Théophile Sautory

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Education

University of California, Berkeley Exp. May 2026
PhD in Mechanical Engineering
Physics informed machine learning & accelerating CFD simulations.
Advisor: Philip Marcus.

Imperial College London
MS in Computer Science, Artificial Intelligence & Machine Learning Sep. 2020
Thesis: Neuro-symbolic video question answering with spatio-temporal properties.
BS and MS in Mechanical Engineering (co-terminal student) Jun. 2019
Thesis : Turbulence modelling with artificial neural networks.

Work Experience

UK National Crime Agency Apr. 2021 – Jul. 2021
Machine Learning Research Assistant with Pr.Dalal Alrajeh *London, UK*
- Implemented Siamese autoencoders trained with contrastive loss for crime linkage.
- Formalized a method to learn the impact of situational contexts on offenders behaviours through a series of rules in inductive logic programming.
- Presented our algorithms to crime analysts, and mentored them towards their application.

Scortex – Quality Intelligence Sep. 2020 – Mar. 2021
Machine Learning Researcher in Semi & Unsupervised Deep Learning *Paris, France*
- Improved the ROC-AUC performance in anomaly detection on images for the MVTec dataset by leveraging descriptors of pre-trained networks with generative models and data augmentation.
- Developed low-data regimes datasets with distribution shifts to increase the robustness of our convolutional autoencoders.

Vekia – Next Generation Supply Chain Jun. 2018 – Sep. 2018
Operations Research Intern *Lille, France*
- Designed statistical models to estimate parameters of the demand distribution in lost sales.
- Explored matrix completion methods and built a multi-layer-perceptron model to improve stock inventory predictions.

Publications

[1] Pierre Gutierrez, Antoine Cordier, Thaïs Caldeira, Theophile Sautory (2021): Data augmentation and pre-trained networks for extremely low data regimes unsupervised visual inspection, Proc. SPIE 11787, Automated Visual Inspection and Machine Vision IV, 1178703, DOI: 10.1117/12.2591876.

[2] Theophile Sautory, Nuri Cingillioglu, Alessandra Russo (2021): HySTER: A Hybrid Spatio-Temporal Event Reasoner, Thirty-Fifth AAAI Conference on Artificial Intelligence Workshop on Hybrid Artificial Intelligence.

[3] Alvaro Prat, Theophile Sautory & S. Navarro-Martinez (2020): A Priori Sub-grid Modelling Using Artificial Neural Networks, International Journal of Computational Fluid Dynamics, DOI: 10.1080/10618562.2020.1789116.

Projects

Neuro-Symbolic AI for Video Question Answering Mar. 2020 - Nov. 2020

- Created a neuro-symbolic learning framework for the video question answering CLEVRER task.
- Incorporated a Mask R-CNN for segmentation, ResNets for depth estimation, alongside an Answer Set Programming framework for natural language processing and temporal and causal reasoning.
- Presented my paper in the 35th AAAI Conference, Workshop in Hybrid AI (Sautory, Cingillioglu, Russo, 2021).

Waymo 2D Object Detection Challenge Apr. 2020 - May. 2020

- Collaborated in a group of three to fine-tune an EfficientDetd4 on 700k - 1080p images using Google Cloud Platform, an NVIDIA Tesla V100 GPU, and PyTorch.
- Implemented test time augmentation, mixed precision training and kmeans clustering for anchor priors to achieve an mAP of 0.58 on the task.

Turbulence Modelling with Artificial Neural Networks Oct. 2018 - Jun 2019

- Formulated a new turbulence model to close the filtered Navier-Stokes equations for sub-grid Large Eddy Simulation using artificial neural networks.
- Improved correlation coefficients on the stress tensor terms in homogeneous isotropic turbulence from the John Hopkins turbulence dataset.
- Partnered with my supervisor and classmate to publish our research (Prat, Sautory & Navarro-Martinez, 2020).

Technical Skills

Programming: Python and MATLAB (experienced), C++ and Embedded C (basics).
Libraries: PyTorch, TensorFlow, Scikit-learn, Keras, OpenCV, Matplotlib, Numpy, Scipy, Pandas.
Tools: Git, Github, LaTeX, Unix environment, CUDA GPUs, Star CCM+, Google Cloud Platform.

Awards

UC Berkeley **Graduate Division Block Grant Award**, Mechanical Engineering 2021
Imperial College London Engineering **Dean's List** (top 10%) 2016, 2017, 2018, 2019

Leadership and Extracurricular

Basketball

- Vice-president of the Imperial College Basketball Society, leading the 120 members to win Imperial Sports Club of the Year (2018-2019).
- Captain of the Imperial College team(2018), 15 years of practice.