

# Ahmed Osama Alkadi

## Mechanical and AI Engineer

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## PROFILE

Mechanical Engineer with a solid foundation in engineering principles, graduated from Alexandria University, Egypt. I have practical experience with professional mechanical software tools and a strong understanding of machine learning, enhanced by a 9-month AI and ML scholarship at ITI. Proficient in Python and deep learning algorithms, I am enthusiastic about integrating AI solutions into traditional engineering processes for innovative and optimized outcomes.

## EDUCATION

### 9-Month Professional AI and ML Scholarship

Information Technology Institute (ITI) 📍

10/2023 – 07/2024

Alexandria, Egypt

It is a fully funded Scholarship by the ministry of information and communication technologies in Egypt.

The AI and Machine Learning track provides a comprehensive understanding of AI and its applications. It covers concepts like supervised/unsupervised learning, neural networks, deep learning, and natural language processing. Practical aspects include data preprocessing, model evaluation, and optimization. Participants gain hands-on experience and a solid foundation in AI principles. Prerequisites: basic programming, statistics, and linear algebra. 📍

### Bachelors of Science in Mechanical Engineering.

Faculty of Engineering, Alexandria University

06/2015 – 07/2020

Alexandria, Egypt

Cumulative Grade (85.88%) – (Excellence with Honor), 8TH over 420 students, class 2020.

The mechanical engineering department focuses on the design, analysis, optimization, and manufacturing of mechanical systems. Key areas include thermodynamics, fluid mechanics, dynamics, materials science, and mechanical design. The department engages in research in power stations design and optimization, renewable and desalination systems, aerospace, and biomechanics.

## WORK EXPERIENCE

### Teacher Assistant

Physics and Mathematics department, Faculty of Engineering Alexandria University.

11/2023 – present

Alexandria, Egypt

### Electric Vehicles Researcher Engineer

Mechanical Engineering Department, Alexandria University 📍

07/2022 – 05/2023

Alexandria, Egypt

Electric Vehicles Researcher, leading a team of mechanical engineers. My role is to manage the design process, investigate, and construct a cooling system of the battery system of an electric vehicle. The project is a cooperative work with the military technical college. The project is adopted by The Arab Organization of Industrialization to make the first locally made EV.

### Co-author of published paper in the field of thermal storage units

Journal of Energy Storage Volume 62, 106832 📍

04/2023

Alexandria, Egypt

The research paper titled “The influence of elliptic aspect ratio and inclination angle on the melting characteristic of phase change material in concentric cylindrical enclosure”.

The published paper discusses experimentally and analytically the effect of the orientation and the geometry of the storage unit on the melting time, which concludes a commercially-optimized design for domestic use storage solar heaters.

The Journal of Energy Storage focusses on all aspects of energy storage in particular systems integration, electric grid integration, modelling and analysis with impact factor of (8.9), Cite Score of (11.8) 📍

## Mechanical Designs Engineer

Metito Water Treatment Company

Worked on three international projects, collaborating with multidisciplinary teams in Tunisia and Algeria, as well as on various projects in Egypt. My role was to set the plant General Arrangement, design the piping system and treatment processes and integrate with other departments.

07/2022 – 10/2023

Cairo, Egypt

## SKILLS

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### CFD and FE analysis

Ansys fluent/ Structure

### Programming Languages

Python, C, C++, MATLAB and EES

SQL and NoSQL

### Data Processing and Visualization

Pandas, Matplotlib, Seaborn

Plotly, Dash, PowerBI

### AWS Cloud

AWS Academy Cloud Foundations Certified [↗](#)

### Modeling and CAD design

Solidworks drawing, modeling and simulation

AutoCAD 2D & 3D drawing

### Machine and Deep Learning

Scikit-learn, numpy, PyTorch, TensorFlow and OpenCV

Recommender systems, Computer vision and NLP.

### Deep Learning

Coursera Deep learning Specialization by

DeepLearning.AI Certified [↗](#)

## EXTRACURRICULAR ACTIVITIES AND ACHIEVEMENT

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### Head of Mechanical Engineers | LYCANS Team | SAE Aero Design competition, USA [↗](#)

Field Team Captain 2022, Head Technical Mechanical Engineer responsible for wing design, aerodynamics analysis, and manufacturing in LYCANS team.

LYCANS Facebook Page [↗](#)

LYCANS team participated in SAE aero design West 2022, California, USA. LYCANS ranked 4th overall among more than 47 teams around the world.

LYCANS team participated in SAE aero design East 2021, Florida, USA. LYCANS ranked 2nd in the mission performance.

LYCANS team participated in SAE aero design West 2020, Texas, USA. LYCANS ranked 6th overall.

## AI PROJECTS (SELECTED)

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### Computer Vision. Visual And Textual Product Similarity Recommendation [↗](#)

This project recommends products based on their textual and visual similarity using cosine similarity. Visual features are extracted with ResNet-50, textual features with TinyBERT-6L, and images are preprocessed by removing backgrounds using a UNet model with MobileNetV2 encoder. Features are combined into vectors, stored in a vector database, and used to find and visualize the top similar products.

Tools: Pytorch, TensorFlow, OpenCV Libraries and Pinecone vector Database

### NLP. Arabic Dialect Classifier [↗](#)

The project aims to build a model to identify and classify different Arabic dialects from text data, ranges from using traditional ML Algorithms like LR and decision trees to more complex DL approaches such as LSTMs and hybrid models combining CNNs with LSTMs, to improve accuracy in dialect classification.

### Computer Vision. Driver distraction detector [↗](#)

The project aims to identify the types of distracted driver through their facial and body movement like arms and face pose. The project went through many stages of testing to increase the accuracy of the prediction from using simple NN to use pretrained models.

Tools: TensorFlow, Scikit-learn and Matplotlib Libraries.

### MobileNet-V1-Model Implementation From Scratch [↗](#)

This project implements the MobileNetV1 model using PyTorch from scratch, a lightweight convolutional neural network architecture designed for mobile and embedded devices. Then to train it on the CIFAR-10 dataset, which consists of 60,000 images across 10 classes.

### Adam, Adagrad and RMSProp optimizers Implementation From Scratch [↗](#)

This practical work involves developing a Python program to implement accelerated gradient descent methods with adaptive learning rates, specifically Adagrad, RMSProp, and Adam, for linear regression of a set of data points. These algorithms aim to optimize the learning process by dynamically adjusting the learning rate based on the gradients of the loss function, leading to faster convergence and improved performance

\*\* Please refer to GitHub account for all projects and further details [↗](#)