Thomas George

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Citizenship: France

Research interests

My research is focused on understanding the generalization properties of deep neural networks and develop efficient training techniques. I am interested in trying to build bridges between deep learning training mechanisms and more established machine learning techniques such as linear models and ensemble methods.

Education

2017 – Present **Mila - Université de Montréal** – Montréal, Canada
PhD in Computer Science
Mentors: Professors Pascal Vincent and Guillaume Lajoie.

2015 – 2017 **Université de Montréal** – Montréal, Canada
Master in Computer Science
Mentor: Professor Pascal Vincent.

2010 – 2013 **École des Mines** – Paris, France
Master of Science and Executive Engineering

2009 – 2010 **University of Bristol** – Bristol, United-Kingdom
Bachelor in mathematics, 1 year exchange student

2007 – 2010 **Sorbonne Université (Pierre et Marie Curie)** – Paris, France
Bachelor in mathematics, with minors in computer science, physics and mechanics

Selected publications

for a full list, please refer to my google scholar page

2021 **Implicit Regularization via Neural Feature Alignment**
Aristide Baratin*, Thomas George*, César Laurent, R Devon Hjelm, Guillaume Lajoie, Pascal Vincent, and Simon Lacoste-Julien.
AISTATS 2021.

2018 **Fast Approximate Natural Gradient Descent in a Kronecker-factored Eigenbasis**
Thomas George*, César Laurent*, Xavier Bouthillier, Nicolas Ballas, Pascal Vincent.
NeurIPS 2018.

2017 **Factorized second order methods in neural networks**
Thomas George.
MSc thesis.

Software

2020 **NNGeometry: Easy and Fast Fisher Information Matrices and Neural Tangent Kernels in PyTorch**
Thomas George.

Teaching experience

October 2019 **Invited lecturer, IFT3395: Fundamentals of machine learning (Université de Montréal)**
Material design and lecture for a 2hrs course on the backpropagation algorithm.

March 2019 **Invited lecturer, IFT6760A: Matrix and tensor factorization techniques for machine learning (Université de Montréal)**
Material design and lecture for a 2hrs course on efficient factorized natural gradient in deep networks.

Fall 2016, 2018, 2019, 2020 **Teaching assistant, IFT6390: Fundamentals of machine learning (Université de Montréal)**
Lab content design and labs teaching. Kaggle competition leading. Homework and exams grading.

Spring 2010 **Teaching assistant: Mathematics and physics refresher course for 1st year students (Sorbonne Université)**
Tutorial teaching during a 3-weeks intensive class aimed at prospective 1st year students.

Industry experience

2013 – 2015 **Eco-Adapt (hardware/software engineer)** – Paris, France
I led the design of hardware and implemented software for a wireless communicating electrical meter aimed at detecting faults.

Summer 2013 **FieldBox.ai (Research engineer internship)** – Paris, France
I designed a scripting framework for automated analysis of time series.

Talks and tutorials

June 2021 Implicit Regularization via Neural Feature Alignment
Conférence sur l'apprentissage automatique 2021, Saint-Étienne, France (remote)

February 2021 Optimization and generalization through the lens of the linearization of neural networks training dynamics
Weekly seminar of Roger Grosse's group at Vector Institute, Toronto, Canada (remote)

Technical skills

Programming languages
Proficient in: Python, PyTorch
Familiar with: Javascript

Software
LaTeX, Git

Languages
French (fluent), English (professional working proficiency)

Other interests

Olympic handball, bouldering (climbing)