

# Abir HARRASSE

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## Education

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### Master's Degree in Industrial Management

EMINES School of Industrial Management

Minor in Data Science: **GPA: 3.98/4.0**

September 2024 - Present

Coursework includes: Probabilities, Machine Learning, Optimization, Statistics, Multivariable Calculus, Martingale strategies, Lebesgue Integration, Measure Theory, Linear Programming, Biomedical Engineering, Robotics, Analytics, Principles of Economics

### Bachelor's Degree in Industrial Management

EMINES School of Industrial Management

Engineering degree program- **GPA: 3.96/4.0**

September 2020 - September 2024

Coursework includes: Real Analysis, General Topology, General Algebra, Linear Algebra, Electromagnetics, Electronics, Robotics

## Papers

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### Adversarial Multi-Agent Evaluation of Large Language Models through Iterative Debates

Chaithanya Bandi, Abir Harrasse\*

Available at: arXiv:2410.04663

### A Comprehensive Study of Assortment Optimization with Substitution and Uncertainty: Introducing a Machine Learning Heuristic

Abir Harrasse\*

Available at: hal-04182275

## Industry Experience

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### Withmartian

Research Intern

September 2024 - Present

Bay Area, San Francisco

- Using mechanistic interpretability methods to probe models during reasoning tasks, investigating whether human-interpretable causal algorithms are implemented. The goal is to develop a general framework for conducting mechanistic interpretability experiments.

## Research Experience

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### LLMs evaluating LLMs

April 2024 - August 2024

Research Intern, supervised by **Prof. Chaithanya Bandi**

National University of Singapore

- Designed adversarial multi-agent systems for LLM output evaluation, with roles like advocates and judges. This dynamic framework improved decision-making, achieving an 8% performance boost over prior methods.

### RL with generative models

January 2023 - January 2024

Research assistant, supervised by **Prof. Omar Saadi**

College of Computing-UM6P

- Focused on model-based reinforcement learning using generative models, testing existing algorithms and optimizing their runtime and sampling efficiency.

### Product Assortment Optimization

June 2023 - July 2023

Research Intern, supervised by **Prof. Agnès Gorge**

Africa Business School - UM6P

- Researched the theoretical aspects of assortment optimization and its impact on retailer profitability. This involved studying substitution effects and demand uncertainty, leading to the development of a new machine learning heuristic.

## Key Achievements and Projects

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### **”Chariot Autonome” Robot**

*AI lead*

*October 2023 - May 2024*

*EMINES-UM6P*

- Collaborated with my team to develop an autonomous robot capable of following the user in real time. Implemented AI features using human tracking algorithms and depth estimation to enhance navigation and interaction capabilities.

### **BCG Platinion Hackathon**

*National Winner*

*October 2023*

*BCG Casablanca*

- Our mobility solution, optimizing matchmaking among transporters, suppliers, and demanders, won the top national prize and second place internationally at the hackathon with 150+ participants. It leverages Google’s VRP-Solver for route optimization under multiple constraints.

### **Morocco IoT and AI Challenge**

*Finalist*

*September 2023*

*Marrakech, Morocco*

- As a finalist in the Morocco IoT and AI Challenge, I presented **Med-Flamingo**, a medical chatbot combining visual language models and LLMs. It interacts in Moroccan Dialect, answers medical questions, and generates reports, with ongoing work on AI safety enhancements. The project is accessible through: medical chatbot.

### **Assets flood protection**

*Project leader*

*March 2023 - April 2023*

*EMINES-UM6P*

- Developed exact algorithms to optimize the cost of building walls around a city of assets for small data and meta-heuristic algorithm to tackle the case of large data.

### **Asthma Mathematical Modelisation**

*Project leader, supervised by Dr. Marcel Filoche*

*October 2022 - December 2022*

*EMINES-UM6P*

- Our biomedical engineering project applied mathematical modeling, employing Navier-Stokes equations to simulate asthma and gain insights into respiratory airflow during asthma attacks. The project is accessible through: results.

### **NaMO - Preparing for IMO’s 61st edition**

*Participant*

*January 2019 - March 2020*

*Rabat, Morocco*

Among the top 25 participants selected for the country’s most prestigious mathematical competition, where more than 1000 best high school students gathered to prepare for international contests like the International Mathematical Olympiads (IMO).

## Awards and Achievements

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### **National Moroccan Merit Scholarship FAR (2020)**

Awarded to the top 50 national scores in high school final examinations, representing the top 0.1% of all candidates.

### **UM6P Excellence Scholarship (2020)**

Granted for exceptional performance in entrance examinations, placing within the top 1% of applicants.

## *Skills*

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<b>Languages</b>	<i>Native:</i> Arabic, French. <i>Fluent:</i> English. <i>Beginner:</i> Mandarin
<b>Programming Languages/Tools</b>	Python, Pytorch, Transformers, Diffusers, Datasets, Slurm, FICO Xpress, SQL

## *Volunteering*

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**MathMaroc** *September 2021-Present*

*Vice General Secretary*

Collaborating with fellow members to organize events, workshops, and outreach programs to engage students and enthusiasts in the exploration and appreciation of mathematics.

**The GenAI Winter School** *October 2023- February 2024*

*Organizer*

Taking an active role in the coordination and organization of The **GenAI Winter School**, an event that welcomed distinguished researchers including **Yann Le Cun**, **Eric Xing**, and other prominent figures in the field.

**Rotaract EMINES Club** *January 2022 - June 2022*

*Co-founder and General Secretary*

Co-founded a social impact club focused on aiding local communities through initiatives such as food distribution, visits to orphanages, and educational orientation sessions in remote middle schools.

**E-maths Club** *January 2021 - June 2021*

*Founder and President*

Founded the first mathematics club at EMINES-UM6P to promote math culture through ludic activities, conferences, peer-to-peer workshops and study groups. Organized orientation sessions connecting students with alumni to explore academic and research pathways.