

# Mohammed Khalil Ghali

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## EDUCATION

**Binghamton University, State University of New York - Watson College of Engineering and Applied Science**

*Master of Science in Systems Science and Industrial Engineering*

**Expected May 2024**

**Al Akhawayn University in Ifrane - School of Science and Engineering, Ifrane, Morocco**

*Bachelor of Science in Computer Science*

**June 2022**

*Cumulative GPA: 3.55 (Magna Cum Laude)*

Minor: Business Administration

Related Courses: Big Data Environment, Intro to AI, Software Engineering, Computer Organization and Architecture, Operating Systems, Computer Communication, Object Oriented Programming, Data Structures, Analysis of Algorithms, Principles of Management, Principles of Finance, Multivariate Analysis, Enterprise Systems Engineering, Engineering Project Management, Modeling and Simulation, Probability and Statistics.

## RESEARCH EXPERIENCE

**Watson Institute for Systems Excellence, Binghamton University**

**Binghamton, NY**

*Graduate Research Associate: Innovation Associates*

**Fall 2022/Present**

- Building and optimization of an automated prescription-based medication filling system simulation model.
- Designing the control flow code of the simulation models to make every station precisely mimic the real life role in the actual system.
- Extract knowledge and insights from noisy, structured and unstructured data to help in informed decision making
- Writing the python script to generate the transactional data to run the simulation based on the actual demand

*Graduate Research Associate: LockerRoom345*

**Fall 2022/Present**

- Contributed in the end-to-end development and launch of LockerRoom345's website, enabling the non-profit organization to provide basic clothing to students in need within the Binghamton area schools through donations from Dick's Sporting Goods(DSG).
- Collaborated with stakeholders and volunteers to understand LockerRoom345's mission and translate it into a user-friendly website design that effectively communicated the organization's impact and resources.
- Participated in the implementation of a responsive website, utilizing JavaScript to architect a robust and scalable platform that ensures optimal user experience across devices, enables easy access to admin operations, and efficiently handles data for seamless interactions.
- Employed MongoDB as the NoSQL database to store and manage dynamic content, providing efficient data retrieval and storage for the website's clothing inventory, shipping records, and user information.

[www.lockerroom345.org](http://www.lockerroom345.org)

## PROFESSIONAL EXPERIENCE

**Center for Learning Excellence at Al Akhawayn University**

**Ifrane, Morocco**

*CRLA Certified Mentor*

**Fall 2020/ Spring 2022**

- Monitored more than 50 assigned mentees in their academic progress through frequent communication and weekly one-on-one sessions.
- Helped more than 100 freshmen, sophomore, junior, and senior students in academic matters.
- Assisted more than 100 students in the drafting of their degree plans and revisions (helping in the choice of minors and concentrations).

**Holding Soraya, Arrawaj Foundation**

**Rabat, Morocco**

*Security and Network Project Management Intern*

**Summer 2021**

- Assisted in the overhaul of the traditional 3-tier security and network architecture that was used.
- Worked on the installation of a hyperconverged infrastructure (Nutanix HCI) that will increase the production capability of the holding by up to 60%.
- Contributed to the setup of a Fortinet web application firewall to decrease the risk of DDoS attacks by 80%.
- Participated in the setup of a Fortinet Security Information and Event Management system (SIEM) against top 10 OWASP vulnerability attacks.

## PROJECTS

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### Generative AI, Large Language Models, Semantic Search and Retrieval Augmentation Project

Binghamton, USA  
Summer 2023, Present

*Advancing Research Inquiry: Harnessing the Power of Language Models and Semantic Search in an Intelligent Document-based Q&A Research Assistant*

- Developed an advanced chatbot for PDFs and documents using cutting-edge Large Language Models (LLMs) integrated with Langchain, enabling efficient access to domain-specific knowledge.
- Addressed existing limitations in chatbot systems by creating a powerful Q&A tool that provides accurate and insightful responses to complex research-related inquiries.
- Utilized a novel methodology involving semantic embedding generation and a vector database for efficient information retrieval, minimizing the high cost associated with extensive model fine-tuning.
- Conducted comprehensive performance comparisons of renowned LLMs, including Falcon-7B, Meta's LLama-7b and Google's Flan-T5, to evaluate their suitability for handling domain-specific tasks and enhance knowledge discovery.

### Big Data, and Machine Learning Project

Binghamton, USA  
Fall, Spring 2023

*Big Data Analytics Approach for World Cup Sponsoring Decision Making*

- Leveraged a Big Data Analytics approach, incorporating logistic regression, PySpark, and Azure Databricks, to build a prediction model for World Cup games outcomes and provide data-driven recommendations for sponsoring decisions.
- Implemented logistic regression models utilizing large datasets to analyze historical World Cup data, enabling accurate predictions of game outcomes and team performances.
- Employed PySpark and Azure Databricks to efficiently process and analyze massive volumes of data, ensuring scalability and real-time insights for dynamic decision making.
- Delivered actionable recommendations on teams to sponsor based on the predictive analytics results, providing valuable insights for maximizing sponsorship ROI in the context of the World Cup.
- Paper submitted and presented in ISE conference.

### Capstone Project

Ifrane, Morocco  
Spring 2022

*Virtual Desktop Based Infrastructure Analysis at AUI*

- Performed a 360 degrees analysis of the AUI virtualized environment including the hyperconverged infrastructure.
- Supervised a full analysis of the virtual desktop infrastructure, including an overview presented by VMware dashboards leading to an improvement of virtual machines performance by 20%.
- Designed the performance analysis focusing on various KPIs defined through 10 different benchmarks represented in 10 differently customized dashboards.
- Designed solutions to improve the whole infrastructure were presented based on the results of performance monitoring and analysis which led to a nearly 5% performance increase.
- Performed a STEEPLE analysis to investigate the external and internal implications of the project.

### Global Learning Platform

Ifrane, Morocco  
Spring 2021

*Object-Oriented class final project*

- Designed a Coursera-like application for learning management.
- Implemented the application using Object-Oriented concepts among which inheritance, polymorphism, abstraction, and encapsulation using Java programming language.

### Business Management Desktop Application

Ifrane, Morocco  
Fall 2020

*Real beauty salon management application post Covid 19*

- Designed alongside a team the skeleton of this desktop application with all functionalities that a beauty salon needs ranging from appointments scheduler to an inventory system and financial documents generating leading to a decrease in calculation errors and waiting time by 50%.
- Implemented the application using the concepts we learned in software engineering class using a Waterfall methodology which contributed to a better and more organized management.

## AWARDS

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**5x AUI School of Science and Engineering Dean's List:**

- Fall: 2019, 2021.
- Spring: 2020, 2021, 2022.

**AUI Merit Based Scholarship****Fall 2018**

- A merit-based offer awarded to excellent newly admitted undergraduate students.
- Top 15 AUI engineering cohort graduates.
- Top 10 computer science department cohort graduates.

**TECHNICAL & RELEVANT SKILLS**

*Computer Tools and Technologies:* MS Office, Cloudera, Amazon Web Services, Hyperconverged Infrastructures, Data Centers Virtualization and Optimization, Data Centers Management, Java, C, VMware, MySQL, PostgreSQL, Big Data, Data Analysis Python, PySpark, Scala, Cloud Computing. Docker, Github, HuggingFace, Azure Databricks, Google Cloud Platform, Large Language Models, Fine Tuning Models.

*Languages:* Arabic: Native, English: Fluent, French: Fluent, Spanish: Elementary Proficiency.

*Certifications:*

- Elements of Building AI: University of Helsinki
- Software Processes and Agile Practices: University of Alberta
- CFA: Ethical Financial Decision Making: CFA
- Build, Train, Deploy ML Models with BERT: Coursera
- Data Science Essentials Suite: Binghamton University
- Probability for Data Science : Binghamton University
- Introduction to Machine Learning : Binghamton University
- Generative AI Fundamentals : Google Cloud
- Introduction to Generative AI Studio: Google Cloud
- Large Language Models: Google Cloud
- Transformer Models and BERT Model: Google Cloud