Nicolas Castanet

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PhD in Reinforcement Learning

Experiences

ISIR, Sorbonne Université (Paris, France) - 3 years PhD *2021-2025*
PhD student in Reinforcement Learning.
Supervisors: Olivier Sigaud (MLIA, SU) and Sylvain Lamprier (LERIA, Université d'Angers, ex MLIA SU)
Title: Automatic state representation and goal selection in unsupervised reinforcement learning.

- Published two papers as first author, one of them in ICML, a major international machine learning conference, the other paper is currently under review.
- Worked on Goal Conditionned Reinforcement Learning from the unsupervised framework, involving intrinsic motivation to automatically generate a curiculum of goals.
- Worked on image-based Reinforcement Learning and Representation Learning strategy such image reconstruction (e.g VAE).
- Implemented RL algorithms/environments using xpag ("exploring agents"), a modular reinforcement learning library with Pytorch/JAX agents along side the Mujoco advanced physics simulator.
- Used the public HPC cluster Jean Zay to conduct experiments.
- Worked simultaneously as a teacher in Sorbonne University for computer science / machine learning majors from 1st year bachelor up to last year's master's degree.

LIP6, Sorbonne Université (Paris, France) - Research internship (M2) *2021*
Under the direction of Sylvain Lamprier and Oliver Sigaud.
Automatic Curriculum Learning for Deep Reinforcement Learning. These methods are applied in the context of sparse or absent reward signal. Research topics:

- Off Policy RL and Relabeling (Hindsight Experience Replay).
- Exploration (Intrinsic motivation, Curiosity ...).
- Automatic Goal Generation, Self-Play.

LIP6, Sorbonne Université (Paris, France) - Research internship (M1) *2020*
Under the direction of Olivier Schwander, Associate professor in the MLIA team.
Classification of gesture detected by radar micro Doppler Soli. Research topics :

- Deep learning for time-space data.
- Signal representation with Riemannian geometry.

Education

Ph.D. in Reinforcement Learning, ISIR, Sorbonne Université *10/2021-01/2025*
Supervisors: Olivier Sigaud (MLIA, Sorbonne Université) and Sylvain Lamprier (LERIA, Université d'Angers, ex MLIA Sorbonne Université)
Title: Automatic state representation and goal selection in unsupervised reinforcement learning.

Master in Computer Science, Sorbonne Université *2019-2021*
"Données, Apprentissage et Connaissances" (DAC)
Data acquisition and processing, Machine learning, Deep learning.

Bachelor in Computer Science, Sorbonne Université *2018-2019*

Engineering school, INP ENSEEIHT (Toulouse) *2016-2018*
Electrical and Automatic Engineering.

Maths preparatory classes - MPSI/PSI, Lycée Sainte-Marie (Paris) *2014-2016*

Publications

Nicolas Castanet, Olivier Sigaud, and Sylvain Lamprier. Imagine Beyond! Distributionally Robust Auto-Encoding for State Space Coverage in Online Reinforcement Learning. (2025) `https://arxiv.org/abs/2505.17830`

Nicolas Castanet, Olivier Sigaud, and Sylvain Lamprier. Stein variational goal generation for adaptive exploration in multi-goal reinforcement learning. (ICML 2023) `https://proceedings.mlr.press/v202/castanet23a.html`

Teaching

Reinforcement Learning and advanced Deep Learning *2024-2025*
2nd year Master DAC, Sorbonne Université

Python introduction *2023-2024, 2024-2025*
1st year Bachelor, Sorbonne Université

Python game development project, development of simple IA agents *2022-2023*
2nd year Bachelor, Sorbonne Université

Business Intelligence and User Modeling *2022-2023*
1st year Master DAC, Sorbonne Université

Technical skills

- **Computer Science :** Statistical learning, Deep learning, Reinforcement learning.
- **Applied mathematics** : Statistics, Probabilities, Optimization, Differential Geometry.
- **Programming languages & Technologies :** Python (NumPy, Pandas, Scikit-Learn, PyTorch, Tensorflow, JAX), Java, Javascript, LaTeX, Git, Mujoco physical simulator.
- **Working environment :** Linux + Git + Python + VS Code & GitHub Copilot.

Miscellaneous

- French native and I speak English at C1 level.
- I pratice sports on a regular basis including trail running, cycling, climbing and bikepacking.
- My other hobbies include woodworking, 3D printing & robotics.