

CARL LEMAIRE

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EDUCATION

Université de Sherbrooke

January 2017 - December 2018

Master's in Computer Science — Advisor : Pierre-Marc Jodoin

Subject : Sparsification of Deep Neural Networks

Deep Learning, Computer Vision, Bayesian Statistics

2 internships at Miovision, inc (Kitchener, Ontario) ; 20 000\$ in Mitacs grants

Université de Sherbrooke

August 2013 - December 2016

Bachelor's degree in Comp. Sci. (Sciences de l'image et des médias numériques)

Score : 3,93 / 4,3

Computer Vision ; Machine Learning ; CGI ; DSP ; Software Design ; Statistics ; Calculus.

WORK EXPERIENCE

Université de Sherbrooke, Sherbrooke

January 2019 – Today

Analyst, Machine Learning and High Performance Computing

Compute Canada staff

- Design and implement machine learning models and pipelines for researchers in a range of fields
- Design and implement tools and processes for the efficient development of machine learning solutions
- Help researchers run machine learning experiments efficiently on Compute Canada clusters
- Help maintain Compute Canada's high performance computing environment

Metareal, Montréal

May 2016 – August 2016

Computer Vision Researcher (Intern)

- Spherical image processing, pattern recognition (OpenCV, C++)
- Synthesis and Tone Mapping of HDR Imagery

Autodesk, Montréal

3 internships, 10 months total May 2014 – December 2015

Software Developer (Intern)

- Implement and maintain a custom framework for unit test and integration tests (C#)
- Implement user interface components

PUBLICATIONS

Carl Lemaire, Andrew Achkar, Pierre-Marc Jodoin. « Structured Pruning of Neural Network with Budget-Aware Regularization ». Published in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019, pp. 9108-9116.

Zhiming Luo, Frédéric B.-Charron, **Carl Lemaire**, Janusz Konrad, Shaozi Li, Akshaya Mishra, Andrew Achkar, Justin Eichel, Pierre-Marc Jodoin. « MIO-TCD : A new benchmark dataset for vehicle classification and localization ». Published in IEEE Transactions on Image Processing, vol. 27, no. 10, pp. 5129-5141, Oct. 2018.

PROJECTS

Pruning of Deep Neural Networks

January 2017 - December 2018

Master's thesis project

- Perform a literature review of : compression, design, acceleration and optimization of neural networks ; with a focus on convolutional neural networks.
- Implement methods from the literature about the pruning of convolutional neural networks
- Design and evaluate new methods for reducing the resource consumption of neural networks while retaining satisfying accuracy.
- Co-write and submit a paper accepted to CVPR.

Antigen-Antibody Affinity Analysis

January 2019 - Today

Machine Learning Consultancy

- Design and implement a model and pipeline for recognizing paratopes in amino-acid chains. Code available online : github.com/lemairecarl/paratope-pred
- Research into new models and approaches to antigen-antibody affinity analysis and discovery.

HyperTrainer : Experiment Manager and Dashboard

February 2019 - Today

Support to the Compute Canada machine learning community

- Implement a system for launching machine learning experiments on various hardware, such as clusters, cloud compute, or a local computer.
- Implement a web-based user interface for managing and monitoring these experiments.
- Code available online : github.com/lemairecarl/hypertrainer

Benchmark on Vehicle Classification and Localization

January 2017 - July 2017

As part of my master's

- Implement 6 convolutional network architectures from the recent literature (AlexNet, VGG, Inception-V3, ResNet, Xception, DenseNet).
- Evaluate the performance of these architectures on the MIO-TCD dataset from Miovision, inc.
- Participate in writing a paper published in IEEE Transactions on Image Processing.

SKILLS

Programming

Python, C++, C#, Javascript, \LaTeX

Tools

PyTorch, Tensorflow, Keras, scikit-learn, NumPy, OpenCV, OpenGL

Communication

Scientific Writing, Scientific Popularization

ACHIEVEMENTS

Scholarships. I obtained a 17,500\$ scholarship from FQRNT. I received a 1,000\$ entry scholarship from the Université de Sherbrooke for past academic excellence.

Involvement and Volunteering. I was president of my class during my bachelor's. I have been member of the administrative council of our students association. I made more than ten blood donations.

Scientific Popularization. I have made oral presentations about machine learning to various audiences. I introduced various subjects, including : neural networks, generative adversarial networks, biases in word vectors, Deep Fakes, neural network sparsification.