Pascal **Leroy**

PHD STUDENT · MACHINE LEARNING

(+32) 479488602 | ✉ pjr.leroy@gmail.com | 🏠 paleroy.github.io | PaLeroy | PasLeroy | PaLeroy | Pascal Leroy

PERSONAL STATEMENT

I am currently pursuing a Ph.D. in **machine learning**. My thesis is submitted and I expect to graduate in June 2024. My research focuses on training teams of agents with **multi-agent reinforcement learning**. Aside, I conducted projects on **neural network compression** for computer vision and drone control applications. I am particularly passionate about applying machine learning to address **real-world** challenges and contribute to **impactful applications**. I am exploring opportunities abroad to contribute to the development of concrete applications. My main motivation is to deepen my understanding of deployed ML applications.

EDUCATION

Ph.D. student in Machine Learning - *Montefiore Institute, ULiège, Liège*   08/2018 - Now
Advisors: Damien Ernst and Jonathan Pisane.
Research interests: reinforcement learning and multi-agent systems.
Thesis: Contributions to Multi-agent Reinforcement Learning.

Master in Computer Science and Engineering - *ULiège, Liège*   09/2016 - 09/2018
Master's thesis: Automatic defect recognition in X-ray imaging by machine learning.
Cum Laude - 75%

Bachelor in Engineering - *ULiège, Liège*   09/2010 - 06/2016

WORK EXPERIENCE

Research Engineer   08/2018 - Now
Montefiore Institute, ULiège
Responsible for the research in projects with industrial consortia of Belgian companies.
Responsible for writing proposals and administrative and financial reports.

Student Trainee   10/2017 - 06/2018
X-RIS: X-Ray Imaging Solutions (Liège)
Development of image processing filters dedicated to X-ray image optimisation.
Additionally, a master's thesis on automatic defect recognition in X-ray imaging by machine learning.

RESEARCH PROJECTS

WalEdgeIA: Embedded AI for Walloon SME   2023 - Now
Partners: Sirris, Cetic, UMons, ULiège.
Develop methodology to facilitate embedded AI technologies for the industry.
Responsible for controlling a drone with embedded robust reinforcement learning.

Infrastructure management planing   2022 - Now
Collaboration with Pablo G. Morato
Using multi-agent RL for planning inspections, repairs or retrofits in structures like bridges or wind turbines.
We are maintaining an open-source repository of these real-world environments (published in **NeuRIPS**)
and working on new environments to promote such applications in the machine learning community.

IADAS: Artificial Intelligence for Autonomous Drones and Satellites   2021 - 2023
Partners: Deltatec, Spacebel, Multitel, ALX, ULiège.
Design hardware and software for embedding neural networks in drones and satellites.
Responsible for compressing and optimising a neural network for monocular depth estimation.

IRIS: Intelligent Recognition Information System   2018 - 2022
Partners: John Cockerill Defense, ACIC, Multitel, Royal Military Academy, ULiège.
Decision-aid based on detection, recognition and analysis of behaviours and threats.
Responsible for designing environments and algorithms for multi-agent reinforcement learning.

Automatic defect recognition in X-ray imaging by machine learning   2017 - 2018
Master's thesis supervised by Vincent Libertiaux, Raphaël Marée and Pierre Geurts.
Support for non-destructive testing with tree-based ensemble methods to detect defects in X-ray images.
This work was done during my internship at X-RIS. **Graded 85%.**

SKILLS

- ***Programming languages***: Python, Bash, C, C++, Java, Matlab, Latex, Typst,...
- ***Software development***: Git, Agile, Docker, CI/CD, GCP, MLOPS.
- ***Libraries***: PyTorch, TensorFlow, Numpy, Matplotlib, Pandas, Onnx, RL libraries,...
- ***Languages***: French (native), English (professional proficiency).

PERSONAL EXPERIENCE

Association Generale des Etudiants Liegeois (AGEL) ASBL
10/2014 - 09/2016

Treasurer (2014-2015) and President (2015-2016)
AGEL is a non-profit organisation in charge of holding student events (turnover > 300k€, 15000 students).
As Treasurer, responsible for the financial viability and accounting management. As President, responsible
for managing the team, public communication and major choices.

Federation des etudiants ULiege (FEDE) ASBL
10/2013 - 09/2016

Elected member of the general assembly and member of the Board of Directors of ULiège (2015-2016).
The FEDE is a non-profit organisation representing 23000 ULiège students to academic authorities.
Responsible for representing the Fede and the students as a member of the Board of Directors of ULiège.

PUBLICATIONS

IMP-MARL: a Suite of Environments for Large-scale Infrastructure Management Planning via MARL
Pascal Leroy, Pablo G. Morato, Jonathan Pisane, Athanasios Kolios, Damien Ernst
*Thirty-seventh Conference on Neural Information Processing Systems Datasets and Benchmarks Track (**NeuRIPS**), 2023.*

Value-based CTDE Methods in Symmetric Two-team Markov Game: from Cooperation to Team Competition
Pascal Leroy, Jonathan Pisane, Damien Ernst
Deep Reinforcement Learning Workshop NeurIPS, 2022.

QVMix and QVMix-Max: extending the deep quality-value family of algorithms to cooperative multi-agent reinforcement learning.
Pascal Leroy, Damien Ernst, Pierre Geurts, Gilles Louppe, Jonathan Pisane, Matthia Sabatelli
AAAI-21 Workshop on Reinforcement Learning in Games, 2021.

TALKS

- *Multi-Agent Reinforcement Learning.* Deep Reinforcement Learning, University of Groningen. 05/2023
- *Workshop on Reinforcement Learning and Multi-Agent RL.* Thales Belgium. 04/2023
- *Emergent Tool Use From Multi-Agent Autocurricula.* Advanced Machine Learning, ULiège. 04/2020

TEACHING

- Optimal decision-making for complex problems (lecture on multi-agent RL). 2020 & 21 & 22 & 23
- Introduction to artificial intelligence (Python projects). 2019 & 20
- Complementary computer science course (C projects). 2019 & 20

REVIEWING

- *Workshop*: SynS and ML (ICML, 2023).

AWARDS

- NeurIPS Travel Award (2023).

REFEREES

- Damien Ernst (dernst@uliege.be) - Ph.D. advisor.
- Jonathan Pisane - Ph.D. advisor.