Gregoire Fournier

Doctor of Philosophy in Mathematics
Machine Learning Engineer
Graduating in August 2025

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⚙ Personal Website
in LinkedIn Profile

EDUCATION

PhD in Mathematics
University of Illinois Chicago

Sep 2020 - Aug 2025

- Developed methods for generating legal reasoning using large language models (LLMs) through context augmentation and Chain-of-Thought, applied to landlord-tenant disputes. This work was **published in JURIX 2024**.
- Designed an **interpretability method for Graph Machine Learning (Graph ML) models**, focusing on counterfactual explanations that provide recourse to users by identifying minimal graph modifications needed to achieve a desired outcome. This work is under review for **ICML 2025**.
- Investigated the **mathematical logic foundations** underlying Graph ML interpretability, exploring formal reasoning techniques to characterize and improve model explanations. This work is under review for **LICS 2025**.

Current Projects:

- Developing a framework for extracting **logic-based explanations for Graph Neural Networks (GNNs)**, leveraging formal logic to express model decisions in interpretable terms.
- Using fine-tuned **LLMs to generate human-readable explanations for GNN predictions**, combining natural language generation with structural insights from graph models.

MS in Engineering (major in Machine Learning)
Centrale Lille, France

2015-2019
SIGPA scholarship recipient

TECHNICAL SKILLS & INTERESTS

Languages: Python, C++, Java, SQL, LaTeX, Bash
Libraries & Tools: PyTorch, Scikit-learn, Pandas, AWS, Git, Docker, Hugging Face
ML: Deep Learning, Graph Neural Networks, Bayesian Methods, Interpretability, Large Language Models
Relevant Coursework: Optimization, Probability, Deep Learning, Bayesian Learning, Explainable AI, Algorithms
Applications & Interests: Explainable AI, Counterfactual Reasoning, Financial Data Science, LegalTech, Scalable ML

EXPERIENCE

ML Engineer
Gustave Roussy

Sep 2019 - Jul 2020
France

- Developed deep learning models for brain tumor segmentation, improving segmentation accuracy by 15% compared to baselines, aiding clinicians in treatment planning.
- Led a team of 3 engineers to build a brain tumor recurrence detection model, leveraging multi-modal MRI data.
- Optimized inference pipelines, reducing segmentation time by 40%, enabling near real-time MRI analysis in a clinical setting.

Research Scientist
A*STAR

Feb - Jul 2019
Singapore

- Applied Bayesian deep active learning techniques to optimize electrical circuit design, reducing the number of required simulations by 60% while maintaining design accuracy.
- Implemented uncertainty quantification methods, increasing model reliability and reducing failure rates in circuit validation by 25%.
- Our research findings contributed to ISCAS 2022 publication, influencing AI-driven circuit design methodologies.

Data Analytics Intern
Allstate

May - Jul 2018
Chicago, IL

- Designed an interactive data visualization pipeline for auto claim scoring models, reducing model debugging time.
- Analyzed large-scale claims data, identifying risk factors that improved fraud detection models' accuracy by 5%.

PROFESSIONAL SERVICE

Machine learning conference reviewer
NeurIPS 2024, ICLR 2024, SDM 2025, ICML 2025

2024-Present

Invited Speaker
IDEAL ML interpretability Workshops, JURIX 2024 conference, UIC Logic Seminar

2020-Present

Research Group Coordinator
UIC Graph Machine Learning Group

2024