Pierre Perrault

Machine Learning Research Scientist

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Work Experience

2020 - Now **Deep learning research engineer**, Idemia, Courbevoie
Team: Video analytics, object detection & tracking.

2019 **Research scientist intern**, Adobe, San José (CA)
Supervised by Jennifer Healey & Zheng Wen.

2017 **Research intern (master thesis)**, CMLA - ENS Paris-Saclay
Supervised by Vianney Perchet.

2015 **Research intern**, University of Warwick, Coventry (UK)
Supervised by Vadim Lozin.

2014 **Research intern**, MAPMO, Orléans
Supervised by Romain Abraham.

Education

2017 - 2020 **PhD, applied mathematics**, INRIA Lille, SequeL team & ENS Paris-Saclay
Title: Efficient Learning in Stochastic Combinatorial Semi-Bandits.
Supervised by Michal Valko (DeepMind) & Vianney Perchet (Criteo AI Lab).

2016 - 2017 **MSc, MVA (mathematics, computer vision, machine learning)**, ENS Paris-Saclay

2015 - 2016 **Agrégation externe (rank: $37/300$), high-level teaching degree**, ENS Paris-Saclay

2015 - 2017 **Élève normalien**, ENS Paris-Saclay

2013 - 2014 **BSc & first year graduate study, fundamental mathematics**, ENS Rennes

2011 - 2013 **Classe préparatoire aux grandes écoles, MPSI - MP**, Lycée Pothier d'Orléans

Publications

2022
- **Pierre Perrault**, *When Combinatorial Thompson Sampling meets Approximation Regret,* NeurIPS 2022

2021
- Xavier Fontaine, **Pierre Perrault**, Vianney Perchet, Michal Valko, *Online A-Optimal Design and Active Linear Regression,* ICML 2021
- **Pierre Perrault**, Jennifer Healey, Zheng Wen, Michal Valko, *On the Approximation Relationship between Optimizing Ratio of Submodular (RS) and Difference of Submodular (DS) Functions*

2020
- **Pierre Perrault**, Etienne Boursier, Vianney Perchet, Michal Valko, *Statistical Efficiency of Thompson Sampling for Combinatorial Semi-Bandits,* NeurIPS 2020
- **Pierre Perrault**, Jennifer Healey, Zheng Wen, Michal Valko, *Budgeted Online Influence Maximization,* ICML 2020
- **Pierre Perrault**, Vianney Perchet, Michal Valko, *Covariance-adapting algorithm for semi-bandits with application to sparse outcomes,* COLT 2020

2019
- **Pierre Perrault**, Vianney Perchet, Michal Valko, *Exploiting Structure of Uncertainty for Efficient Matroid Semi-Bandits,* ICML 2019
- **Pierre Perrault**, Vianney Perchet, Michal Valko, *Finding the Bandit in a Graph: Sequential Search-and-Stop,* AIStats 2019

Editorial Activities

Reviewer NeurIPS (2018, 2020), ICML (2018, 2019), COLT (2018, 2019, 2020), ALT (2019), AIStats (2019)

Program committe EWRL (2018)

Talks

2022
- *When Combinatorial Thompson Sampling meets Approximation Regret*, NeurIPS

2021
- *Crowd counting and localization*, Idemia, Courbevoie

2020
- *Efficient Learning in Stochastic Combinatorial Semi-Bandits*, Thesis defense
- *Statistical Efficiency of Thompson Sampling for Combinatorial Semi-Bandits,* NeurIPS
- *Budgeted Online Influence Maximization*, ICML and Adobe, San José, USA
- *Covariance-adapting algorithm for semi-bandits with application to sparse outcomes*, COLT
- *Multivariate first-order stochastic dominance*, ENS Machine Learning seminar

2019
- *Sensor Based Recommendation Engine for Digital Signage*, Adobe, San José
- *Stochastic combinatorial bandits*, CMLA Machine Learning seminar, ENS Paris-Saclay
- *Exploiting Structure of Uncertainty for Efficient Matroid Semi-Bandits*, ICML

2018
- *Expanding searches on trees and MAB*, SequeL seminar, Inria Lille
- *Stochastic multi-arm bandit problem and some extensions*, Lambda seminar, Université de Bordeaux

Patents

- **Pierre Perrault**, Wassim Bouatay, Samuel Asserpe, *Tracking of high speed vehicles,* Idemia IDENTITY & SECURITY, submitted
- **Pierre Perrault**, *Estimation of vehicle 3D bounding boxes,* Idemia IDENTITY & SECURITY, filed 14/04/2022
- **Pierre Perrault**, Dora Csillag, Stéphane Gentric, *Method for detecting interactions between several elements of interest,* Idemia IDENTITY & SECURITY, filed 07/02/2022
- **Pierre Perrault**, *Method for determining 3D coordinates of a keypoint according to its image coordinates,* Idemia IDENTITY & SECURITY, filed 18/11/2021
- **Pierre Perrault**, *Method for determining the calibration parameters of a camera,* Idemia IDENTITY & SECURITY, filed 04/11/2021

Teaching

2020 - Now **External lecturer - MSc level**, Télécom Paris & UPMC
- *Deep learning for object detection and tracking.*
- *Face recognition.*

2017 - 2020 **Teaching assistant**, ENS Paris-Saclay
- *Graphs in machine learning (MSc MVA, reference: Michal Valko).*
- *Functional analysis, differential calculus, optimization, numerical analysis for differential equations (Agrégation level, reference: Frédéric Pascal).*
- *Fourier analysis (graduate level, reference: Arthur Leclaire).*

2014 - 2016 **Mathematics examiner**, Lycée Chaptal (Paris), Chateaubriand and Joliot-Curie (Rennes)
Levels: MP, ECS2, PCSI, BCPST1, BCPST2.

Students and mentoring

2022 **Siwar Mhadhbi**, Intern at Idemia, Student at Télécom Paris & M2 MVA
Crowd counting & localization.

2021 - Now **Drazic Martin**, Apprentice at Idemia, Student at ECE
Synthetic data generation for road safety & public space scenes.

2022 - 2023 **Wenjie Guoduthoit, Peter Harfouche, Joffrey Ma**, Bachelor year-long project at Idemia, Students at Télécom Paris
Abandoned bag alerting with 3D keypoints.

2021 - 2022 **Anthony Kobanda, Guillaume Loranchet, Flavien Vidal**, Bachelor year-long project at Idemia, Students at École polytechnique
Video action recognition based on 3D keypoints.

Skills

Machine Learning: Deep Learning, computer vision, GANs, adversarial attacks, fairness, explainability, natural language processing, semi/self-supervised learning, sequential learning, reinforcement learning, bandit algorithms, recommender systems, combinatorial optimization, graph-based methods, approximation algorithms.

Code: Python (PyTorch, TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, ONNX).

Languages: French (mothertongue), english (fluent).