Research Statement

Hossein Yarahmadi, PhD

My academic career has been dedicated to advancing the fields of artificial intelligence (AI), multi-agent systems, and reinforcement learning. My PhD research, conducted at the University of Antwerp, Belgium, focused on the "Credit Assignment Problem in Multi-Agent Reinforcement Learning." This work introduced novel approaches that improved learning efficiency in distributed environments, with outcomes published in high-impact journals such as “Swarm and Evolutionary Computation”, “Robotics and Autonomous Systems”, and “Sensors”. Additionally, I have contributed to the PACo project in Flanders Make Company, Belgium, applying theoretical research to practical challenges.

As a Postdoctoral Research Fellow at the University of Antwerp, my work centers on enhancing decision-making in intelligent agents through the integration of reinforcement learning and reasoning (rule-based) methods. This approach aims to create adaptable and robust systems, particularly in dynamic and uncertain environments.

Current Research Interests

My current research interests include:

1. Reinforcement Learning and Multi-Agent Systems: Developing scalable algorithms that address cooperative and competitive dynamics in multi-agent environments.

2. Integration of Learning and Reasoning: Investigating how reinforcement learning can be enhanced with symbolic AI to create more interpretable and reliable systems.

3. Sustainable AI: Exploring frugal AI techniques to make algorithms more energy-efficient and environmentally friendly.

4. Real-World Applications: Applying AI research to solve practical problems in areas like robotics, smart cities, and industrial automation.

Future Research at IPM

At the Institute for Research in Fundamental Sciences (IPM), I plan to:

1. Advance Multi-Agent Learning: Develop scalable frameworks for multi-agent systems, focusing on communication, coordination, and adaptability.

2. Interdisciplinary Collaborations: Work with IPM experts to explore the theoretical underpinnings of AI, contributing to robust and theoretically sound models.

3. Mentorship and Education: Engage in teaching and mentoring, contributing to the academic community at IPM and fostering a collaborative research environment.