


Tom Marty

 3rdcore.github.io
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EDUCATION

Ph.D. in Machine Learning <i>MILA - Montréal Institute of Learning Algorithms - GPA 4.00</i>	Jan. 2024 – <i>Montréal, Canada</i>
M.Sc. in Machine Learning <i>Polytechnique Montréal - GPA 3.91</i>	Sep. 2021 – Jun. 2023 <i>Montréal, Canada</i>
B.Sc. in Computer Science, minor in Applied Mathematics <i>X 2018, Ecole Polytechnique - GPA 3.84</i>	Sep. 2018 – Jun. 2021 <i>Palaiseau, France</i>
Lycée Jean-Baptiste Say <i>"Classe préparatoire" Intensive multi-disciplinary preparation - GPA 4.00 - Top 0.1% national</i>	Sep. 2016 – Jun. 2018 <i>Paris, France</i>

RESEARCH INTEREST

- **Broad interest** : Artificial intelligence, Machine Learning, Generative AI and Operational Research
- **Methodological interest** : **Causality**, Bayesian Statistics, OOD Generalization, Information Theory
- **Applications** : Fairness, Robust Machine Learning, Open-Ended Decision Making, AI for video-games

INDUSTRY AND ACADEMIC EXPERIENCE

Visiting Researcher <i>ServiceNow Research</i>	Apr. 2023 – Sept. 2023 <i>Montréal, Canada</i>
<ul style="list-style-type: none">• Developed WorkArena (ICML2024): an open-source Benchmark and Gym environment for evaluating Agent at solving common-knowledge tasks on a Web Browser	
Research Supervisor <i>Corail Research Group</i>	Jan. 2022 – Sept. 2022 <i>Montréal, Canada</i>
<ul style="list-style-type: none">• Supervised five interns on the development of the open-source project SeaPearl• Teaching Assistant for the course INF8215 given by Quentin Cappart in Fall 21 and Fall 22	
Research Engineer Intern <i>Corail Research Group</i>	Jan. 2021 – Sept. 2021 <i>Montréal, Canada</i>
<ul style="list-style-type: none">• Developed <i>SeaPearl</i> : an open-source RL-driven generic Constraint Programming solver• Used Deep Q-networks and Heterogeneous GNNs to approximate optimal decision process	
Software Engineer Intern <i>Dronisos, drone light show company</i>	Jun. 2020 – Sept. 2020 <i>Bordeaux, France</i>
<ul style="list-style-type: none">• Developed <i>Harmony</i>, a Physics based meta-heuristic that secures massive drone swarms• <i>Harmony</i> - currently in use - reduced the allocated securing time from 2 weeks (handmade) to 2 seconds• Achieved automatic securing on the company first 1000 drones choreography (+500k\$ show)	




PUBLICATIONS

Learning a Generic Value-Selection Heuristic Inside a Constraint Programming Solver


Tom Marty*, Tristan François, Pierre Tessier, Louis Gautier, Léo-Boisvert, Louis-Martin Rousseau, Quentin Cappart, (extended version)
Constraint Journal *under review

WorkArena: How Capable Are Web Agents at Solving Common Knowledge Work Tasks?



Alexandre Drouin, Maxime Gasse, Massimo Caccia, Issam H Laradji, Manuel Del Verne, **Tom Marty**, Léo Boisvert, Megh Thakkar, Quentin Cappart, David Vazquez, Nicolas Chapados, Alexandre Lacoste
International Conference on Machine Learning (ICML). 2024.

 Project  Code  PDF

The Unsolved Challenges of LLMs as Generalist Web Agents: A Case Study

Rim Assouel*, **Tom Marty***, Massimo Caccia, Issam H. Laradji, Alexandre Drouin, Sai Rajeswar, Hector Palacios, Quentin Cappart, David Vazquez, Nicolas Chapados, Maxime Gasse, Alexandre Lacoste
Foundation Models for Decision Making Workshop (NeurIPS). 2023.  PDF

Learning a Generic Value-Selection Heuristic Inside a Constraint Programming Solver

Tom Marty*, Tristan François, Pierre Tessier, Louis Gautier, Louis-Martin Rousseau, Quentin Cappart
Constraint Programming (CP). 2023.  Code  PDF

OTHER PROJECTS

- Leveraging Information Theory to create better optimizers** | *Python, Pytorch Lightning* May. 2024 –
• Work in progress...
- On the Necessity of Human Insight to Improve Adversarial Robustness** Mar. 2024 –
• Work in progress...
- WorkArena : an Open-Source Benchmark for evaluating Web Agents** | *Python* Apr. 2023 – Mar. 2024
• Paper accepted at ICML 2024 Vienna, and presented at NVIDIA GTC 2024
- SeaPearl : an Open-Source RL-driven Constraint-Programming Solver** | *Julia* Fev. 2021 – Jul. 2023
• Paper accepted at CP2023, Toronto
- Adversarial Attacks on Sentiment Classification models** | *Python, HuggingFace* Fev. 2022 – May. 2022
• Adversarial fine-tuning on large NLP models : Eleuther AI GPT 125M/1.3B/2.7B/6B parameters
• Evidence of a correlation between scaling and robustness against increasingly subtle Adversarial Attacks
- Diffusion Geodesic distance for non-linear dimensionality reduction** | *Python* Oct. 2021 – Jan. 2022
• Approximated the geodesic distance using a diffusion process over the manifold
• Proposed a new data visualization algorithm based on Multi-Dimensionnal Scaling and Diffusion Geodesic
- Autonomous Drone Swarm Deployment - DGA contest** | *Python, PyTorch* Nov. 2020 – Mar. 2021
• Multi-agent Q-Learning method for deployment optimization
• Density-Based Spatial Clustering for point of interest detection
- Realtime 3D Deep Motion Capture** | *C++, OpenCV, PyTorch* Oct. 2020 – Dec. 2020
• Implemented a method of inferring a full character's 3d pose using only a camera as an input
• Inspired by a EECV 2020 research paper to implement the algorithm
- Sketch-based Shape Retrieval** | *Python, C++, OpenGL* Sep. 2020 – Dec. 2020
• Implemented a method to find any specific 3d model in a database using a drawing as an input
• Succeeded to faithfully retrieve several simple 3D shapes by using a single drawing given by a user

Visit  my website to delve into these projects...

HONORS AND AWARDS

- Distinguished Paper Award at CP2023, Toronto Sept. 2023
- MITACS Accelerate scholarship of two units for my internship at ServiceNow Research Mar. 2023
- Outstanding Investment Mention, Ecole Polytechnique de Paris Jul. 2022
- Vallet Fondation scholarships for outstanding CPGE students 2018

TEACHING EXPERIENCE

- Teaching Assistant** Fall 2022
INF8215, Artificial Intelligence : Algorithms and methods
- Teaching Assistant** Fall 2021
INF8215, Artificial Intelligence : Algorithms and methods
- Teaching Assistant** Nov. 2018 – Mar. 2019
Ministry of National Education France
• Responsible for a group of up to 20 undergraduate students during scientific workshops
• Worked alongside the academic team to prepare students for entrance exams

STUDENT ASSOCIATION

Public Speaking Club: Rethorix

Oct. 2019 – Oct. 2020

- Organization of an eloquence contest between the schools of the Plateau de Saclay

President of Nuit du Styx

Nov. 2020

- General organization and logistic of an electronic music festival gathering more than 2000 peoples

SKILLS & HOBBIES

Languages: French : Native | English : Fluent | Russian : Primary

Developer Toolbox: Git, Pytorch, Lightning, Hydra, WandB, VScode, SLURM, CI testing

Programming Languages: Python, Julia, C++, R

Remote Controlled UAV: Conception, Building, Programmation, Testing, Adjustment

Activities: Outdoor climbing, river surf, ski, mountain hiking

REFERENCE

Prof. Dhanya Sridhar (Ph.D. advisor)

Core academic member of MILA - AI CIFAR Chair holder

Email : dhanya.sridhar@mila.quebec

Dr. Alexandre Lacoste

Staff Research Engineer, ServiceNow Research

Email : alexandre.lacoste@servicenow.com

Prof. Quentin Cappart (M.Sc. advisor)

Assistant Professor at Polytechnique Montréal

Email : quentin.cappart@polymtl.ca