Mathias Vigouroux

Resume

	Research Topic
	Uncertainty & metacognition, Interpretability & Robustness in AI.
	Education
2023–2024	Master 2 in Applied Maths: Mathématiques, Vision, Apprentissage, ENS Paris-Saclay. Robusteness and Interpretability of AI. Graph neural network, topolological data analysis, optimal transport, RL, NLP
2022–2024	Normalien, Diplôme École Normale Supérieure Paris , <i>ENS UIm.</i> Major in Cognitive Science, Human-Machine Comparison through interdisciplinary approach. <u>Math Lecturer</u> for non-math ENS student.
2022–2024	M1 CogMaster, ENS UIm - Université PSL. Major in Modelling for Human Psychology, Theory of Machine Learning
2021–2022	M2 Computational Neurosciences Neuroengineering , <i>Université Paris-Saclay</i> . Modelling Biological Neurons, Dynamical Systems
2019-2024	Engineering cycle , <i>École Nationale des Statistiques et de l'Administration Economique (ENSAE)</i> . Statistical expertise and Modelling Rational Human Behavior
2016–2019	Preparatory classes , <i>Lycée du Parc.</i> PCSI - PC* : Competitive undergraduate program in physics, chemistry and mathematics.
	Professional experiences
11/2024 - Present	Psychophysics Research Intern , <i>LCSP Team - ENS</i> . Research intern on our ability to detect attentional variation in others. Under the Supervision of Jérôme Sackur
04/2024-09/2024	 Al Research Intern, MILES Team - PRAIRIE - PSL University. Trying to develop uncertainty metrics for Large Language Models. Direct Supervisor Jamal Atif and Yann Chevaleyre. Master supervisor: Gabriel Peyré.
10/2021-07/2023	 Master Thesis : Computational Neuroscience and Neuroengineering, continued as part time Internship, Commissariat Energie Atomique - Neurospin - Unicog - Brain Dynamics and Cognition. Bayesian modeling of the unfolding of temporal prediction. in prep, paper publication, first author. Presented at the conference "Colloque des jeunes chercheur · ses en sciences cognitives 2022", FRESCO.
07/2021-07/2022	 Research Internship, continued as Research Assistant, Center of Research in Economics and STatistics (CREST) - Brain and Spine Institute Paris (ARAMIS Team). Interdisciplinary research project (social sciences, genetics, neurosciences): biological determinants of risk aversion.
10/2020-05/2021	 Research assistant for the administartion, CREST. Developed analytical tools for publication monitoring
01/2021- current	 Freelance DataScientist, Self employed - DataM Consulting. Canvasing clients, enhance algorithms efficency. Associated with other freelancers.
07/2020-09/2020	 Data Science Internship, World Water Council. Developed tools to improve the communication and geopolitical strategy of the Council with Twitter data.
	Projects
Academic	NLP, few-shot learning : Pattern-Exploitation Training for low resource languages (Hungarian). Fine-tuning of existing algorithm, creation of new tasks.
Academic	NLP, RLHF: Agent creation for machines. Comparing text-davinci-3 to ChatGPT.
Academic	Interpretability of Transformers: Discovering Latent Knowledge in Language Models Without Supervision
Academic	Sentiment Analysis, web-scrapping: Political polarization in the USA
Academic	Deep RL reacher algorithms for curriculum learning of Deep RL in continuously parameterized environments

- Academic Topological Data Analysis: Principal Geodesic Analysis of Merge Trees.
- Academic Statistical learning for extreme value: Regular Variation in Hilbert Spaces and PCA for Functional Extremes.

Academic
 Optimal Transport: Approximate Bayesian Computation with the Sliced-Wasserstein Distance.
 Academic
 Segmentation, few-shot learning: Learning radiological and oncological anatomy with few-shots learning
 Academic
 Supervised learning: Kaggle competition in partnership with Dreem to predict sleep stage from EEG data
 Academic
 Humans' Metacognition: Second-order models are necessary to correctly model the human sense of confidence.
 Academic
 Brain-machine interface: To what extend tactile feedback augment prosthetic arms performance ?
 Associative
 Member of the Al Safety Team at Effiscience, inter-ENS student association to promote more effective research.
 Associative
 Organisation of sustainable hackathons in cooperation with Capgemini Invent as Treasurer of Entrepreneur's club.
 Associative

Languages

Programming Python (PyTorch, Transformers, Scikit-learn, MNE), SLURM, R, Matlab.

Hungarian, French Mother tongue.

English **Proficient user**.

Spanish Intermediate.

Japanese Beginner.