Miguel Faria | Curriculum Vitae

SARDINE Lab, Instituto de Telecomunicações, Lisboa, Portugal

 +351 927582669   •   +351 214359707

✉ miguel.faria@tecnico.ulisboa.pt

About Me

Passionate researcher in the field of Artificial Intelligence. My main research focus in at the junction of robotics and machine learning, namely in applications of machine learning approaches to robots and other intelligent agents to improve their communication capabilities. I am mainly interested on understanding how we can apply Optimal Planning techniques and Reinforcement Learning techniques to improve agents' expressiveness. I did my PhD focused on models for decision making that better highlight the underlying system's intentions in interactions between humans and autonomous systems.

I am also passionate about teaching and making Computer Science and AI easier to understand, because I feel there are many misconstructions about Computer Science and AI in the general public, stemming from a lack of understanding, that correct mentoring and teaching can correct.

Besides research and teaching, I'm a photography enthusiast and do photography as a hobby, which led me to be part of several photography groups and even had some photographs published on photography magazines. I love music, which led me to learn to play guitar by myself during college.

Education

PhD in Computer Science and Engineering   **Lisbon**
Instituto Superior Técnico, University of Lisbon   *2018–2023*

Master in Computer Science and Engineering   **Lisbon**
Instituto Superior Técnico, University of Lisbon   *2014–2017*
Average grade of 17 in 20.

Bachelor in Computer Science and Engineering   **Lisbon**
Instituto Superior Técnico, University of Lisbon   *2011–2014*
Average grade of 15 in 20.

Research

Positions

Post-Doc for the NextGenAI-CRAI Project   **Lisbon**
Instituto de Telecomunicações   *April 2024 –*

Post-doc contract for research in the NextGenAI/CRAI project focused on developing Fair, Transparent and Explainable AI for Human-AI and Language Technologies and Embodied Human-AI Interaction. My research focuses on applying both notions of Theory of Mind and Reinforcement Learning to large language models (LLMs) – such as the well known Chat-GPT model – so that these models can be better used to share and disseminate knowledge as well as more useful in teaching others.

Research Assistant for the TrustAT Project **Lisbon**
GAIPS@INESC-ID *November 2022–March 2024*

Research grant awarded for work in the TrustAT project to develop trustworthy multi-agent robotic systems for ad-hoc teamwork. In the context of the project, I integrated the team responsible for the user study design to understand how humans, with varying degrees of trust in robots, collaborate with said agents. I was also part of the team responsible for creating the decision models of the robots interacting with humans.

PhD Candidate in Computer Science and Engineering **Lisbon**
Instituto Superior Técnico & GAIPS@INESC-ID *September 2018–November 2023*

PhD student in Computer Science and Engineering, with focus in Artificial Intelligence applied to autonomous agents. My thesis aims at investigating the application of Machine Learning methods, namely optimization and reinforcement learning techniques, in improving an autonomous agent's communicative capabilities. I focus in applying the concept of legibility – moving or acting in a manner that makes intentions "readable" – to an agent's decision making process, making its intentions clearer when interacting with humans or other intelligent agents.

Research Assistant for the INSIDE Project **Lisbon**
GAIPS@INESC-ID *March 2017–September 2018*

Research grant awarded for work in the INSIDE project to develop an intelligent robotic system capable of socially and autonomously collaborate with humans. In the context of the project I've integrated the team responsible for creating the robot's decision system and develop the robot's interaction behaviours.

Projects

○ **Research Project:** *TrustAT: Trustworthy Ad Hoc Teamwork*

This research project is an initiative to investigate how to create an autonomous agent that can efficiently and robustly collaborate with previously unknown teammates. The project plans to achieve this through novel ad hoc teamwork algorithms to build trust within human-robot interactions and by addressing a vital question: How can a robot learn to cooperate with unknown human teammates in complex domains while fostering trust development, whereby the robot does not have any pre-coordination protocol and must learn to cooperate on the fly?

○ **Research Project:** *INSIDE: Intelligent Networked Robot Systems for Symbiotic Interaction with Children with Impaired Development*

This research project was an initiative to create autonomous robotic systems capable of collaborating with humans in a symbiotic manner, especially in collaborative activities with children with ASD. The main goal of this project was the development of a networked robotic system, capable of autonomous interactions in a wide range of therapeutical activities. This project brought together a consortium of different research labs, universities, companies and one hospital. In the project I was responsible for developing intelligent behaviours and interaction capabilities of the robot. In detail, I designed the decision making process for the various tasks the robot had to perform, as well as the gaze and body movement behaviours the robot displayed during the interactions with the child and therapist.

Talks

○ "Improving Agents' Communication Capabilities Using Legibility in Multi-Agent Interactions" at the 2022 IVA Conference
○ "Understanding robots: Making robots more legible in multi-party interactions" at the 2021 RO-MAN Conference
○ "Me and you together movement impact in multi-user collaboration tasks" at the 2017 IROS Conference
○ "Me and you together: A study on collaboration in manipulation tasks" at the 2016 AAAI Fall Symposium Series
○ "Follow me: Communicating intentions with a spherical robot" at the 2016 RO-MAN Conference

Awards

- Research grant awarded by Inesc-ID for the AFOSR project TrustAT (Trustworthy Ad Hoc Teamwork), Fall of 2022
- Best paper award at the twentieth EPIA Conference on Artificial Intelligence, Fall of 2021.
- PhD grant awarded by Fundação para a Ciência e Tecnologia in the context of the NetSYS doctoral program, Fall of 2018.
- Research grant awarded by Inesc-ID for the CMU/Portugal project INSIDE (Intelligent Networked Robot Systems for Symbiotic Interaction with Children with Impaired Development), Spring of 2017

Public Service

- Program committee for the 2024 International Conference on Autonomous Agents and Multiagent Systems (AAMAS)
- Organizer of the workshop on Explainable Robotics at the 2023 IEEE International Conference on Robotics and Automation (ICRA)
- Student volunteer for the 2022 ACM International Conference on Intelligent Virtual Agents (IVA)
- Student volunteer for the 2022 EPIA Conference on Artificial Intelligence
- Review of the article "CoMBiNED: Multi-Constrained Model Based Planning for Navigation in Dynamic Environments" for the IEEE/RSJ International Conference on Intelligent Robots and Systems conference.
- Review of the article "Encouraging Human Interaction with Robot Teams: Legible and Fair Subtask Allocations" for the IEEE Robotics and Automation Letters journal.
- Review of the article "A Control Strategy for a Tethered Follower Robot for Pulmonary Rehabilitation" for the IEEE Transactions on Medical Robots and Bionics journal.
- Review of the article "Safety in AI-HRI: Challenges Complementing User Experience Quality" for the 2016 Artificial Intelligence for Human-Robot Interaction symposium, part of the AAAI Fall Symposium Series.

Publications

Miguel Faria, Francisco S Melo, and Ana Paiva. Guess what i'm doing: Extending legibility to sequential decision tasks. *Artificial Intelligence*, 330:104107, 2024.

Miguel Faria, Francisco S. Melo, and Ana Paiva. Understanding robots: Making robots more legible in multi-party interactions. In *2021 30th IEEE International Conference on Robot Human Interactive Communication (RO-MAN)*, pages 1031–1036, 2021.

João G Ribeiro, Miguel Faria, Alberto Sardinha, and Francisco S Melo. Helping people on the fly: Ad hoc teamwork for human-robot teams. In *EPIA Conference on Artificial Intelligence*, pages 635–647. Springer, 2021.

Francisco S Melo, Alberto Sardinha, David Belo, Marta Couto, Miguel Faria, Anabela Farias, Hugo Gambôa, Cátia Jesus, Mithun Kinarullathil, Pedro Lima, et al. Project inside: towards autonomous semi-unstructured human–robot social interaction in autism therapy. *Artificial intelligence in medicine*, 2018.

Miguel Faria, Rui Silva, Patrícia Alves-Oliveira, Francisco S. Melo, and Ana Paiva. Me and you together movement impact in multi-user collaboration tasks. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 2793–2798, 2017.

Rui Silva, Miguel Faria, Francisco S Melo, and Manuela Veloso. Adaptive indirect control through communication in collaborative human-robot interaction. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017.

Miguel Faria, Rui Silva, Francisco S Melo, and Ana Paiva. Me and you together: A study on collaboration in manipulation tasks. In *2016 AAAI Fall Symposium Series*, 2016.

Miguel Faria, Andrea Costigliola, Patrícia Alves-Oliveira, and Ana Paiva. Follow me: Communicating intentions with a spherical robot. In *Robot and Human Interactive Communication (RO-MAN), 2016 25th IEEE International Symposium on*, pages 664–669, 2016.

Teaching

Experience

Autonomous Agents and Multi-Agent Systems
Instituto Superior Técnico

Lisbon

Spring 2022

Teaching assistant for the course of Autonomous Agents and Multi-Agent Systems (AASMA), from the Master in Computer Science and Engineering at Técnico Lisboa. I taught three hours weekly of practical classes and one hour and a half of office hours. Besides teaching, my responsibilities covered: creating and reviewing the practical classes' exercises, help and mentoring the students with their course projects and reviewing and correcting the course's exams. In the Spring of 2022, I taught the course for 217 students.

Learning and Intelligent Decision-Making
Instituto Superior Técnico

Lisbon

Spring 2017, Spring 2018

Teaching assistant for the course of Learning and Intelligent Decision-Making, from the Master in Computer Science and Engineering. I taught three hours weekly of practical classes and one and a half hours weekly of office hours. I also was responsible for reviewing the lab assignments and correcting the students' tests, exams and lab assignments. In the Spring of 2017, I taught 100 students and had a student evaluation of 8.69 out of 9; in the Spring of 2018 I taught 141 students and had a student evaluation of 9 out of 9.

Planning, Learning and Intelligent Decision-Making
Instituto Superior Técnico

Lisbon

Fall 2020, Spring 2022, Spring 2024

Teaching assistant for the course of Planning, Learning and Intelligent Decision-Making (PADI), from the Master in Computer Science and Engineering at Técnico Lisboa. I taught three hours weekly of practical classes and one hour and a half of office hours. I was also responsible for reviewing the course's lab assignments and exams and for correcting the students' lab assignments. In the Fall of 2020, I taught 206 students and had a student evaluation of 9 out of 9; in the Spring of 2022 I taught the course for 177 students; and in the Spring of 2024, I taught the course for 146 students.

Search and Planning
Instituto Superior Técnico

Lisbon

Fall 2021, Fall 2022

Teaching assistant for the course of Search and Planning, from the Master in Computer Science and Engineering. I taught three hours weekly of practical classes and one and a half hours weekly of office hours. I was also responsible for creating the solutions for the practical exercises supplied to the students; writing introductory guides for the CSP solver "Minizinc" and the PDDL planning language, used in the practical classes and the course's project; and finally, I helped in creating a solution for the course's project and in researching planners that could be used in the project. I was also responsible for helping in the correction of the course's projects and in designing a process to automatically evaluating the projects. In the Fall of 2020, I taught the course for 81 students and in the Fall of 2022, I taught the course for 73 students.

Social Robotics and Human-Robot Interaction
Instituto Superior Técnico

Lisbon

Fall 2022

Teaching assistant for the course of Social Robotics and Human-Robot Interaction, from the Master in Computer Science and Engineering. I taught three hours weekly of practical classes and one and a half hours weekly of office hours. I also was responsible for supervising the student's class projects, where they had to design and implement a user study in the field of social robotics. In the Fall of 2022, I taught the course for 77 students.

Workshops

- Workshop on Explainable Robots in the 2023 IEEE International Conference on Robotics and Automation (ICRA)

- Workshop on Robot Operating System (ROS) in the context of the course on "Social Robots HRI", Fall 2020
- Workshop on Human-Robot Interaction tools in the context of the course on "Social Robots HRI", Fall 2018

Awards

- Excellence in teaching award for the course of Planning, Learning and Intelligent Decision-Making, Fall of 2020.
- Excellence in teaching award for the course of Learning and Intelligent Decision-Making, Spring of 2018.

Work Experience

Laboratory Manager   **Lisbon**
GAIPS/INESC-ID   *September 2016–March 2017*

Responsible for maintaining the computer infrastructure of the Group of AI for People and Society (GAIPS) at INESC-ID. My responsibilities covered: robot maintenance; inventorying and tracking of the group's assets; maintenance of the group's website and server, so these were available for usage by the group's members; and advertisement of the group's current activities and achievements.

Verão na ULisboa Activities Monitor   **Lisbon**
Lisbon University   *July 2015*

I spent a week working for an initiative at the Lisbon University called "Verão na ULisboa", where I organised and monitored activities, related to computer science, for children from the 10th to the 12th grade through which they learned a basis of computer science and what one does in the field. At the end all the staff and most children praised my work and was invited to be part of the team in the following year.

Extra-curricular activity

CoderDojo@Técnico   **Lisbon**
Instituto Superior Técnico   *Fall 2014 - Fall 2016*

Between 2014 and 2016 I was part of an extracurricular project to teach young people what is computer science and the basis of programming and computation. This initiative was comprised of a group of college students that wanted to show mid and high school students what one does in the field of computer science. I was part of the group that created this initiative and was a part of it until in 2016 I had to leave due to the demands of my master's courses and master's thesis. As a member of the CoderDojo@Técico, I was responsible for deciding and organizing the activities that the participants would do in each session and to managing both the team and the activities during the sessions. With this project I developed skills in team management and organizing events. Also, with this project I could improve my team working skills.

Technical and Personal skills

- **Programming Languages:** Proficient in: C, C++, C#, Java, Python, Matlab, Arduino, TeX, HTML, CSS, MySQL, PHP, JavaScript
- **Software Skills:** Linux and Windows Systems, ROS, Android
- **Modelling Tools:** UML, BPML, SysML
- **General Business Skills:** Good presentation skills, Works well in a team, capable of manage teams and make quick decisions.

- **Other:** Can write well organised and structured reports.