# *Caroline Dakoure*

203-3980 Rue Gertrude, Montréal (QC) H4G 1R8
(514) 625-9613, caroline.dakoure@umontreal.ca
https://github.com/carodak/

## *Profile*

∴ Strong interest in the ethical use of new technologies, games, XR, with a positive impact on humans and their environment
∴ Strong communication skills, especially for collaboration and mediation
∴ Analytical mindset, conscientious, and attention to detail
∴ Languages: French and English

## *Education*

**Master's Degree in Computer Science (Artificial Intelligence)** **2020**

Adaptive VR Emotional Environments
Under the direction of Dr. Claude Frasson, University of Montreal

**Bachelor's Degree in Computer Science** **2017**

Université de Montpellier, France

**Scientific High-School Diploma (specialization in Mathematics)** **2014**

Lycée Jacques Prévert, Saint-Christol-lès-Alès, France

## *Specific knowledge*

**Game Engine:** Unity

**DevOps Automation Tools:** Docker

**Data Management:** SQL, SGBD MySQL, Castor, Redcap

**Programming Languages:** C++, C#, C, Java, Python, Scheme, Bash

**Machine Learning:** Librairies Scikit-learn, Numpy, TensorFlow, Keras, PyTorch, etc.

**Web:** PHP, React, Javascript, HTML5, CSS3,

## *Work experience*

**Research Software Developer**, Centre de Recherche Douglas, Québec **Nov. 2020-Now**

∴ Lead VR application development: MRI Simulation, Lobby Room (Unity, C# with design patterns), from requirements analysis to production; design, development, testing, optimization, and Meta Store deployment
∴ Conceptualize and lead development of web applications using React, PHP, JS, HTML, CSS (e.g., a match-3 puzzle game with procedural content generation, and an e-learning platform)
∴ Analyze XR (AR/VR) requirements and learn new computer techniques to address them
∴ Develop cognitive tests in Python and JavaScript and create Python scripts to automate tasks
∴ Supervise, mentor, and share expertise with new members of the programming team
∴ Provide recommendations on computer system-related issues

**Student trainee in a Computer Science and Research Laboratory** **Jul. 2017**
**LIRMM**, Montpellier, France

∴ Experiment deep learning (Keras, TensorFlow, Scikit-learn) and node2vec (with Networkx) algorithms to learn new representations of the features and get better predictions
∴ Implement an architecture in Python with several classifiers (neural network, decision tree) to determine graph properties (e.g., planarity, and tree structures)

## *Student projects and personal achievements*

**VR environments that change according to the patient's emotions** as part of my master's degree project at UdeM **2020**

∴ Develop adaptive VR environments using Unity3D and C#
∴ Create an NPC pathfinding & Goal-Oriented Action Planning system.
∴ Coordinate paired programming to develop a ML classifier for emotion detection
∴ Plan tasks to meet company deadlines & participate in team meetings
∴ Find strong scientific theories to choose appropriate environments

Achievements: Created two real-time changing virtual reality (VR) environments using Unity3D based on patients' emotions. Developed a machine learning model using Python to detect the intensity of confusion (ranging from 0 to 1) from EEG signals.

**Development of procedural content** as part of a course on modern computer games at McGill **2018**

∴ Simulate the behavior of various types of agents (steering behaviors, collision detection, procedural content generation, game physics)
∴ Develop a system where movement is based on directional forces

Achievements: Created a simulation in Unity3D and C# featuring three different types of agents. Some agents needed to reach an exit while others interfered or socialized.

**Development of a Gomoku game** as part of a second-year bachelor's project **2016**

∴ Create a game in C++ where 2 players can play Gomoku
∴ Implement the MinMax algorithm to allow a player to play against an AI
∴ Enhance the MinMax algorithm using the alpha-beta pruning technique
∴ Implement a specific variation of Gomoku (Renju)

Used the Code::Blocks IDE with the SFML library (C++) for development

## *Publications*

https://orcid.org/0000-0002-3195-3643

- Co-author, CCGH 2023.
- First author in FLAIRS 2021 Conference Proceedings (34) and BFAL 2020, Springer

## *Other Achievements*

**Participant,** MIT Reality Hack 2025 **2025**
∴ Over 5days, we developed a musical game in MR using Unity

**1st price,** Winner of the NeuroVR Hackathon 2024 organized by McGillXR **2024**
∴ Over 24hours, we developed the first version of an MRI simulation in VR using Unity

**1st price in a Competition,** Winner of the 2019 Serene-Risc CyberStats Challenge **2019**
∴ Creation of an informative poster to promote awareness messages on Cybersecurity and Cybercrime using data from Statistics Canada's and presentation at GoSecure 2019

## *Social implications*

**Mentor** during McGillXR Hackathon (2025), **Bikes Upcycling** for Togo at CycloNordSud (2023), **Animal Care** at Café Chato (2022), and **Participant Welcoming and Registration** for "Ça va aller" campaign event at UdeM (2019)