – May 2020
Bachelor of Science in Computer Engineering Grade:Very Good (Top 5 of the Class)   *Assiut, Egypt*

Experience

El Sewedy University of Technology - Polytechnic of Egypt   September 2024 - Present
Assistant Lecturer   *Cairo, Egypt*

- Assisted professors with teaching and grading assignments for undergraduate courses in the Computer science and engineering department.

Egypt Japan University for Science and Technology   March 2021 - August 2024
Teaching Assistant/Research Assistant   *Alexandria, Egypt*

- Assisted professors with teaching and grading assignments for undergraduate courses in the Computer science and engineering department, including an introduction to AI and Software Engineering.
- In my role as a research assistant, I specialize in Natural Language Processing, with a particular focus on the Arabic language. My work primarily involves the development of Text-to-Speech (TTS) systems and associated models for Arabic.

Projects

Masry: A Text-to-Speech System for the Egyptian Arabic | *Python, PyTorch, TensorFlow*

- Masry, an end-to-end system for synthesizing Egyptian Arabic speech. It utilizes advanced Tacotron speech synthesis models (Tacotron1 and Tacotron2) with Griffin-Lim and HiFi-GAN vocoders to create natural Egyptian Arabic speech from mel-spectrograms. The study includes the construction of a dataset.

Automated Text2SQL Prompt Optimization | *Python, SQLite, DSPY*

- Developed a Text2SQL pipeline to convert natural language questions into SQL queries using dspy for prompt optimization.
- Built an SQLite database from Kaggle's Employee Dataset and designed an evaluation set with 30-70 user questions and Gold SQL queries.
- Implemented a Text2SQL model and measured execution accuracy to assess query correctness.
- Optimized prompts using dspy to enhance query generation accuracy and improve performance metrics.

Arabic Product Recommendation Chatbot for Retail | *Python, LangChain, OpenAI APIs*

- Developed an Arabic Product Recommendation Chatbot leveraging Retrieval-Augmented Generation (RAG) to enhance accuracy and contextual relevance in retail queries.
- Integrated vector databases to enable efficient retrieval of product descriptions, supplier details, and Q&A pairs for precise recommendations.
- Implemented entity recognition and intent classification to map user queries to relevant products with high precision.
- Optimized Arabic NLP pipelines to handle linguistic complexities, improving query understanding and response coherence.

Robotic Arm (Graduation Project) | *C, Machine Learning*

- The BSc final project involves creating a 3-DOF robotic arm that utilizes a microcontroller for controlling its movements. The controller doesn't require prior knowledge of the arm's mechanical design and can adapt to various environmental changes, including different loads.

Professional Development

Machine Learning Specialization, Coursera.

Udacity's AI Programming with Python Nanodegree.

Generative AI with Large Language Models, Coursera

Building and Evaluating Advanced RAG Applications, DeepLearning.AI.

Technical Skills

Programming Languages: Python, C, C++, MATLAB
Machine Learning : TensorFlow, Pytorch, Scikit Learn, Numpy/Pandas, Matplotlib, CUDA, LLMs, RAG
Technologies/Frameworks: Linux, GitHub, LangChain, Hugging Face, DSPY
Problem Solving Skills, Design Patterns, Software Engineering Methodologies
Languages: English: IELTS: 6.5 September 2024, Arabic: Native

Recognition and Awards

- **Best Student Paper Finalist at ICINCO 2023.**
- **Master's Scholarship from Egypt-Japan University of Science and Technology (a fund of 270000EGP) 2021.**
- **Participated in ACM ECPC as of one 3 teams from our university and the only team from our college -2016.**

Leadership / Extracurricular

Enactus Assiut   **July 2018 – June 2020**
Project Leader   *Assiut University*

  ∗ I served as the leader for a project focused on educating children about STEM (Science, Technology, Engineering, and Mathematics) and fostering their skills in this field.

Assiut Robotics Team   **January 2016 – December 2019**
Head of Organizing Committee and Technical Member   *Assiut University*

  ∗ During this period, I worked on various robotics projects, including the development of a Robotic Arm, and took part in several competitions related to this field.

Ideasgym Labs and Techno Kids Labs   **September 2018 – April 2019**
Instructor and Coach   *Assiut Silicon Waha*

  ∗ I worked as an instructor for students aged 10 to 16, teaching them about robotics and electronics. Additionally, I took on the role of a coach for these young learners, guiding and preparing them to participate in robotics competitions.

Publications

Azab, A.; Zaky, A.; Ogawa, T. and Gomaa, W. (2023). Masry: A Text-to-Speech System for the Egyptian Arabic. In Proceedings of the 20th International Conference on Informatics in Control, Automation and Robotics - Volume 2, ISBN 978-989-758-670-5, ISSN 2184-2809, pages 219-226.

Teaching Experience

ElSewedy University of Technology   **October 2024 – Present**
Assistant Lecturer   *CS Department*

Duties included shared responsibility for lectures, exams, homework assignments, grading, office hours, and leading weekly computer lab exercises, as well as advising, control work, and proctoring.

Computer Science Department
  · CET-111 Introduction to Computer Programming (Fall 2024)
  · CET-213 Software Engineering (Fall 2024)

Egypt Japan University for Science and Technology   **March 2021 – September 2024**
Teaching Assistant   *CSE Department*

Duties included shared responsibility for lectures, exams, homework assignments, grading, office hours, and leading weekly computer lab exercises.

Computer Science and Engineering Department
  · CSE-212 Computer Programming (Fall 2021, Fall 2022, Fall 2023)
  · CSE-213 Numerical Analysis (Spring 2022)
  · CSE-329 Computer Networks (Spring 2021, Spring 2022, Spring 2023)
  · CSE-322 Software Engineering (Spring 2021, Spring 2022, Spring 2023, Spring 2024)

- CSE-317 Data Structures (Fall 2021, Fall 2022, Fall 2023, Fall 2024)
- CSE-314 Advanced Programming (Fall 2021, Fall 2022, Fall 2023)
- CSE-326 Analysis and Design of Algorithms (Spring 2023, Spring 2024)
- CSE-434 Machine Learning (Fall 2022, Fall 2023)

Computer Science and Information Technology Program
- CSC-111 Fundamentals of Programming (Fall 2021)
- CSC-121 Data Structures and Algorithms (Spring 2022)
- CSE-214 Computer Organization (Fall 2021, Fall 2022, Fall 2023)
- CSE-312 Discrete Math (Spring 2023)

Faculty of International Business and Humanities
- MTH-122 Mathematics (Spring 2021)

Pharmacy Department
- NPC-111 Information Technology (Fall 2021)

References

Dr. Mostafa Soliman | *Professor*
Egypt Japan University for Science and Technology, Alexandria, Egypt
Email: mostafa.soliman@ejust.edu.eg

Dr. Ahmed Z. Bayoumi | *Assistant Professor*
Egypt Japan University for Science and Technology, Alexandria, Egypt
Email: ahmed.zaky@ejust.edu.eg

Dr. Mostafa Abdelrehim | *Senior Engineer*
Qualcomm, San Diego, California, United States
Email: mossaied2@gmail.com