

Clément Detry

MACHINE LEARNING ENGINEER

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Education

Université de Montréal & Mila - Quebec AI Institute

MSc in Machine Learning

Montréal, CA

Sept 2022 - Jan 2024

- **Courses:** Data Science, Machine Learning, Representation Learning (by Prof. Aaron Courville), NLP, Big Data

Maastricht University

BSc in Data Science and Artificial Intelligence

Maastricht, NL

Sept 2018 - Jan 2022

- **Thesis:** Identifying Patterns in Jaw Activities: Time Series Analysis of Sleep-Related Data ([link](#))
- **Supervisor:** Prof. Rachel Cavill

Work Experience

HumanWare Technologies

ML Engineer

Montréal, CA

May 2023 - Present

- Initiated and led the development of an object detection task for visually impaired users to locate personal objects, leveraging the use of a GPS-based device equipped with dual cameras. This project aimed to enhance users' independence by facilitating the retrieval of their objects.
- Implemented and trained a custom PyTorch model using a few-shot learning approach. This model enables the detection of personal objects with only a few training examples.
- Designed a recording mechanism using the SiamRPN tracking model from the PySOT library, allowing users to capture images of their objects.
- Collaborated with software teams and beta-users to refine and optimize the model, focusing on its integration and usability.

Nomics Care

Data Scientist

Liège, BE

Sept 2021 - Jun 2022

- Automated the detection of specific patterns in sleep time series data related to jaw activities, which were previously identified manually by doctors. The project aimed to streamline the diagnostic process by identifying patterns of "signal invalidity" and "awakeness".
- Gathered time series data using the MNE-Python library and performed preprocessing with Pandas to clean and structure the dataset. Employed SMOTE oversampling to balance the data, ensuring it was well-suited for effective model training.
- Implemented and evaluated supervised machine learning models, specifically a 1-D CNN and an LSTM, using Tensorflow and Keras frameworks. Results showed an overall validation F1-score of 0.98, indicating sufficient model performance in identifying the targeted sleep patterns.

Nomics Care

Web Developer Intern

Liège, BE

Jun 2021 - Aug 2021

- Initiated the migration of a Windows-based application for sleep activity signal analysis to a web server. This strategic shift was designed to simplify the user experience, enabling doctors to access patient analysis platforms from any device.
- Leveraged Django web framework to transition existing Python-based code for the web application development. This approach capitalized on the pre-existing codebase, streamlining the development process and maintaining system coherence.
- Developed the backend for user authentication interfaces and password management systems, and established an SQL database for storing user data. Concluded the internship by initiating the implementation of a dashboard feature for doctor's patient data overview.

Projects

Medical Image Segmentation ([link](#))

Université de Montréal

Montréal, CA

Jan 2023 - May 2023

- Worked within a three-person team on a project aimed at 3D medical image segmentation, utilizing CT and MRI scans. The objective was to assess and refine the architectural framework of a U-Net model to enhance its segmentation performance.
- Implemented a series of strategic modifications to the U-Net model, including adjustments to the convolutional block, improvements in skip connections and the integration of a cross-attention mechanism. At the same time, established a standardized data preprocessing and augmentation pipeline, ensuring consistent and accurate evaluation of architectural changes across model iterations.

Interactive Human vs Robot "Water Pong" Game ([link](#))

Maastricht University

Maastricht, NL

Sept 2021 - Jan 2022

- In a team of four, implemented an interactive "Water Pong" game with real-time computer vision, utilizing Hough Circle Transform in OpenCV for cup detection and YOLOv5 for ball tracking, facilitating accurate distance measurements.
- Developed a lookup table for the robotic arm's throw parameters, correlating with cup positions, resulting in a target hitting accuracy of 90%.

Skills

Languages	Python, Java, Matlab, SQL
Frameworks	PyTorch, Keras, Tensorflow, YOLO, Django, Flutter
Libraries	Numpy, Pandas, Matplotlib, OpenCV, Scikit-learn, HuggingFace, MLFlow, Optuna, MNE-Python
Other Tools	Git, Docker, LaTeX, Jira