# RAOUI Younès

Professor Researcher

## 👤 Profile

I have over ten years of experience in research in robotics and mechatronics. I work on LLM-based robot navigation, Simultaneous Localization and Mapping, and robot path planning. I am a developer of real-time applications for real robots. I also build realistic robotic simulations. Besides, I am a lecturer at the Faculty of Sciences of Rabat, focusing on supervising of Phd students.

## 💼 Employment History

### Professor at Faculty of Sciences, University Mohammed V in Rabat
October 2013 — Present

I am a researcher and lecturer of robotics and AI at the Physics department at the Faculty of Sciences of Rabat.

### Member of the European Neural Network Society
January 2020 — Present

### Preparation of my Habilitation to Direct Research at Faculty of Sciences, Physics department, Laboratory of Conception and Systems Lab, Rabat
2013 — Present

I am currently preparing my HDR on bio-inspired robot navigation. First, I built a Bayesian system that implements monocular SLAM but using a new detector descriptor invariant to rotation. It shows a high repeatability, which makes the navigation more accurate. Then, I conceived a navigation system that implements the dynamic neural field for obstacle detection and avoidance. It generates an optimal action that the robot should take if it encounters an obstacle.

Then, I studied the RatSLAM system, which does localization and mapping using the topological approach. Furthermore, I built a similar NeoSLAM system that uses visual objects to describe the environments. Those objects serve as input to a Continuous Attractor Network that integrates the path in a structure like the grid cells inside the hippocampus.

Currently, I am working on implementing an LLM-based navigation system that uses pre-trained models to predict the trajectory of a mobile robot.

## Details

Faculté des Sciences de Rabat, 4 Avenue Ibn Batouta, B.P. 1014 Rabat, 11100 Morocco
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### Date / Place of birth

Sep 08, 1980
Casablanca, Morocco

### Nationality

Moroccan

### Driving license

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## Skills

Programming (Python, C/C++, ROS, Latex)

Research

Brain-Inspired Robotics

Computer vision

Machine learning and deep learning

Optimization, probability and statistics

Gazebo, CoppeliaSIM

UML

## Languages

Arabic

French

# 📚 Education

### Doctorate, University Mohammed V in Rabat, Rabat
October 2004 — April 2011

I prepared my Phd thesis in the Laboratoire d'Informatique, de Mathématiques Appliquées, d'Intelligence Artificielle et de Reconnaissance de Formes (LIMIARF) at the Faculty of Sciences of Rabat.

### Doctorate (Co-supervision), Institut National Polytechnique de Toulouse, Toulouse
October 2004 — April 2011

I was registered both in France and in Morocco to obtain a joint PhD diploma. During my stay in France, I was funded by two european FP6 projects; I worked first for the COGNIRON project on object recognition using interest points, then for the COMMROB project on a RFID-based localization method for a mobile robot navigating indoor, typically

in a mall or some other public areas.

### Master, Engineer Institute of Telecommunication (INPT), Faculty of Sciences , Rabat
September 2002 — September 2004

### Engineer, Facuty of Sciences and Techniques, Settat
September 1998 — July 2002

# 🎓 Courses

### Workshop on Robotics with Robotic CoppeliaSim Simulator to professors of UM5R, Mohammed V University of Rabat, Center for Pedagogical Innovation
May 2024 — May 2024

### Deep learning, Faculty of Sciences of Rabat
July 2022 — March 2023

### Python programming language, Faculty of Sciences of Rabat
January 2015 — Present

### Robotics and AI, Faculty of Sciences of Rabat
February 2013 — Present

### C programming, Faculty of Sciences of Rabat
January 2020 — Present

### Electronics and control theory, Faculty of Sciences of Rabat
January 2015 — January 2017

English

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Chinese

## Hobbies
Reading, Sport, Traveling

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### Lecturer, Faculty of Sciences, Rabat
November 2013 — Present

I am a lecturer in the Physics department in the Bachelor "Science de la Matière Physique" teaching programming, electronics, and control theory. I am a member of the team of the Masters "Science et Ingénierie de Données" and "Informatique et Électronique des Système Embarqués"

### Supervision of several projects of Master and Bachelor students, Rabat
April 2013 — Present

I supervise students in projects related to robot navigation, deep learning, and computer vision.

### Partcipation to international conferences

I participated in many international conferences on robotics and neural networks:

- International Conference on Artificial Neural Networks (ICANN) in 2014, 2021, 2022, 2023, and 2024
- International Conference on Advanced Robotics (ICAR) in 2009
- International Symposium on Experimental Robotics (ISER) in 2014 and 2021
- International Conference on Informatics in Control, Automation and Robotics (ICINCO) in 2011, 2015, and 2016

### Selected Publications

- Raoui Y, Amraoui, M, **Simultaneous Localization and Mapping of a Mobile Robot with Stereo Camera Using ORB features,** Journal of Automation, Mobile Robotics and Intelligent Systems, 2024
- Raoui Y, Wermter S, Weber C, **NeoSLAM: Neural Object SLAM for Loop Closure and Navigation.** 31th International Conference of Artificial Neural Networks, International Conference of Artificial Neural Networks 2022
- H Loutfi, A Bernatchou, Y Raoui, R Tadili, **Learning processes to predict the hourly global, direct, and diffuse solar irradiance from daily global radiation with artificial neural networks-** , International Journal of Photoenergy 2017
- Y Raoui, EH Bouyakhf, **Steerable Filters for Rotation Invariant Salient Feature Points Applied to Monocular SLAM**, Proceedings of the 13th International Conference on Informatics in Control, 2016
- Y Raoui, EH Bouyakhf, **A multi-sensory stimuli computation method for complex robot behavior generation,** 12th International Conference on Informatics in Control, Automation, 2015

- M.K.Ettouhami, Y.Raoui, M.Elbelkacemi, H.Elimrani, . El Gharad, M.Boukalouch, **Human-Robot Collision Avoidance with RFID Sensors Using Fuzzy Logic and Extended Kalman Filter**, Applied Mathematical Sciences, 2013
- Younes Raoui, Michel Devy, El-Houssine Bouyakhf, Fakhita Regragui, **Comparing Determinist and Probabilistic Methods for RFID-based Self-localization and Mapping.** ICINCO (2) 2011: 211-216
- Younes Raoui, El-Houssine Bouyakhf, Michel Devy, **Mobile Robot Localization Scheme based on Fusion of RFID and Visual Landmarks.** ICINCO (2) 2011: 296-299
- Y Raoui, M Goller, M Devy, T Kerscher, JM Zollner, R Dillmann, **RFID-based topological and metrical self-localization in a structured environment,** 2009 International Conference on Advanced Robotics, 1-6 13 2009

## 👥 Internships

### Summer school of Artificial Intelligence at Al Akhawayn University, Ifrane
July 2024 — July 2024

It addresses the skills gap in AI product management. Through an immersive five-day program, participants will explore the wide range of AI applications in a corporate setting and the tools available to facilitate AI use and integration.

### High-Level Forum on Artificial Intelligence at AI Movement, UM6p, Rabat
June 2024 — June 2024

### Winter school of Generative AI at University Mohammed VI, Benghrir
February 2024 — February 2024

### Summer school of Artificial Intelligence at Al Akhawayn University, Ifrane
July 2023 — July 2023

### IEEE RAS Winter School on SLAM in Deformable Environments at-IEEE Robotics and Automation Society (RAS), Australian Robotics and Automation Association (ARAA), Online
July 2021 — July 2021

Successfully completed the Winter School focused on Simultaneous Localization and Mapping (SLAM) in deformable environments.

### Chineese Training at Confucius Institute, Rabat
January 2019 — January 2020

I prepared the HSK certificate

### English Training at Amideast, Rabat
January 2014 — July 2018

I did courses in English, writing, and advanced conversation.

**Neuro-robotics training at INSERM, Marseille**

October 2014 — November 2014

**Summer School of Image and Robotics at Clermon Ferrant, France**

July 2008 — July 2008