Ashraf Hany

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Education

2021 - Present BSc. in Computer Science, **MSA University**, Egypt **(Dual Degree Program)** **CGPA: 3.80/4**
First Class Honors
2021 - Present BSc. in Computer Science, **Greenwich University**, United Kingdom

Achievements

Best Undergraduate Project *Spring 2023*

- Awarded (Sophomore Best Undergraduate Project) for publishing a research paper in an IEEE conference during the 2nd year of my undergraduate studies.

MSA CPC Founding Community Leader *Fall 2023*

- Founded MSA Competitive Programming Community and participated at the ECPC 2023.

Second Place Winner at NU Quantum-AI Hackathon 2024 *Summer 2024*

- The challenge centered on a Raman shift spectroscopy dataset from a recent Nature paper. We were tasked with preprocessing the data to reduce 1389 features for encoding into a VQC (Variational Quantum Classifier), in addition to building and optimizing the VQC model itself using Qiskit.

Experience

Quantum Machine Learning Researcher | **MSA University** Spring 2024 – Present

- Utilizing quantum machine learning algorithms using Pennylane for a research project aimed at developing a QML classifier model and testing it on multiple datasets.
- Learning Quantum Computing.

Junior Teaching Assistant | **MSA University** Fall 2023

- Volunteered as a Junior Teaching Assistant for the courses:
  - `MTH103` Discrete Math
  - `CS213` Multimedia Programming
  - `CS232` Algorithms and Data Structures
  - `CS102` Fundamentals Of Computing II

Intern | **National Bank of Egypt** July 2023 – August 2023

- Developed a python script to check for variants of a domain name using symbol-oriented permutation.
- Back-seated the top industry professionals on Web Pentration Tests, Network Pentration Tests, Threat intelligence, Patching, VA, Incidents Handling, Phishing.

Full-stack Developer | **Freelancer** June 2023 – October 2023

- Developed websites from scratch using HTML, CSS, Javascript, Node.js, MongoDB for clients wanting to build websites to showcase their companies' work.
- Deployed projects on the clients' selected domains and handled the backend server configuration.
- Was repsonsible for developing the UI/UX of multiple projects.

HCI Researcher | **MSA University** Feb. 2023 – July 2023

- Directed a research project in Human-Computer Interaction (HCI). As the first author and project lead.
- Explored the application of Tangible User Interfaces (TUIs) in higher education programming, with the goal of assessing their effectiveness in comparison to conventional learning approaches.
- Coordinated between the volutneers, a total of 20 computer science students, aged 17 to 22, conducted a 45-minute learning activity with both TUI and traditional paper methods.
- Published and presented findings at the 1st Intelligent Methods, Systems, and Applications (IMSA 2023).
- Discussed this research with the Former Minister of Education in Egypt, Dr. Tarek Shawki, who is currently the university counselor for the American University in Cairo at his office at the AUC.

Publications and Submissions

Hany, Ashraf; Ramadan, Enjy; Akl, Amr; Atia, Ayman. *The Effect of Using Tangible User Interfaces Compared to Traditional Learning for Teaching Programming in Higher Education: An Experimental Study*. In: *2023 Intelligent Methods, Systems, and Applications (IMSA)*, 2023, pp. 514-519. DOI: `10.1109/IMSA58542.2023.10217780`

PROJECTS

Quantum Varitional Classifier | *Qiskit, Python* Hackathon – Summer 2024

- Secured second place in Egypt's first Quantum-AI Hackathon organized by Nile University.
- Worked on a Raman shift spectroscopy dataset from a recent Nature paper, which included contributions from an Egyptian scholar and Dr. Amr Essawi, a postdoctoral researcher at Stanford University.
- Preprocessed the data to reduce 1389 features for encoding into a Variational Quantum Classifier (VQC).
- Developed and optimized the VQC model using Qiskit's RealAmplitudes ansatz, ZZFeatureMap, COBYLA optimizer, and Sampler.
- Experimented with around 150 different models, achieving a testing accuracy of 71%, the second-highest among all teams during the 24-hour period.

Utilizing SVM and Decision Trees in Breast Cancer Detection | *Scikit-learn, Matplotlib, Numpy* CS316

- Developed and evaluated breast cancer detection models using Python and scikit-learn, achieving a consistent 96% accuracy with Decision Tree and Support Vector Machine algorithms.
- Applied advanced machine learning techniques including ensemble methods and feature engineering to refine model performance, emphasizing robust generalization on unseen data.
- Executed model validation with cross-validation and various performance metrics to ensure reliability and guide future enhancements with hyperparameter tuning and algorithm comparison

Tangible User Interface | *Java, TUIO* Research – Spring 2022

- Developed a tangible user interface using the TUIO library that can be interacted with physically using 3D Printed objects.
- Designed and Printed 3D figures that can be used to interact with the interface.
- Used this game to teach to students Priority Queue during a research project.

TicTacToe with AI | *Pygame, Backtracking* Harvard CS50AI

- Developed a tictactoe game that can be played against AI using pygame and backtracking

Huffman Compression Algorithm | *C++* CS213 – Fall 2022

- Developed a C++ program from scratch that can compress and decompress any file using Huffman's compression's algorithm. I developed the Huffman compression algorithm from the ground up without using any readymade functions.

Multimedia Game Development | *.NET, C#, NAudio* CS232

- Designed and developed **Escape the Castle,** A 2D action game set in a medieval castle environment. Utilized `.NET` and `C#` for game development.
- Crafted engaging characters and weapon systems. Designed sprites and animations for smooth interactions. Developed interactive game-play mechanics, including character movement, shooting dynamics, and enemy interactions.
- Implemented immersive audio experiences using `NAudio`. Created diverse sound effects for characters and weapons.

MILS School Management system | *Python* CS244 – Spring 2022

- Used the latest software engineering strategies (Observer, Factory, Strategy,...,etc.) to develop a system for a school in Cairo, Egypt
- Adopted the Model-View-Controller (MVC) architectural pattern.

SKILLS

Languages: Java, Python, C/C++, SQL (Postgres), NoSQL (MongoDB), LaTeX , JavaScript, HTML/CSS
Frameworks: Django, Larvel,Bootstrap ,jQuery
Developer Tools: Git, Google Cloud Platform, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse
Libraries: Pygame, Networkx, PyTorch, NumPy, Matplotlib, PennyLane
Mathematics: Calculus, Discrete Math, Linear Algebra, Numerical Analysis/Methods, Coding Theory
Algorithmics: Various Design Strategies (Greedy, Divide & Conquer, Dynamic Programming etc.)

EXTRACURRICULAR COURSES

Harvard CS50 *[CERTIFICATE]* (Harvard, edX)
Harvard CS50 AI With Python *[CERTIFICATE]* (Harvard, edx)
Supervised Machine learning: Regression and Classification *[CERTIFICATE]* (Coursera, Deeplearning.Ai, Stanford)
Microsoft Azure AI *[CERTIFICATE]* (Microsoft)
Microsoft Azure Fundamentals *[CERTIFICATE]* (Microsoft)