

# SAWSAN E. KASSEM

Cairo, Egypt ♦ +2 01002990427  
[sawsank118@gmail.com](mailto:sawsank118@gmail.com) ♦ [www.linkedin.com/in/sawsan-kassem-2a63961a2/](https://www.linkedin.com/in/sawsan-kassem-2a63961a2/)  
[github.com/sawsan185/](https://github.com/sawsan185/)

## EDUCATION

**Arab Academy for Science, Technology & Maritime Transport**  
*BS in Artificial Intelligence, Major in Data Science*

Graduated: January 2025  
**GPA: 3.7/4.0**

## COURSES AND TECHNICAL SKILLS

<b>Languages</b>	C, C++, C#, Python, R, SQL, HTML 5, CSS, JavaScript, Prolog.
<b>Software &amp; Tools</b>	TensorFlow, Keras, Pytorch, Power BI, Tableau, Express, MongoDB, PostgreSQL, Oracle, Bootstrap, Node.js, CUDA, OpenCV, AWS, Docker, pandas, scikit-learn, NumPy, Seaborn, Matplotlib, Scipy, NLTK, Selenium, MySQL, LaTeX, Unity, GeoPandas, Langchain, HuggingFace Transformers, Ollama, Apache Spark.
<b>Independent Online Courses</b>	Supervised Machine Learning: Regression and Classification, Advanced Learning Algorithms, Unsupervised Learning, Recommenders, Reinforcement Learning, AWS Academy Cloud Foundation.

## RESEARCH EXPERIENCE

**Arab Academy for Science, Technology & Maritime Transport**

Oct 2023 - Jul 2024

*Bachelor Thesis: Intellillearn - Advanced AI-Powered Educational Assistant*

- Designed and implemented a multi-modal chatbot assistant capable of processing lectures in various formats, including PDF documents, voice recordings, and video files.
- Leveraged advanced large language models (LLMs), such as GROQ, for dynamic question-answering, text summarization, and code generation tailored to the uploaded content.
- Integrated state-of-the-art speech-to-text (STT) models like Whisper for seamless transcription of audio and video lectures.
- Conducted an extensive literature review to analyze current educational technologies and identify opportunities for innovation through AI-driven tools.
- Delivered a robust and user-friendly platform, enhancing student engagement and personalized learning experiences by enabling real-time interactions and streamlined study support.

## INDUSTRY EXPERIENCE

**iSchool**

January-July 2024

*AI and Coding Instructor*

- Led interactive online coding classes for students aged 6 to 18, utilizing platforms such as Scratch and PictoBlox.
- Structured classes included both theoretical instruction and practical application, fostering engagement and reinforcing learning objectives.
- Offered individualized feedback and support to students, addressing their specific learning needs and fostering their development in programming languages and artificial intelligence concepts.

**Banque Misr**

July-August 2023

*Data Science Intern*

- Developed a loan approval prediction system leveraging machine learning models to assist the bank in making data-driven decisions, improving the efficiency and accuracy of loan approval processes.
- Designed and implemented an ATM optimization project, focusing on best routing strategies to restock ATMs efficiently. Utilized web scraping techniques to extract ATM location data from the bank's website and applied clustering algorithms to optimize ATM placement and routing logistics.
- Enhanced customer experience by building a system to identify the nearest ATM locations, providing real-time accessibility and convenience.
- Conducted data preparation, cleaning, and analysis to ensure data integrity and high-quality insights for machine learning development.
- Generated insightful visualizations and reports to communicate findings effectively to stakeholders.

**RobotLAB Inc**

Jun 2022

*Robotics Trainee*

- Deal with ROS concepts like nodes, topics, and messages to control robots.
- Acquired practical skills in debugging robot hardware issues and diagnosing problems.
- Demonstrated proficiency in designing 3D game environments using Unity.

## PROJECTS

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### LLM-Powered Multimodal Chatbot with RAG , [GitHub](#)

December 2024

- Developed a chatbot using Streamlit and RAG with open-source LLMs from Ollama, enabling question answering and summarization for PDFs, CSVs, and arXiv files. Integrated multimodal capabilities, including image captioning and visual question answering. Added audio I/O for voice prompts and responses, enhancing accessibility and interactivity.

### Boolean Search Engine , [GitHub](#)

November 2024

- Implemented Binary Search Tree (BST), Term Document Incidence Matrix, and Inverted Index to store and index Shakespeare's 44 books, measuring construction time for each.
- Designed a Boolean query processor with precedence handling, and integrated spelling correction for inaccurate queries.
- Calculated query parsing and retrieval time, optimizing search efficiency and response time.

### Hybrid Image Search System , [GitHub](#)

November 2024

- Built a high-speed image search system using traditional features (e.g., HOG, LBP) and deep features (VGG16). Combined features and reduced dimensionality with PCA for efficient storage and retrieval.

### Exploratory Data Analysis and Hypothesis Testing , [GitHub](#)

October 2024

- Performed descriptive and inferential statistical analysis using pandas, NumPy, and SciPy, including data cleaning, hypothesis testing, and correlation analysis.
- Visualized data distributions with matplotlib and seaborn, generating histograms, box plots, and heatmaps.
- Conducted hypothesis tests on population mean and variance, deriving insights through statistical inference.

### Text Correction using Transformers , [GitHub](#)

January 2024

- Implemented a text correction system using HappyTransformer and the T5 model. Utilized the JFLEG dataset for training and evaluation.

### Loan Approval Prediction , [GitHub](#)

October 2023

- Developed a web-based loan approval prediction system using MongoDB and machine learning for seamless dataset management, analysis, and visualization.

### Cyber-Attacks and Malware detection , [GitHub](#)

March 2023

- Deep learning model to detect and prevent cyber- attacks and malware before they occur.

### Food Recipes Website , [GitHub](#)

January 2023

- Designed and developed an interactive food recipes website using HTML, CSS, Node.js, Express, and MongoDB. Utilized JavaScript for interactivity and dynamic content.

### Fake news detection , [GitHub](#)

October 2022

- Preprocessed a dataset of news articles using Python and applying the tf-idf vectorizer to transform the text into numerical features.
- Logistic regression was chosen as the appropriate machine learning model and was trained using the preprocessed dataset.

### Ride Sharing System , [GitHub](#)

May 2021

- Simulated a ridesharing application in Python using OOP and data structures, modeling request flows, matching drivers to riders, calculating fares, and tracking ride statuses.

### Smart Attendance System , [GitHub](#)

March 2020

- Developed a basic security system using Arduino and RFID technology. The system involved using an RFID reader to scan RFID tags and authenticate access to a secure area.
- The project involved designing and building the hardware components, programming the Arduino microcontroller to control the system, and configuring the RFID reader to communicate with the microcontroller.

## EXTRACURRICULAR ACTIVITIES

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### AAST Innovation Club: Project Manager

Sept 2022

- Oversee and coordinate the planning, execution, and delivery of projects aimed at promoting technological advancements and innovations. I ensured effective communication and collaboration among team members, stakeholders, and partners, while adhering to project timelines and budgets.

## LANGUAGES

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Fluent in written and spoken English and Arabic; basic knowledge of German.