RICCARDO CADEI

Machine Learning Researcher

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Education

Harvard University — Visiting Graduate Student

Sept 2022 – March 2023 Cambridge (MA), United States

Affiliation: @HSPH, @HDSI ***Project***: Causal Inference for Machine Learning
Thesis: Introducing a new algorithm for interpretable discovery and inference of Heterogeneous Treatment Effects [1], and releasing the corresponding R package on CRAN with software paper [2].
Conferences: HDSI 2022

EPFL — M.Sc. Data Science

Sept 2020 – March 2023 Lausanne, Switzerland

@***VITA***: Introducing the Causal (Representation) formalism and a Robust and Adaptive modular architecture for Motion Forecasting [3], [4].
@***LESO-PB***: Introducing a U-Net (FCNN) based model for detection of available rooftop areas to install photovoltaic panels from satellite images [5].
Conferences: CISBAT 2021, NeurIPS 2021, CVPR 2022, NeurIPS 2022
Summer Schools: M2L 2020, Neurosymbolic Programming 2022, M2L 2022

Politecnico di Milano — B.Sc. Mathematical Engineering

Sept 2017 – July 2020 Milan, Italy

Grade: 110/110 ***Associations***: PoliMi Data Scientists, Ass. Ing. Matematici
Thesis: *Mathematical Programming for activity planning in Oncology Day-Hospital*

Experience

Harvard University

Mar 2023 – Present Cambridge (MA), United States

Research Fellow @NSAPH: Conducting research in Causal Inference and Machine Learning in the context of climate change, environmental impacts on health outcomes, and regulatory policy [6].

Schlumberger-Doll Research

Feb 2022 – Aug 2022 Cambridge (MA), United States

Machine Learning Researcher: Deep Learning for Causal Modeling and interpretation of acoustic subsurface data for anomaly detection and prevention.

École polytechnique fédérale de Lausanne

Nov 2020 – Feb 2022 Lausanne, Switzerland

Teaching Assistant: In Introduction to Machine Learning (BIO-322)
Research Assistant (*Summer Intern*) @iGH: Developing a mobile app for (non-invasive) upper body posture detection using Deep Learning.

L.O.L. Consultants

Dec 2020 – Feb 2021 [remote] Melbourne, Australia

Machine Learning Engineer: Detection of available rooftop area to install photovoltaic panels from high-quality satellite images using Deep Learning.

Projects

For a structured summary of my personal and academic projects, visit my Personal Portfolio by clicking **[here]** or scanning the QR Code on the right (25+ repositories; >100 ★ on GitHub ; 1 CRAN package with 1700+ downloads).

Awards

Research

Jane Warren Award 2023
By Health Effects Institute for our Causal Rule Ensemble algorithm [1].

Machine Learning

Generali Data Challenge 2021
Best model and code in the Churn Classification Datahon at @Generali S.p.a out of 280+ participants.

Higgs Boson Challenge 2020
2nd place* in the AICrowd final challenge of Machine Learning course at @EPFL out of 290+ teams.

Oracle GraphML Contest 2019
1st place in the Kaggle final challenge of Graph Machine Learning course at @Politecnico di Milano in partnership with @Oracle Labs.

ML for Networking Contest 2019
1st place in the Kaggle final challenge of ML for Networking course at @Politecnico di Milano.

*among the official submissions, 8th overall

Mathematics

International competition for mathematical and logical games 2018
5th national place (ITA), class L2 (Under21).

Grand Prix of Applied Mathematics
5th national place (ITA) out of 7500+ students. 2017
6th national place (ITA) out of 7500+ students. 2016

Coding

Machine Learning: Python , R , Julia
Deep Learning: PyTorch , Tensorflow
Math: MATLAB , Python , R , AMPL
Big Data: Spark , Scala , SQL , HDFS , AWS
Robotics: RobotC , C , Python
App and Web: HTML , CSS , Android Studio

Languages

Italian: C2, **English**: C1, **French**: A1

Referees

Prof. Francesca Dominici **Harvard**
@ fdominic@hsph.harvard.edu

Other Interests

Sport: Marathon Runner (2:53:26) @CRC, Long distance Hiker, Cycle Tourist, Skier and Skater.
Volunteer: NIPS (logistic), LeadTheFuture (mentoring), BrixiAmaTe (teaching), AVIS, CARITAS.

Publications

[1] Falco J Bargagli-Stoffi, Riccardo Cadei, Kwonsang Lee, and Francesca Dominici. “Causal rule ensemble: Interpretable Discovery and Inference of Heterogeneous Treatment Effects”. In: ***arXiv*** *preprint arXiv:2009.09036* (2023).

[2] **[Under Review]** Riccardo Cadei, Naeem Khoshnevis, Kwonsang Lee, Daniela Maria Garcia, and Falco J. Bargagli-Stoffi. “CRE: an R package for interpretable discovery and estimation of Heterogeneous Treatment Effect”. In: ***Journal of Open Source Software*** (2023).

[3] Yuejiang Liu, Riccardo Cadei, Jonas Schweizer, Sherwin Bahmani, and Alexandre Alahi. “Towards Robust and Adaptive Motion Forecasting: A Causal Representation Perspective”. In: *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*. 2022, pp. 17081–17092.

[4] Yuejiang Liu, Riccardo Cadei, and Alexandre Alahi. “Towards Robust and Adaptive Motion Forecasting: A Causal Representation Perspective”. In: ***NeurIPS*** *Workshop on Distribution Shifts: Connecting Methods and Applications*. 2021.

[5] Roberto Castello, Alina Walch, Raphael Attias, Riccardo Cadei, Shasha Jiang, and Jean-Louis Scartezzini. “Quantification of the suitable rooftop area for solar panel installation from overhead imagery using Convolutional Neural Networks”. In: ***Journal of Physics**: Conference Series*. Vol. 2042. 1. IOP Publishing. 2021, p. 012002.

[6] Mauricio Tec, Riccardo Cadei, Francesca Dominici, and Corwin Zigler. “Projecting the climate penalty on $PM_{2.5}$ pollution with spatial deep learning”. In: ***ICLR*** *Workshop in Tackling Climate Change with Machine Learning*. 2023.