

# Kareem Elozeiri

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## EDUCATION

### University of Science and Technology at Zewail City

6th of October, Egypt

*B.Sc in Communications and Information Engineering GPA: 3.84/4.00 (Provost's Honors Rol)*

Oct. 2020 – Aug. 2025

**Relevant Courses:** Data Structures & Algorithms, Database Systems, Operating Systems, Machine Learning, Deep Learning, Statistical Inference and Data Analysis, Information Theory.

## EXPERIENCE

### Mohamed bin Zayed University of Artificial Intelligence (MBZUAI)

Abu Dhabi, UAE

*NLP Visiting Research Student*

July 2024 – Present

- Work on new machine-generated content detection techniques, factuality checking, and explainability.

*NLP Research Intern*

May 2024 – July 2024

- Developed machine-generated text detection techniques on M4 and Outfox datasets using RoBERTa and DeBERTa.
- Expanded dataset and fine-tuned models to detect machine-polished and machine-humanized essays and abstracts.
- Conducted token and perplexity analysis to enhance model explainability.
- Implemented domain adversarial training for a RoBERTa-based model to make detection domain independent.

### Online Dimensions

Remote

*Machine Learning Engineer (Part-time)*

July 2023 – May 2024

- Worked on machine learning models for computer vision, NLP & time-series forecasting tasks.
- Developed ML pipelines using Django, sklearn, tensorflow, PostgreSQL & bash.

### Zewail City of Science and Technology

Egypt

*Undergraduate Machine Learning Research Assistant*

July 2023 – Present

- Optimized channel quality indicator prediction in 5G networks using signal auto-correlation analysis, time series analysis and convolutional recurrent neural networks.
- Optimize radio planning and transmission site localization using computer vision and reinforcement learning.

## PROJECTS

### 5G CQI Time series forecasting | Python, Pandas, Sklearn, Tensorflow

- Developed a **Convolutional Recurrent Neural Network (CRNN)** architecture to accurately predict channel quality factors in **5G networks**, enabling **optimized allocation** of network resources.
- Performed **input sequence length optimization** using **auto-correlation analysis**.

### JPEG Compression | Python, NumPy

- Implemented from scratch the JPEG blocks: **DCT, Quantization, Run Length Code, Entropy Coding** using **Numpy**.
- For entropy coding used both Huffman and finite-precision arithmetic coding algorithms.

### Lorenz Image Encryption | Python, NumPy, Flask, React.js

- Developed a **symmetric encryption algorithm** for images based on **lorenz attractor's chaotic nature**.
- Built a user-friendly React app with a REST Flask API backend for seamless utilization.

### Basmagly | React.js, TypeScript, Python, Flask, Hugging Face Transformers, MySQL

- Created an educational assistant website leveraging NLP to generate quizzes and Q&A pairs from user-provided text.
- Integrated retrieval-augmented generation (RAG) using Hugging Face Transformers for accurate question answering.
- Implemented a TypeScript/React front end and a Flask/Python backend, with MySQL for user data and chat storage.

## PUBLICATIONS

### LLM-DetectAIve: a Tool for Fine-Grained Machine-Generated Text Detection | EMNLP 2024 Demo

- Mervat Abassy, **Kareem Elozeiri**, Alexander Aziz, Minh Ngoc Ta, Raj Vardhan Tomar, *et al*.
- Paper Link: <https://arxiv.org/abs/2408.04284>

## TECHNICAL SKILLS

**Languages:** Python, C/C++, C#, Matlab, Go, Typescript, JavaScript, SQL, HTML/CSS.  
**Frameworks & Libraries:** Tensorflow, Pytorch, pandas, NumPy, Django, Node.Js, React.Js.  
**Software & Tools:** Linux, Git, Docker, MySQL, PostgreSQL.

## ACHIEVEMENTS & AWARDS

- Selected from over 1,000 applicants to join the Undergraduate Research Internship Program (UGRIP) 2024 at MBZUAI.
- Dell Egypt AI Hackathon Semi-finalist (2023).
- 32nd nationally on Egypt in Thanawya Amma Math section (Egyptian High School System) (2020).