Mouad Boumediene, Postdoc

mouadboumediene@yahoo.fr
ORCID: 0000-0003-4714-5656
+213 7 93 74 18 90
linkedin.com/in/mouad-boumediene/
https://mouad-boumediene.github.io/
YouTube Channel
Zerdezas, 21047 Skikda, Algeria

Summary

Postdoctoral researcher specializing in **robotics and artificial intelligence**, with expertise in **multi-agent pathfinding**, deep reinforcement learning, and UAV trajectory planning. I recently held a **postdoctoral position** at MMMI, **University of Southern Denmark**, and earned my **Ph.D**. in Electrical Engineering from the **University of Skikda**. I developed **HM-DRL**, a method for enhancing multi-agent pathfinding with a heatmap-based heuristic for distributed deep reinforcement learning. I also developed **Gen4jectory**, a 4-D UAV trajectory planning algorithm that guarantees zero loss-of-separation. Also created **FDA***, a focused grid-based pathfinding method that dramatically reduces memory use and run-time.

Experience

2023 – 2024

Postdoctoral Researcher, MMMI - University of Southern Denmark, Odense, Denmark.
As a postdoctoral researcher at SDU, i focused my efforts on developing Muti-Robot coordination approaches using Deep reinforcement learning.

- contributed to the "Swarm Robotics for Industry 4.0" project supported by the Independent Research Fund in denmark, under grant 0136-00251B
- Developed HM-DRL a Deep Reinforcement Learning approach for distributed multi-aobot pathfinding (MAPF). Then i wrote and published a journal paper in Springer's Applied Intelligence Journal.
- Developed Relocation-MAPF a muli-robot pathfinding (MAPF) algorithm that enhanced both the efficiency and success rate of robot fleets using a relocation strategy that aims to reduce the number of bottlenecks in densely populated MAPF environments

Feb 2023

Robotics Researcher, Ph.D Internship, Syddansk Universitet - University of Southern Denmark.
Studied the application of Deep Reinforcement Learning for Swarms of AMRs in modern industry 4.0 environments.

- contributed to the "Swarm Robotics for Industry 4.0" project supported by the Independent Research Fund Denmark under grant 0136-00251B

Experience (continued)

2021 – 2022 **Robotics Engineer, Freelance,** AiGro Netherlands (remote).
Designed simulations and developed localization algorithms for Agricultural mobile robots.

- built and tested a 2D simulator designed to help with developing pathfinding and localization algorithms for autonomous mobile robots.
- implemented a sensor fusion approach based on kalman filter to localize an autonomous mobile robot
- used the robot's IMU and GPS data collected in real-life experiments to test and validate our localization approach

2019 - 2022 **Temporary Lecturer,** University of 20 août 1955, Skikda, Algeria.
I earned extra credit for teaching laboratory sessions and tutorial classes as part of my PhD.

- Taught advanced signal processing and digital regulation both as laboratory sessions and tutorial classes.
- supervised masters students' final year projects.

Education

2019 – 2023 **Ph.D, University of Skikda, Algeria** in Automation.
Thesis title: *Contributions to the command of mobile robots.*
Worked mainly on mobile robots pathfinding

2017 – 2019 **Master's degree, University of Skikda, Algeria** in Instrumentation .
Related Coursework: *Sensors, advanced digital electronics, digital regulation, microprocessors and DSP, Electronic circuits*.

2014 – 2017 **Bachelor degree, University of Skikda, Algeria** in Electronics Engineering.
Related Coursework: *fundamental electronics, micro-processor systems, signal processing, OOP*.

Research Publications

Current Projects

1. M. Boumediene and A. L. Christensen, *Enhancing mapf planners using strategic relocation*, Status: submitted to Springer's Autonomous Robots journal.
2. I. Panov, M. Boumediene, H. S. Midtiby, and K. Jensen, *Gen4jectory 2.0 – 4-d trajectory planning with obb-vs-obb collision detection based on sat for multiple rotary-wing uavs*, Status: under proofreading.

Journal Articles

1. M. Boumediene, A. Maoudj, and A. L. Christensen, "Hm-drl: Enhancing multi-agent pathfinding with a heatmap-based heuristic for distributed deep reinforcement learning," *Applied Intelligence*, vol. 55, p. 873, Jul. 2025. DOI: 10.1007/s10489-025-06747-0.
2. M. Boumediene, L. Mehennaoui, and A. Lachouri, "FDA*: A Focused Single-Query Grid Based Path Planning Algorithm," *Journal of Automation, Mobile Robotics and Intelligent Systems (JAMRIS)*, pp. 37–43, May 2022. DOI: 10.14313/JAMRIS/3-2021/17.

Conference Proceedings

1. I. Panov, M. Boumediene, H. Midtiby, and K. Jensen, "Gen4jectory algorithm – 4-d trajectory planning with minimised flight time for multiple rotary-wing uavs," English, 15th ANNUAL INTERNATIONAL MICRO AIR VEHICLE CONFERENCE AND COMPETITION, IMAV2024-25 ; Conference date: 16-09-2024 Through 20-09-2024, Sep. 2024, pp. 242–252. URL: https://www.imavs.org/imav2024-proceedings/.
2. C. Bellel, L. Mehennaoui, F. Bouchareb, and M. Boumediene, "Unicycle mobile robot control using neural model predictive controller," in *Fourth International Conference on Technological Advances in Electrical Engineering (ICTAEE'23)*, Laboratory of Automatic of Skikda, 20 Aout 1955 University, Skikda, Algeria, May 2023, pp. 110–117. URL: https://drive.google.com/file/d/1C6RUU5zixy_UfJga0yu86lvQMPaJo1EE/view?usp=sharing.
3. M. Boumediene, S. Laouar, D. L. Mehennaoui, and P. S. Ouchtati, "Design, simulation and control of a self-balancing robot in a gazebo environment and ros 2 framework," in *Proceedings of the International Conference on Technological Advances in Electrical Engineering (ICTAEE)*, Skikda, Algeria, May 2023, pp. 98–103. URL: https://drive.google.com/file/d/1C6RUU5zixy_UfJga0yu86lvQMPaJo1EE/view?usp=sharing.
4. M. Boumediene, N. Zeghida, B. Manaa, and D. L. Mehennaoui, "Design, construction, and control of a self-balancing robot including a new frame assembly approach and a custom pcb," in *Proceedings of the International Conference on Technological Advances in Electrical Engineering (ICTAEE)*, Skikda, Algeria, May 2023, pp. 200–206. URL: https://drive.google.com/file/d/1C6RUU5zixy_UfJga0yu86lvQMPaJo1EE/view?usp=sharing.

Skills

Languages	English, Arabic, French.
Coding	Python, PyTorch, TensorFlow, ROS&Gazebo, Matlab, GIT, LaTeX, …
Misc.	Academic research, data analysis, publication writing, and peer review.

projects

- **Hobby Coding YouTube Channel** Where i publish concise, hands-on tutorials and project showcases on **robotics simulations**, **multi-agent pathfinding**, **Python algorithms**, and **Unity visualizations**, engaging a global audience of developers and researchers. link : https://www.youtube.com/channel/UCR27JFRfdHEiMdSoCUeZAGg

References

Prof. Anders Lyhne Christensen
MMMI, University of Southern Denmark
Full Professor
Phone: +45 65 50 73 24
Email: andc@mmmi.sdu.dk

Dr. Abderraouf Maoudj
IRC-IMR, KFUPM, Kingdom of Saudi Arabia
Postdoctoral Researcher
Phone: +966 5 66 92 75 19
Email: abderraouf.maoudj@kfupm.edu.sa

Jev Kuznetsov
ROX Automation, Netherlands.
CEO.
Robotics R&D
Phone: +31 624 51 76 84
Email: jev.kuznetsov@gmail.com

Dr. Lamine Mehennaoui
University of 20 Aout 1955, Skikda, Algeria
Senior lecturer, PhD thesis supervisor.
Electrical Engineering Dpt
Phone: +213 6 99 61 16 51
Email: me_lamine@yahoo.fr