Fabian Fumagalli
Passionate about Understanding Machine Learning

Contact me 🔗 🔵
ffumagalli@techfak.uni-bielefeld.de
Website

born September, 27, 1993

Languages
German (Native)
English (Proficient)
Italian (Elementary)

Academia
Workshop Organizer
DynXAI at ECML PKDD 2023
TempXAI at ECML PKDD 2024
Reviewer
ICLR'25, NeurIPS'24, ICML'24, AAAI'25, AISTATS'25, MLJ, ESANN'24

Awards & Certificates
Best Paper Award
XAI'23
ECML'23 (MLJ Journal Spotlight)
Top Reviewer
ICML'24, NeurIPS'24
Certificates
SAS Viya Machine Learning Specialist
SAS Visual Business Analyst
SAS Base Programmer

Programming
Python
e.g. torch, scikit-learn, numpy, scipy, pandas, matplotlib...
SQL
SAS Base
JavaScript

Personal
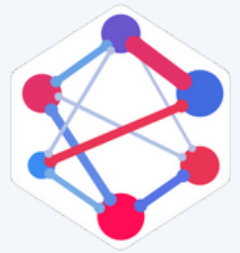**Voluntary Trainer | 11/2011 - 08/2016**
TuS Lichterfelde e.V.

Academic Research
SHAP-IQ: Uncovering Interactions for Explainable AI

Computing Feature Interactions with Shapley Interactions
- for vision transformer and language models
- model-agnostic for any deep learning model
- for tabular data and models, e.g. XGBoost and LightGBM

SHAP-IQ
URL

Interactions and Benchmarking across Applications
- e.g. data valuation, LLM prompting, uncertainty quantification

Selected Publications
- shapiq: Shapley Interactions in Machine Learning, **NeurIPS 2024** (blog post)
- KernelSHAP-IQ: Weighted Least Square Optimization for Shapley Interactions, **ICML 2024**
- Beyond TreeSHAP: Efficient Computation of any-order Shapley Interactions for Tree Ensembles, **AAAI 2024**
- SHAP-IQ: Unified Approximation of any-order Shapley Interactions **NeurIPS 2023**

Incremental XAI: Efficient Explanations in Dynamic Environments

Computing Feature Attributions on Evolving Data Streams
- for models that adapt incrementally
- applicable for sensor networks, financial models, and IoT

Selected Publications
- Incremental Permutation Feature Importance (iPFI): Towards Online Explanations on Data Streams, **Machine Learning Journal**
- iSAGE: An Incremental Version of SAGE for Online Explanation on Data Streams, **ECML PKDD 2023**
- iPDP: On Partial Dependence Plots in Dynamic Modeling Scenarios, **xAI 2023**

Work Experience
PhD Candidate in Explainable AI | 10/2021 - now
Bielefeld University | AG Machine Learning

SAS & Data Science Consultant | 10/2018 - 10/2021
CBTW (former PTC, mayato)
- international project and client responsibility
- high-performance cloud solutions
- optimization and modeling regulatory processes for banking

Student Data Scientist | 10/2017 - 10/2018
CBTW (former PTC, mayato)

Data Scientist Intern | 01/2017 - 06/2017
Munich Re
- machine learning for health insurance

Teaching Assistant | 10/2014 - 10/2016
Freie Universität Berlin

Education
Mathematics M.Sc. | 10/2015 - 10/2018
Technische Universität Berlin
- stochastics, financial mathematics, mathematical deep learning

Mathematics B.Sc. | 10/2012 - 11/2015
Freie Universität Berlin

Statistics (ERASMUS+) | 08/2016 - 12/2016
Norwegian University of Science and Technology