Tom Marty

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Education

Polytechnique Montréal Sep. 2021 –
Master Thesis in Operationnal Research, Computer Science - CORAIL Research Group *Montréal Canada*

- **Courses :** Représentation Learning (Aaron Courville) | Spectral Graph Theory (Guy Wolf) | Continual Learning (Irina Rish)
- **SeaPearl (Thesis) - Supervised by Quentin Cappart and Louis-Martin Rousseau:** Using Reinforcement-Learning and Graph Representation Learning to accelerate discrete optimization problem solving process - one paper in preparation for **CPAIOR 2023**

Ecole Polytechnique - X 2018 Sep. 2018 – Jun. 2021
Bachelor Of Science in Computer Science, Minor in Applied Mathematics - GPA 3.84 *Palaiseau, France*

- **Theoretical Computer Science** : Graph Theory | Computational Geometry | Advanced Algorithmic
- **Applied Mathematics** : Optimisation | Statistical modeling | Deep Learning
- **Computer Graphics** : Computer Vision | Image Processing and Rendering

Lycée Jean-Baptiste Say Sep. 2016 – Jun. 2018
"Classe préparatoire" Intensive multi-disciplinary program leading to entrance exams - GPA 4.00 *Paris, France*

Experience

Research Supervisor Jan. 2022 – Sept. 2022
Corail Research Group *Montréal, Canada*

- Supervised five interns on the development of the open-source project SeaPearl
- Teaching Assistant for the course INF8215 given by Quentin Cappart

Research Engineer Intern Jan. 2021 – Sept. 2021
Corail Research Group *Montréal, Canada*

- Developped *SeaPearl* : an open-source RL-driven generic Constraint Programming solver
- Used Deep Q-networks and Heterogeneous GNNs to approximate optimal decision process

Software Engineer Intern Jun. 2020 – Sept. 2020
Dronisos, drone light show company *Bordeaux, France*

- Developed *Harmony*, a Physics based meta-heuristic that secures massive drone swarms (NP-Complete)
- *Harmony* - 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)

Teaching Assistant Nov. 2018 – Mar. 2019
Ministry of National Education *Noyon, 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

Projects

SeaPearl : an Open-Source RL-driven Constraint Programming Solver | *Julia* Fev. 2021 –

- Please visit this link for detailed explanations

Adversarial Attacks on Sentiment Classification models | *Python, HuggingFace* Fev. 2022 – May. 2022

- Adversarial fine-tunning 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
- Project coordinated by Irina Rish, AI CIFAR Chair holder, MILA

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-Dimentionnal 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
- Used 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

Student Association

Public Speaking Club: Rethorix Oct. 2019 – Oct. 2021
- Organization of an eloquence contest between the schools of the Plateau de Saclay

Skills & Hobbies

Languages: French : Native | English : Fluent | Russian : Primary
Programming Languages: Python, C++, Julia, R, Pytorch
Developer Tools: Pycharm, CLion, Git, SCRUM Framework
Open-Source web service deployment: Nextcloud, Nginx, Swag, OpenMediaVault
Remote Controlled UAV: Conception, Building, Programmation, Testing, Adjustment
Sports: Outdoor climbing, Ski, Montain hiking