HOMER

Update: January 2023

AutoML

Explainable AI

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(Med)

HOMER

AutoML

Team: Kasia, Ania, Piotr, Mateusz, **<place for you!>**

New topic in AutoML: A human-in-the-loop AutoML approaches. Human - both from model builders (machine learning experts) and decision support system users (domain experts)

Projects:

- **Model developers:**
  - EPP -based tool to analyse model performance
  - Forester
- **Domain experts**:
  - Consolidated learning
  - Datasets Ontology-Based Semantic Similarity (DOSS)

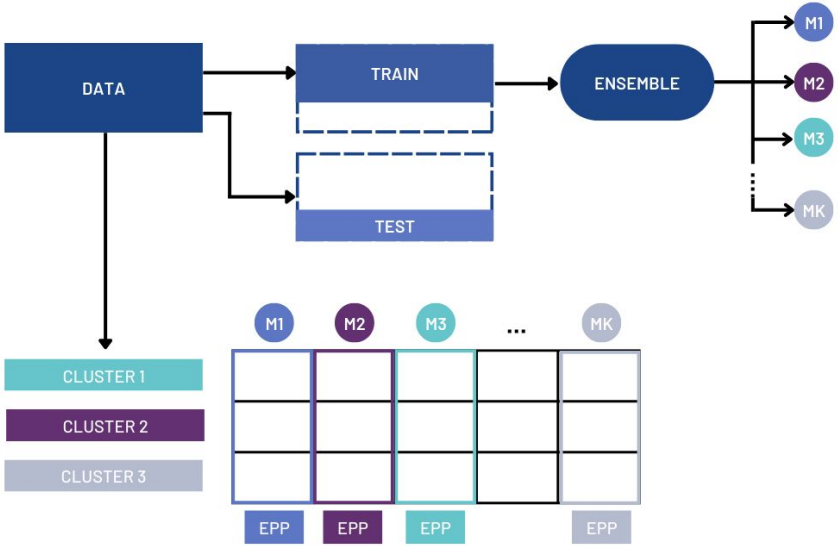
Katarzyna Woźnica

Update with respect to October 2022

1. **Consolidated Learning**
   a. Presented at ML in PL 2022
   b. Still in review 😢
2. **DOSS**
   a. Collection of SNOMED annotated phenotyping datasets
   b. Ambiguous answer when it comes to improving HPO speed
   c. The need for change to argumentation the value of the created resource
3. **Bachelor theses (x2, MAD):**
   a. Analysis of methods for creating ensembling models in various AutoML frameworks

Katarzyna Woźnica

e4xp

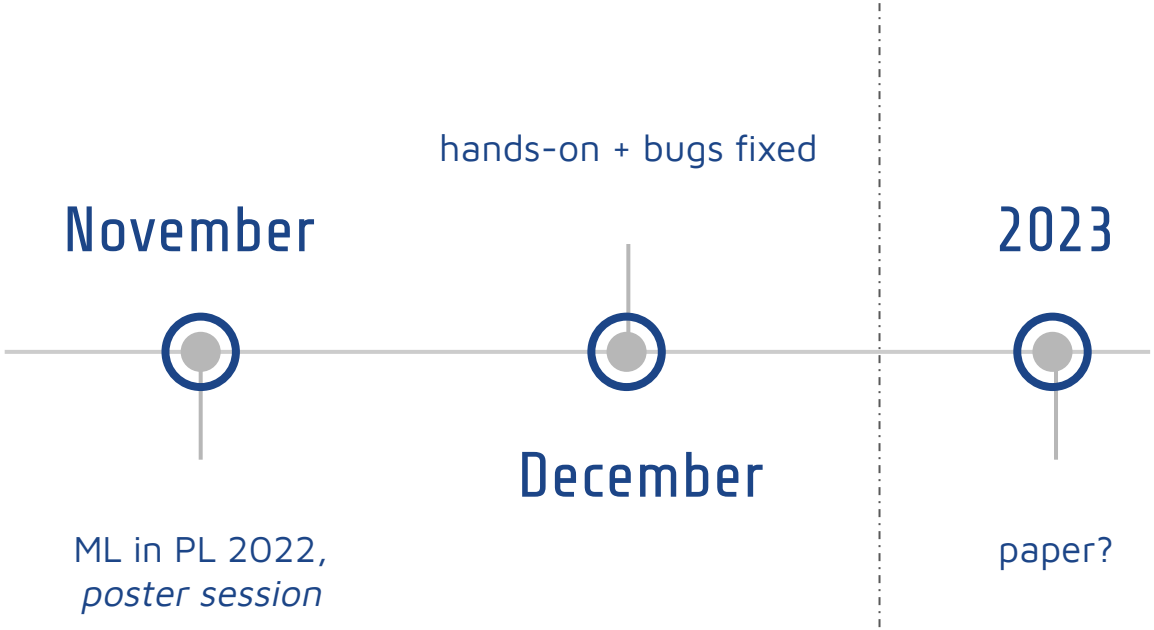


Problems:

- With realistic assumptions about train-and-test split and unbalanced data, we need other data than OpenML
- Clustering is very important - how to choose clusters that capture differences in model performance

Katarzyna Woźnica

forester - What's new?



Anna Kozak

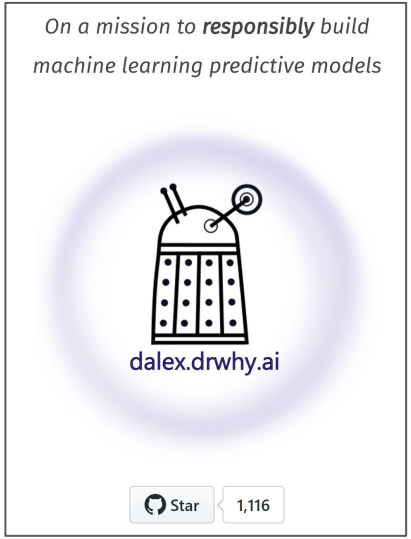
Explainable AI (2023)

Team: Hubert, Mateusz, Mikołaj, Maciej, Bartłomiej, <place for you!>

New topic in (X)AI: Evaluating foundation/generative/transformer models regarding explainability, fairness, bias, data and concept drifts, security, human understanding and trust.

First target: *TabPFN* (ICLR 2022 & 2023) – a prior-data fitted network (transformer) for classification on tabular data.

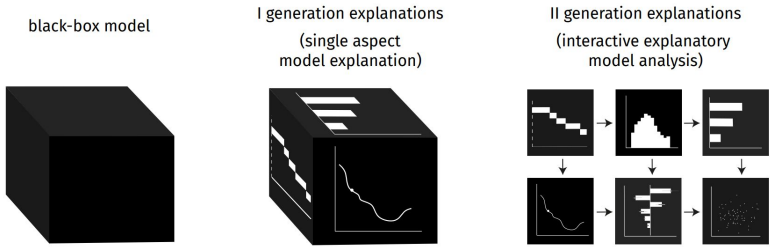
Tentative plan: cyclical meetings starting January 10th, in-house hackathon at the start of February

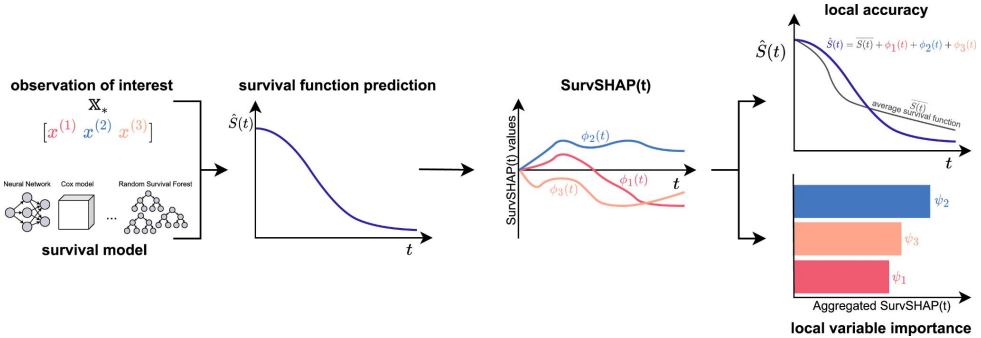


Hubert Baniecki

Update with respect to October 2022

1. 🥳 **SurvSHAP(t)** paper is published in Knowledge-Based Systems (90th percentile in AI)
2. 🚀 **survex** R package has a new version on CRAN
3. 🤭 **IEMA** paper was revised and submitted into the special issue on XIML in DMKD





All these were presented at ML in PL 2022

The work on surv ML was also presented at the LMU seminar (Bernd Bischl group).

Mateusz Krzyziński

New since October 2022

1. [BSc] ARTEMIS Python package
2. [BSc] AutoeXplainer Python package
3. [letter] Be careful when evaluating explanations regarding ground truth. Nat Mach Intell
4. [grant] Explainable AI for hyperspectral image analysis. European Space Agency
5. [paper in preparation] Hospital length of stay prediction based on X-ray images
6. [initial results] Collaboration with physicians (surv ML use cases)

Mikołaj Spytek

SurvSHAP(t): submission journey

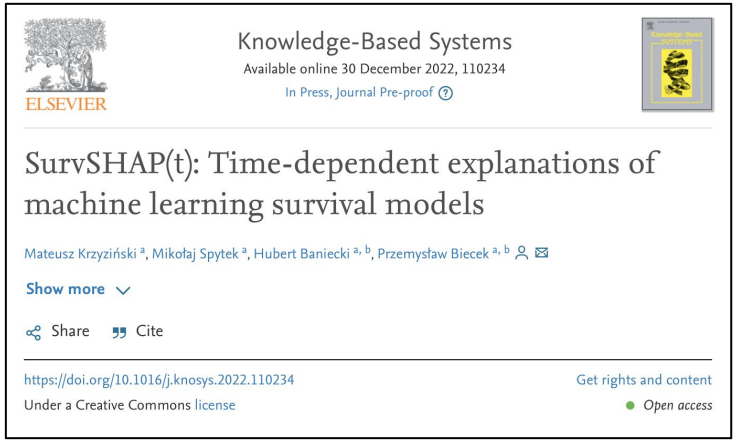
Accepted to Knowledge-Based Systems
after just 1 round of reviews.

What was revised?

1. experiments on additional synthetic datasets
2. comparison to SurvNAM (another method based on Neural Additive Models)
   – finally not included in the paper

What next?

1. calculation time improvement (resolving issues)
2. global explanations



Mateusz Krzyziński

Be careful when evaluating explanations regarding ground truth

Hubert Baniecki[1], Maciej Chrabaszcz[2], Andreas Holzinger[3,4,5], Bastian Pfeifer[4], Anna Saranti[3,4], and Przemysław Biecek[1,2]

[1] *MI2.AI Lab, University of Warsaw, Warsaw, Poland*
[2] *MI2.AI Lab, Warsaw University of Technology, Warsaw, Poland*
[3] *Human-Centered AI Lab, University of Natural Resources and Life Sciences Vienna, Austria*
[4] *Medical University of Graz, Austria*
[5] *xAI Lab, Alberta Machine Intelligence Institute, Edmonton, Canada*

Arising from Saporta et al. Benchmarking saliency methods for chest X-ray interpretation. *Nature Machine Intelligence* 4, 867–878 (2022). DOI: 10.1038/s42256-022-00536-x

Table 1: Comparison between different DenseNet models fine-tuned on two predictive tasks achieving similar predictive performance measured with **AUC** and mutual information (**MI**). The models differ in the localization performance measured with **Hit rate** and **mIoU**, which is an intersection between explanations produced by a saliency method (GradCAM) and a ground truth annotated by humans.

Pathology: Atelectasis

Model	AUC	MI	Explanation	Hit rate ↑	mIoU ↑
DenseNet	0.84	0.18	GradCAM	0.11	0.08
DenseNet + in-mask	0.84	0.15	GradCAM	0.58 (+0.47)	0.28 (+0.20)
DenseNet + out-mask	0.83	0.18	GradCAM	0.03 (-0.08)	0.07 (-0.01)

Pathology: Enlarged Cardiomediastinum

Model	AUC	MI	Explanation	Hit rate ↑	mIoU ↑
DenseNet	0.83	0.21	GradCAM	0.36	0.27
DenseNet + in-mask	0.87	0.28	GradCAM	0.93 (+0.57)	0.60 (+0.33)
DenseNet + out-mask	0.87	0.24	GradCAM	0.00 (-0.36)	0.09 (-0.18)

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Benchmarking saliency methods for chest X-ray interpretation

Adriel Saporta, Xiaotong Gui, Ashwin Agrawal, Anuj Pareek, Steven Q. H. Truong, Chanh D. T. Nguyen, Van-Doan Ngo, Jayne Seekins, Francis G. Blankenberg, Andrew Y. Ng, Matthew P. Lungren & Pranav Rajpurkar

Nature Machine Intelligence **4**, 867–878 (2022) | Cite this article

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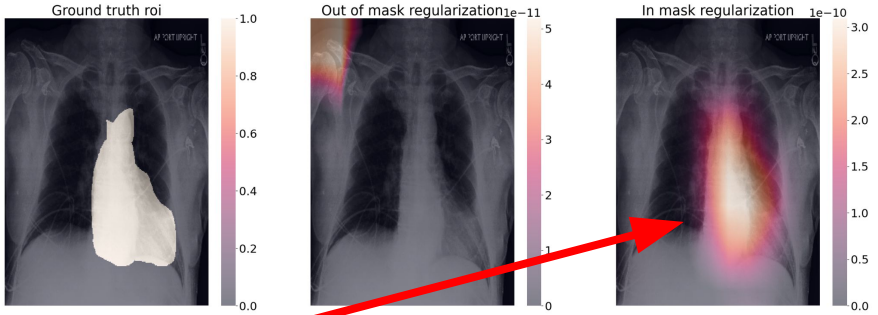
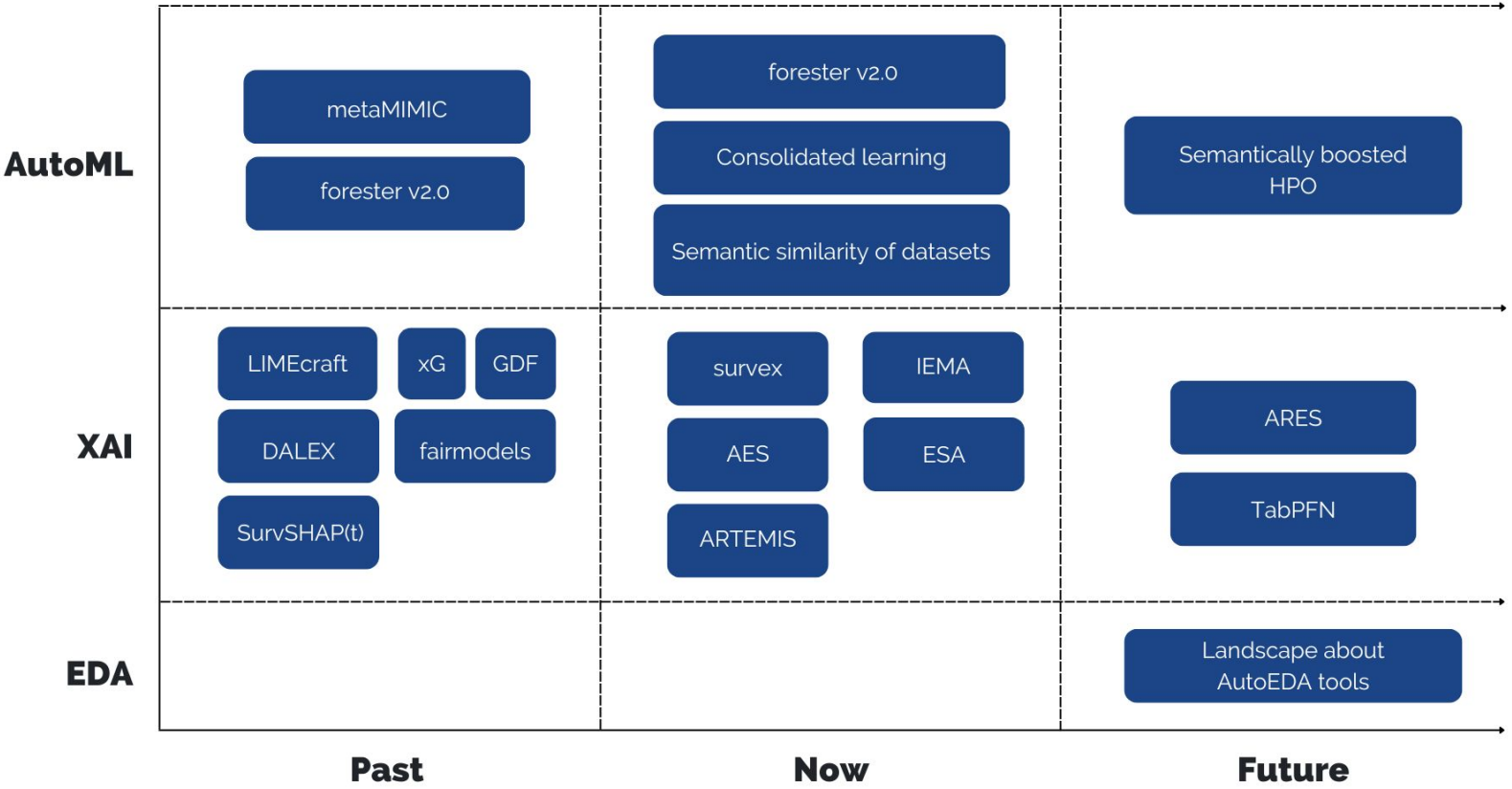


Hubert Baniecki

MI

Conferences – MLinPL 2022

Mikołaj Spytek


AutoML
XAI
EDA
metaMIMIC
forester v2.0
forester v2.0
Consolidated learning
Semantic similarity of datasets
Semantically boosted HPO
LIMEcraft
xG
GDF
DALEX
fairmodels
SurvSHAP(t)
survex
IEMA
AES
ESA
ARTEMIS
ARES
TabPFN
Landscape about AutoEDA tools
Past
Now
Future

Questions?

MI