Gabriel Huang

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SUMMARY

Applying for Researcher Role on FATE topics
- Final-year PhD student at Mila–Québec AI Institute & Université de Montréal
- Expected graduation in July 2022
- Looking for a full-time position starting in September 2022

RESEARCH TOPICS

- **Relevant topics of interest**: ethics and morality in AI, value-aware language models, transparent and logical AI decisions, human decision process (behavior science), augmenting AI with emotions and values to improve interactions and alignment with societal values, AI's impact on society (AI policy and governance), countering mass-manipulation and disinformation, values and biases encoded in AI models and datasets
- **Technical expertise**: few-shot and low-data learning, self-supervised learning, large language models, vision+language transformers, object detection, instance segmentation, generative adversarial networks, deep learning optimization, scattering networks
- **Non-technical interests**: behavior science, moral philosophy, policy analysis, disinformation, marketing, geopolitics

EDUCATION

Mila - Québec AI Institute　　　　　　　**Jan 2017-July 2022 (Expected)**
PhD in Machine Learning, Université de Montréal
Supervised by Simon Lacoste-Julien, mentored by Hugo Larochelle and Pascal Vincent
Ranked 1st at qualifying exams on deep learning　　　　　**GPA: 4.3/4**

Ecole Normale Supérieure, Paris　　　　　　　**2015-2016**
MSc. Machine Learning, Computer Vision and Applied Mathematics (MVA)
⇒ *The class is composed of the best French students in the field, coming from the leading "Grandes Ecoles". These French schools perform a very strong selection of students based on mathematical skills, and provide thorough training.*

CentraleSupéléc, Paris　　　　　　　**2013-2016**
MSc. Applied Mathematics and Statistics
Ranked 1st/500 graduates
⇒ *CentraleSupéléc is commonly recognized as the #2 engineering school in France. I followed a multidisciplinary curriculum in Mathematics, Physics and Computer Science, with a specific focus on Machine Learning during the third year.*

Princeton University　　　　　　　**Spring 2015**
Visiting student—supervised by Brian Kernighan
Graduate classes on Deep Learning Theory, Online Convex Optimization, Computer Vision, and Machine Translation.

EXPERIENCE

ServiceNow (formerly ElementAI), Montréal   **March 2021-July 2022**
Visiting Researcher in Low-Data Learning Program.
- Investigate methods for self-supervised and few-shot semantic segmentation and instance segmentation (project lead)
- Survey the self-supervised and few-shot object detection field—under review at IEEE TPAMI (project lead)
- Develop self-supervised representations for remote sensing and satellite imaging (project lead)
- Write comprehensive review of low-data language models (project lead)
- Contribute to climate-change benchmark project (code helper)

Google Research, Mountain View   **Sept 2019-June 2020**
Research Intern, GARCON Team
- Investigate multimodal captioning of YouTube instructional videos using video features and automated speech recognition.
- Explore several self-supervised pretraining strategies for sequence-to-sequence transformer. Beat SOTA on YouCook II dense captioning task—AACL-IJCNLP 2020.
- Use several text-only and multimodal pretraining and parallel sources such as HowTo-100M, Youtube-8M, Wikihow, Recipe-1M, YouCook II.

Patterns Technologies, Montréal   **2017-2018**
Chief Data Scientist and Co-founder
- Deploy a customized object detection API on Google Cloud.
- Generate email digest automatically from on-site user reviews.

Cardabel, Inappropriate Trading Detection, Paris   **Fall 2016**
Machine Learning Consultant
- Set-up Apache Spark infrastructure, train employees, write documentation.
- Port anomaly detection algorithms from C# to PySpark.

Dassault Systèmes, Paris   **2013-2016**
Research Intern, two days per week in parallel with MSc
- Research on Human Activity recognition with a Kinect.
- Research on Content recommendations for internal social network.
- Implement and parallelize supervised and unsupervised machine learning algorithms in C++ and CUDA.

SKILLS

Frameworks. PyTorch, Detectron2, Lightning, DistributedDataParallel, timm, TensorFlow, OpenCV, torchgeo, Flask, javascript.
Hands-on skills. Train distributed multi-gpu models, self-supervised pretraining, multimodal language models, vision transformers, unsupervised machine translation, object detectors, batch-process large video datasets (>10 Terabytes). Geo-data.
Research contributions. Multimodal Transformers, Vision transformers, Meta-learning models, Few-shot learning, Object Detection, Instance Segmentation, Generative Adversarial Networks
Hardware. Work with real-time RGB and Kinect video feeds, build an Arduino UAV Drone.

PUBLICATIONS

A Survey of Self-Supervised and Few-Shot Object Detection
Gabriel Huang, Issam Laradji, David Vazquez, Simon Lacoste-Julien, Pau Rodriguez
IEEE TPAMI 22, under review
[paper] [project page] [tweetorial]

Repurposing Pretrained Models for Robust Out-of-domain Few-Shot Learning
Namyeong Kwon, Hwidong Na, **Gabriel Huang**, Simon Lacoste-Julien
ICLR 2021
[paper] [video]

Multimodal Pretraining for Instructional Video Captioning
Gabriel Huang, Bo Pang, Zhenhai Zhu, Clara Rivera, Radu Soricut.
AACL-IJCNLP 2020.
[paper] [data] [video] [slides]

Are Few-Shot Learning Benchmarks too Simple ? Solving them without Test-time Labels
Gabriel Huang, Hugo Larochelle, Simon Lacoste-Julien.
Technical Report, extends ICLR 2019 Workshop Paper
[paper] [code] [shortscience]

Scattering Networks for Hybrid Representation Learning
Edouard Oyallon, Sergey Zagoruyko, **Gabriel Huang**, Nikos Komodakis, Simon Lacoste-Julien, Matthew Blaschko, Eugene Belilovsky.
IEEE TPAMI 2018
[paper]

Parametric Adversarial Divergences are Good Task Losses for Generative Modeling
Gabriel Huang, Hugo Berard, Ahmed Touati, Gauthier Gidel, Pascal Vincent, Simon Lacoste-Julien.
Technical Report, extends ICLR 2018 Workshop Paper
[paper]

Negative Momentum for Improved Game Dynamics
Gauthier Gidel, Reyhane Askari Hemmat, Mohammad Pezeshki, **Gabriel Huang**, Rémi Lepriol, Simon Lacoste-Julien, Ioannis Mitliagkas.
AISTATS 2019
[paper] [visualization]

AWARDS

• Winner of 2017 McGill ImplementAI Hackathon, virtually controlled proof-of-concept instrument using RGB video pose-estimation.
• Winner of 2014 Dassault Aviation UAV Challenge, build and program autonomous hexacopter to drop packages on visual targets using RGB camera.
• Winner of the 2014 Startup WeekEnd Polytechnique Jury's Prize, proof-of-concept low-cost eye tracker for an orthoptics spinoff from Université Pierre et Marie Curie

COMMUNITY ENGAGEMENT

• Review for NeurIPS, ICML, ICLR, CVIU, MAIS, WiML.
• Teaching assistant, *Probabilistic Graphical Models.* Co-prepare course content and grade assignments.

PERSONAL INTERESTS

• Acroyoga, rock-climbing and paragliding.
• Personal blog on human behavior, societies and AI: naivepsychology.com