Amro A. Abdalla

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Education

Georgetown University | Washington DC, USA
Ph.D. in Computer Science — **Aug 2023 – Present**
Research Advisor: Prof. Sarah Adel Bargal
Research Focus: Computer Vision, Generative AI, Multi-modal Learning

The American University in Cairo – AUC | Cairo, Egypt
B.Sc. in Computer Engineering — **Feb 2017 – May 2022**
- **Awards:** Honors (Cum Laude), Dean's List, Merit scholarship from Al Ghurair Foundation to attend AUC.
- **Minors:** Mathematics, Business Administration

Industry Experience

Data Scientist - **Dell Technologies** — **Oct 2022 – Aug 2023** — **Cairo, Egypt**
- Developed an intercell interference detection algorithm in 5G networks using regression and clustering models.
- Submitted two patents on the use of AI in 5G networks.
- Contributed to Dell's yearly Hackathon, responsible for ideation, execution, and coordination with various teams to ensure a successful event. Mentored participating teams and received recognition from both participants and upper management for team's work.
- Mentored two teams in the annual Envision the Future Competition by Dell, leading one team to secure first place in the 2022-2023 competition for the Middle East, Turkey, and Africa.

Data Science Intern - **Dell Technologies** — **Mar 2022 – Oct 2022** — **Cairo, Egypt**
- Built and tested regression models that achieved **12%** improvement on existing fixed threshold-based methods for 5G admission control.
- Collected data from the *Network Simulator 3* and performed data analysis and visualization for insights.

Software Development Intern - **Siemens EDA (Mentor Graphics)** — **Aug 2021 – Oct 2021** — **Cairo, Egypt**
- Developed a new parsing tool in **C** for Mentor's UCDB database system to generate **XML** and text files of the corresponding database using **libxml** library and UCDB APIs.
- Wrote **Makefiles** to build and link the new tool with external libraries.

Development Intern – **The American University in Cairo** — **Jan 2020 – Jun 2020** — **Cairo, Egypt**
- Implemented a custom **stack unwinding** library for a new UNIX-based distributed micro-kernel using **C**, **C++**, and **x86 assembly**.
- Established support for g++ **exception handling** on Linux-based operating systems.

Academic Experience

Teaching Assistant – **The American University in Cairo** — **Sep 2021 – Dec 2021** — **Cairo, Egypt**
- Conducted tutorial sessions for students in the **Deep Learning course** about utilizing tools like **Tensor-Flow** and **NumPy** for implementing the concepts they studied in the course.
- Assisted students with their assignments and final projects.

Research Assistant – **The American University in Cairo** — **Jan 2020 – Jun 2020** — **Cairo, Egypt**
- Implemented a custom **stack unwinding** library for a new UNIX-based distributed micro-kernel using **C**, **C++**, and **x86 assembly**.
- Established support for g++ **exception handling** on Linux-based operating systems.

Papers

[1] Mallick R, **Abdalla A**, Bargal SA. FaithFill: Faithful Inpainting for Object Completion Using a Single Reference Image. arXiv preprint arXiv:2406.07865, 2024.

[2] Cui, C., **Abdalla, A.**, Wijaya, D., Solberg, S., Bargal, S.A. (2024). Large Language Models for Career Readiness Prediction. In: Olney, A.M., Chounta, IA., Liu, Z., Santos, O.C., Bittencourt, I.I. (eds) Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners, Doctoral Consortium and Blue Sky. AIED 2024. Communications in Computer and Information Science, vol 2150. Springer, Cham. https://doi.org/10.1007/978-3-031-64315-6_26

[3] Ahmed M, Moussa O, Shaheen I, Abdelfattah M, **Abdalla A**, Eid M, Eraqi H, Moustafa M.The Right Losses for the Right Gains: Improving the Semantic Consistency of Deep Text-to-Image Generation with Distribution-Sensitive Losses. arXiv preprint arXiv:2312.10854, 2023.

Projects

Garment Is All You Need
- Developed an inference pipeline using pretrained **diffusion models** and **IP adapters** to generate fashion models wearing certain garments.
- Allowed the user to personalize the generation by using text prompts and/or portrait images of a certain character.

Custom AI Assistant
- Built a custom chatbot based on the Llama 2 model using **HuggingFace** and **LangChain**.
- Used **FAISS** for efficient similarity search to allow the assistant to be contextually aware.
- Integrated file uploads and web search into the system to allow the user to ask questions about custom data and sites.

Insights into U.S crime patterns (Data Science)
- Collected five relevant datasets using web crawling and API calls and performed data cleansing and preprocessing.
- Conducted thorough statistical analysis on the datasets to gain insights into crime trends, victimization patterns, and recidivism.
- Performed cluster analysis to categorize states into groups based on their patterns of offense counts and plotted the results with Plotly.
- Conducted several other analyses (classification, topic modeling, hypothesis testing), and built a website to present the results.

Countries Encyclopedia (Databases Systems)
- Implemented a web crawler for information about all countries from Wikipedia and Google News using **Beutifulsoup** and **Selenium**
- Designed a Relational Model and inserted the collected data into a **MySQL** database using **pymysql**.
- Created an interactive CLI application using the **cmd2** package in Python to interface with the database.

Talks

Generative AI in Vision– **Dsquares Tech Meetup** **Aug 2024** **Cairo, Egypt**

- Invited by the Dsquares team to give a talk about Generative AI in Computer Cision with emphasis on industrial use cases (i.e., Generative AI for Fashion modeling).
- The talk was part of Dsquares' tech meetup where tech founders, CTOs, and university deans were featured.

Explainable AI in 5G Networks– **Dell Technologies Hackathon** **Feb 2023** **Cairo, Egypt**

- Gave a talk about explainable AI and its role in 5G AI-powered applications.
- The talk was part of Dell's annual hackathon for students and professionals.

Selected Graduate Courses

- Deep Learning for Computer Vision
- Empirical Methods in NLP
- Experimental AI
- Introduction to Deep Learning
- Introduction to Data Science

Skills

- **Programing**: Python, C\C++, SQL, Verilog, MATLAB, LaTex
- **Software tools and packages**: NumPy, Pandas, TensorFlow, Keras, PyTorch, Scikit-learn, OpenCV, Git, Linux, Arduino, KiCad

Extracurriculars

- Vice President | AUC Robotics Club
- Academics committee head | AUC Robotics Club
- General Manager | FabLab AUC
- Electronics team leader| Aquavaders ROV Team & Minesweepers Robotics Team