Arg-XAI: a Tool for Explaining Machine Learning Results

15 maggio 2023

A.D. 1308
unipg
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DI PERUGIA

Overview

- Some motivations
- Tool demo
- Validation
- Future work

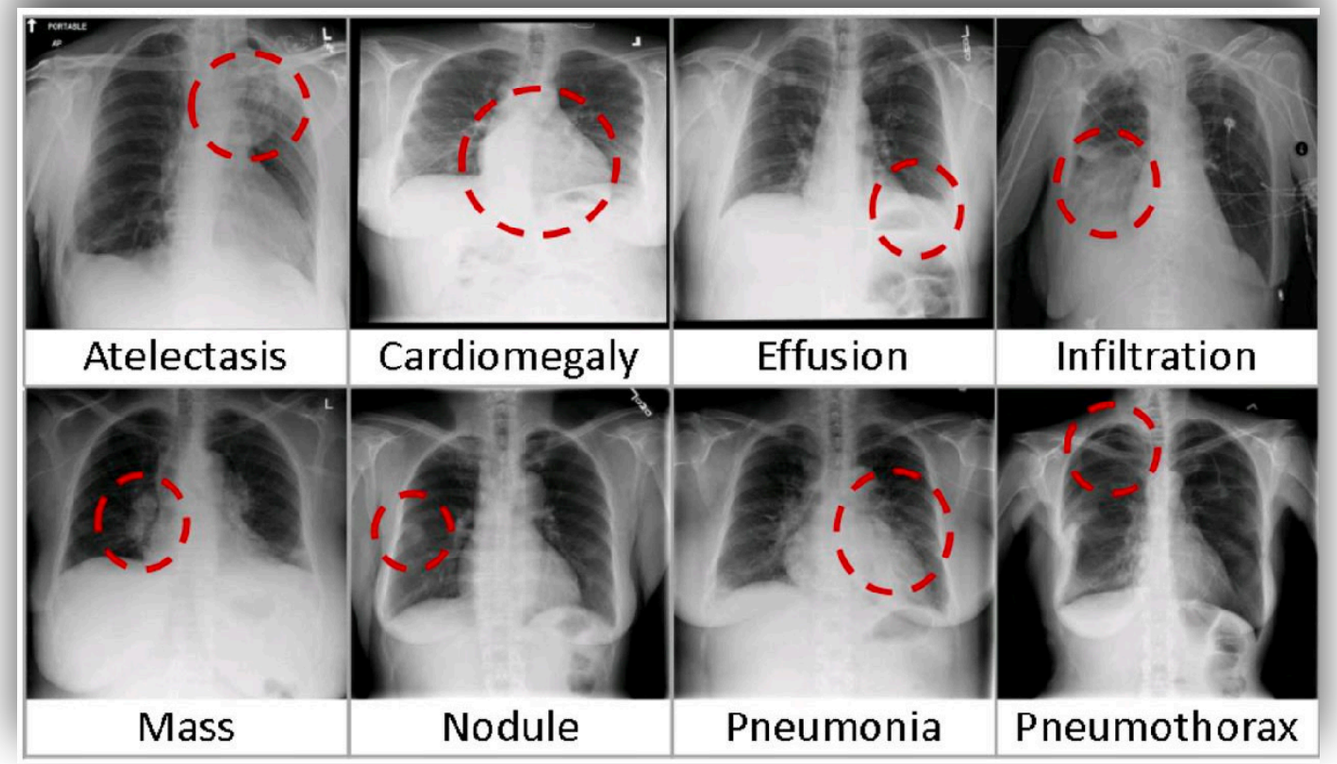
Titanic: a Class Prediction Example

1. Get a dataset
2. Train the model
3. ???
4. Profit

Feature	Values	Type	Description
Pclass	$1, 2, 3$	categorical	Ticket class
sex	$0, 1$	categorical	passenger gender
SibSp	$0 - 8$	categorical	# of siblings/spouses
Parch	$0 - 6$	categorical	# of parents/children
Embarked:	C, Q, S	categorical	port of embarkation
Survived:	$0, 1$	categorical	passenger survival
Age	$0.17 - 76$	numerical	passenger age
Fare	$0 - 512$	numerical	passenger fare

- Anna survived
- … but why?

Explanation in Critical Fields



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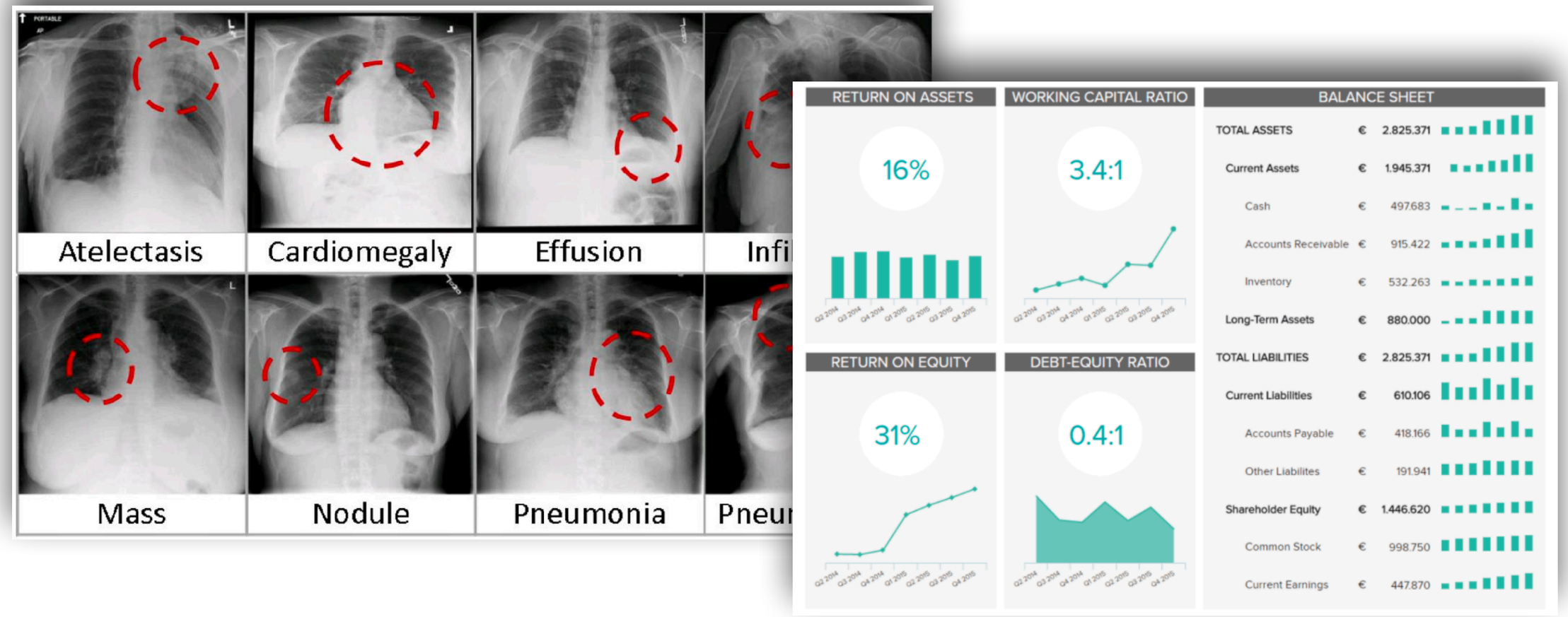

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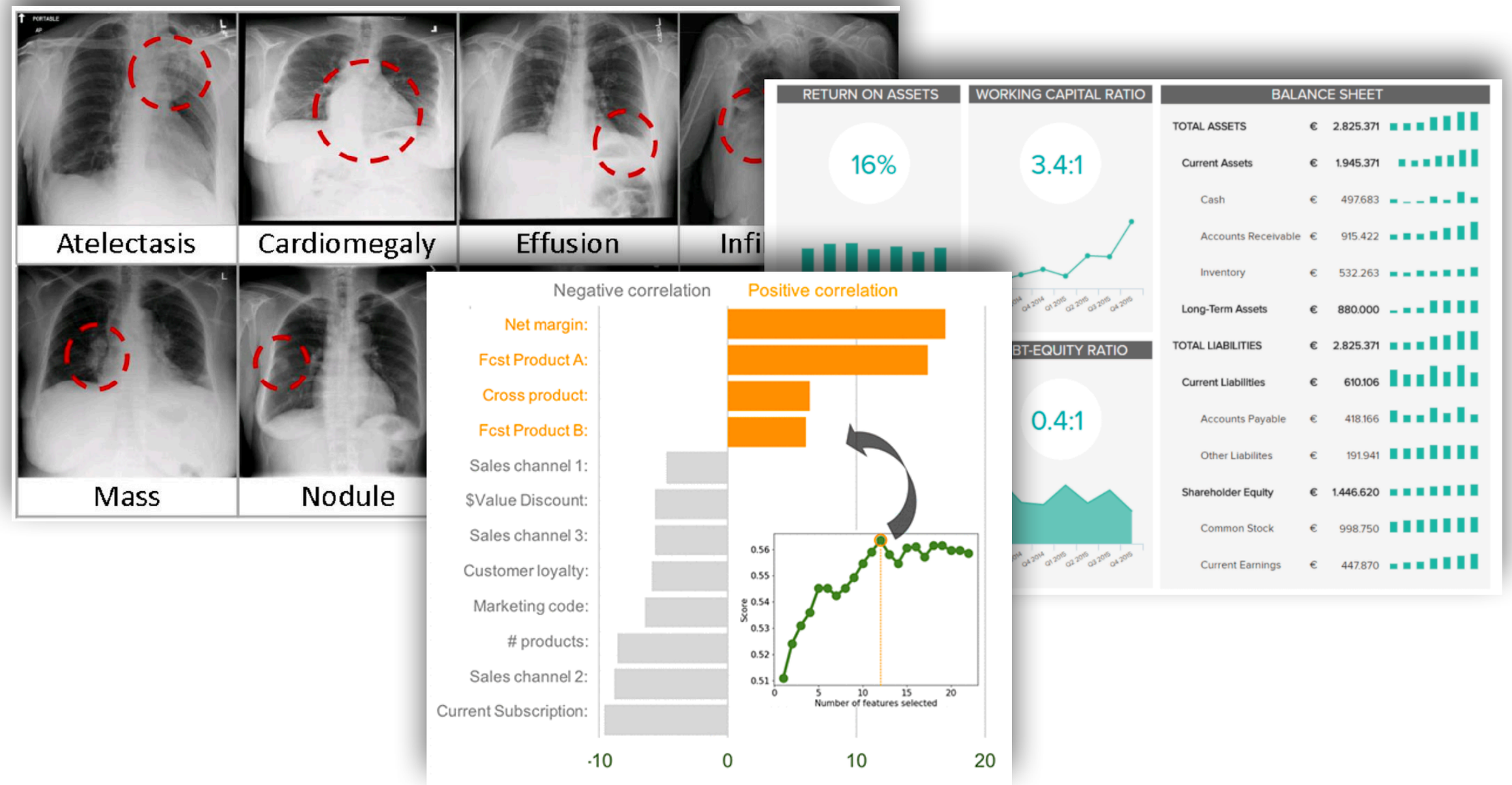

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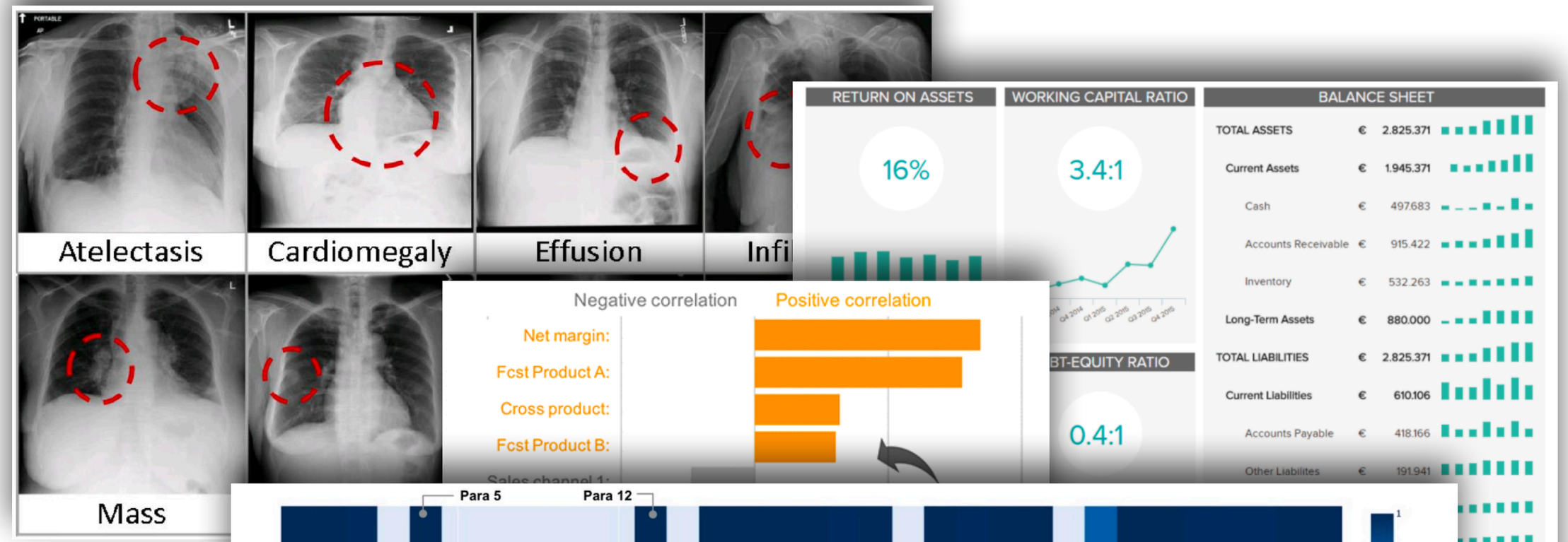

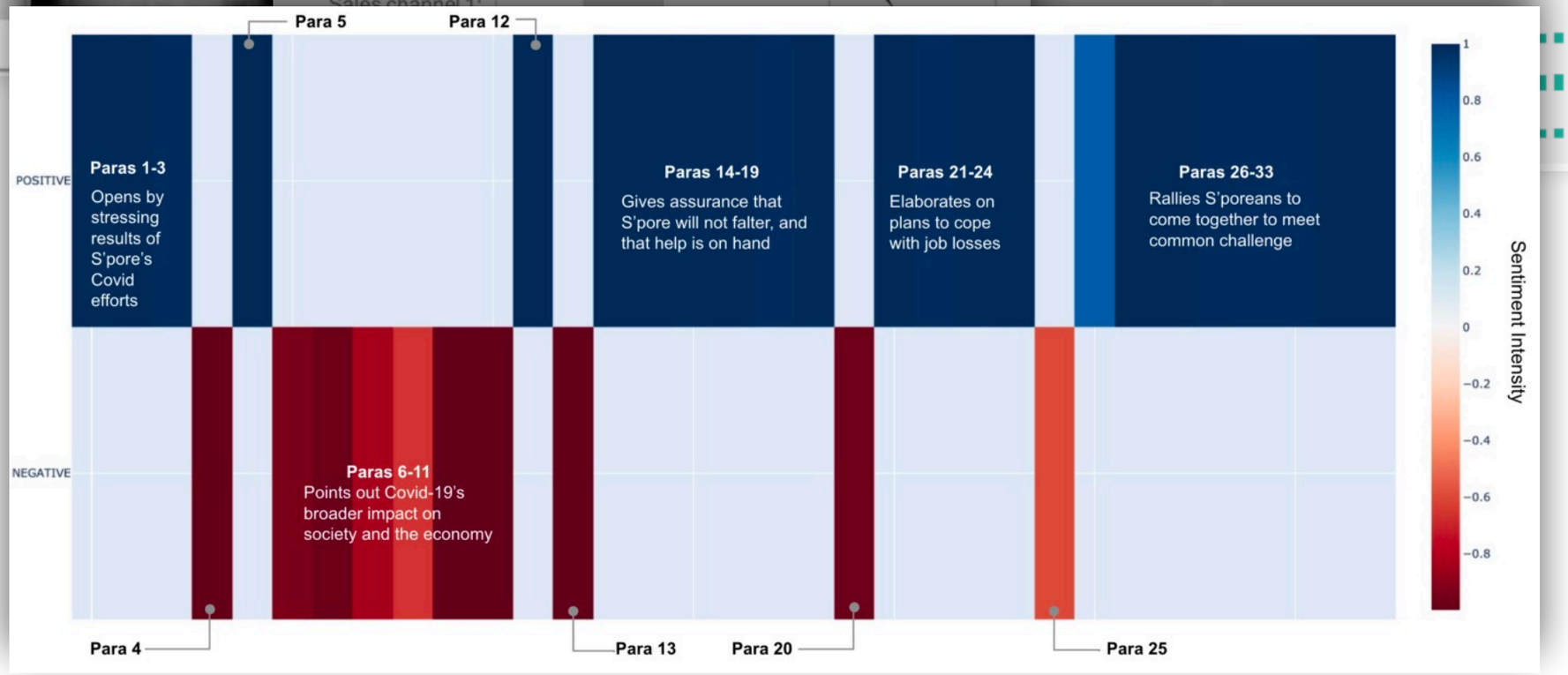

In a nutshell…

- We want to explain the results of a classifier
- Basic idea of the tool:
  - Transform the dataset into a Bipolar Argumentation Framework
  - Use argumentation semantics to select acceptable arguments
  - Produce an explanation tree

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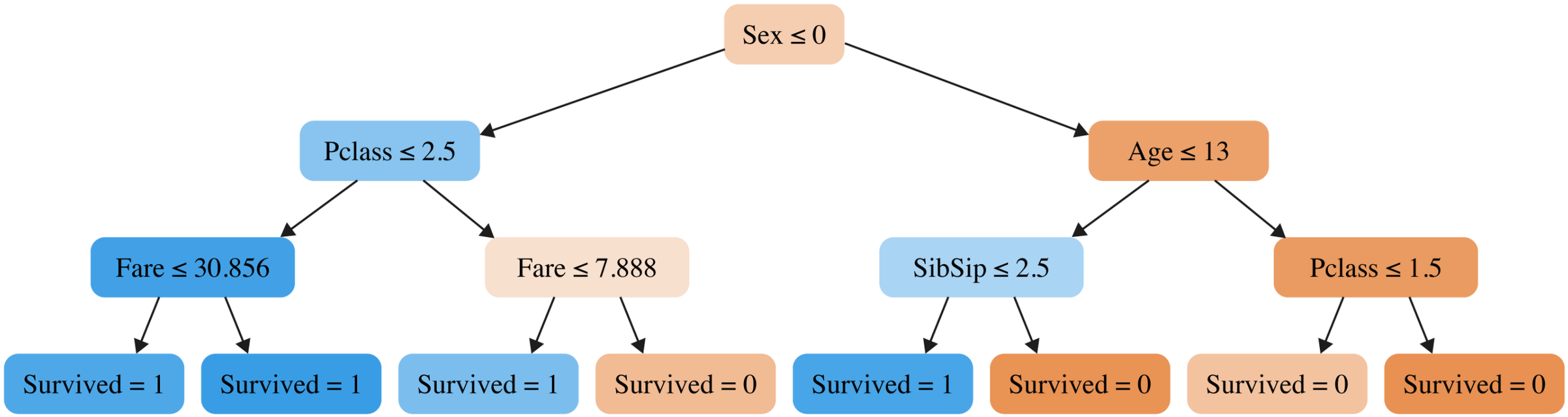
Demo

arg-xai.dmi.unipg.it

Validation A: Decision Tree

- Semi-stable extension:

Sex=0, Pclass=1, Fare≥10.4812, Survived=1,
Age<0.96, Embarked=C, Parch=1, SibSp=1



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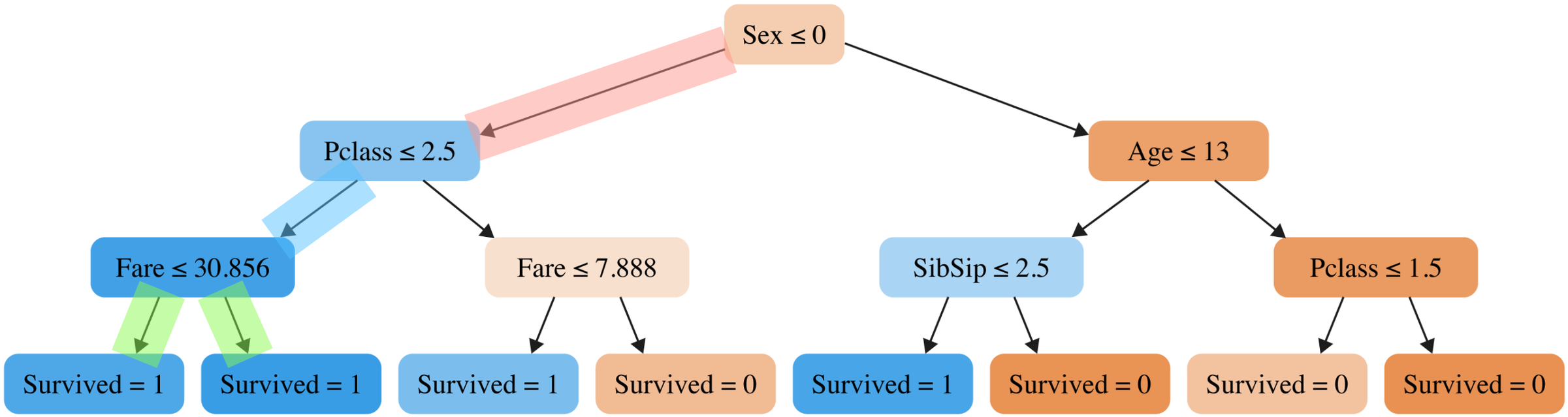

Validation B: Rule-Based Classifier

- Semi-stable extension:

  thall=2, caa=0, slp=2, exng=0, sex=0, cp=2, chol<245.5, oldpeak<1.7, thalach≥147.5, trtbps<107, age<54.5, restecg=1, **Heart Attack=1**, fbs=1

- We use RIPPER to derive a set of rules for **Heart Attack=1**

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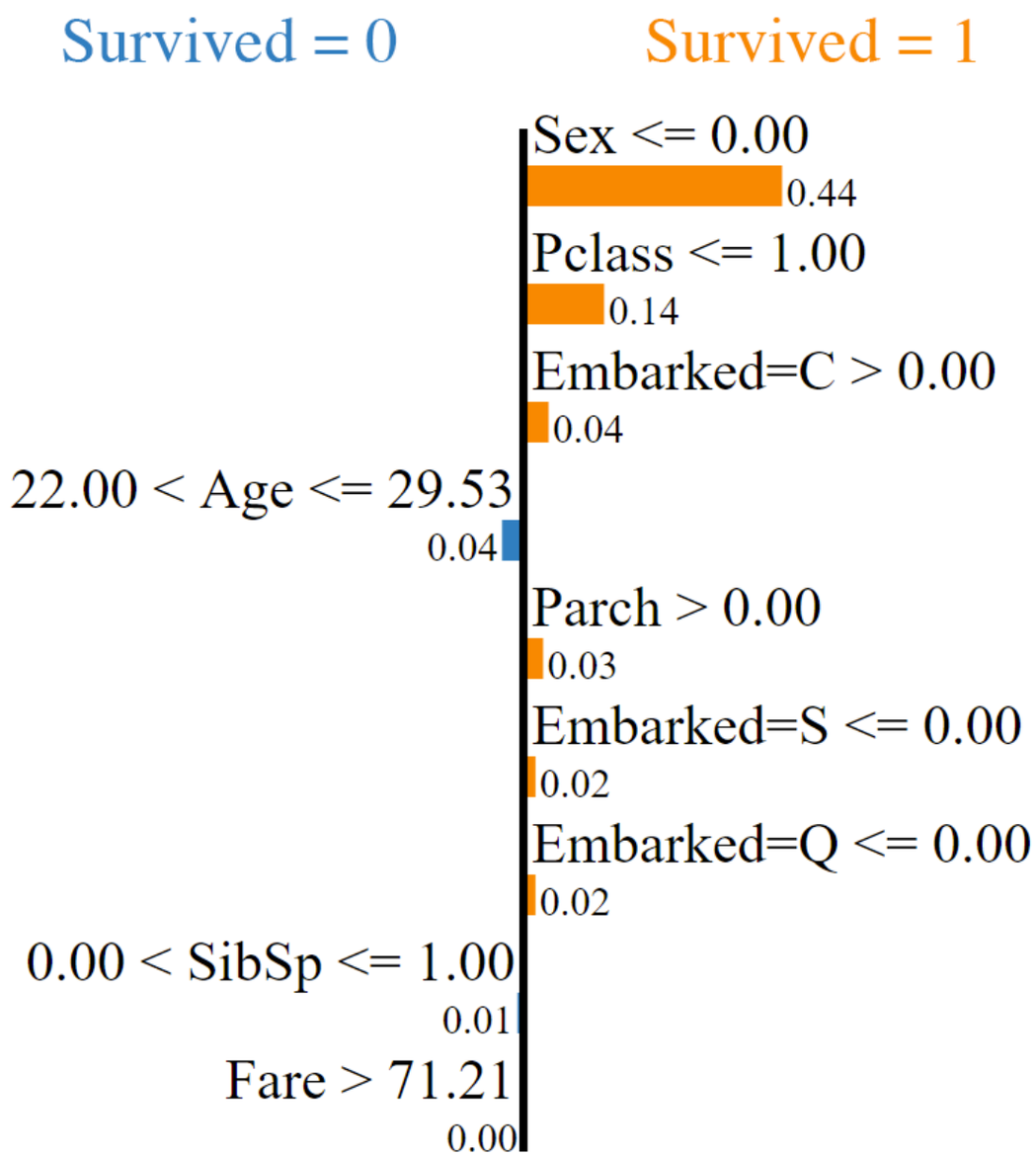

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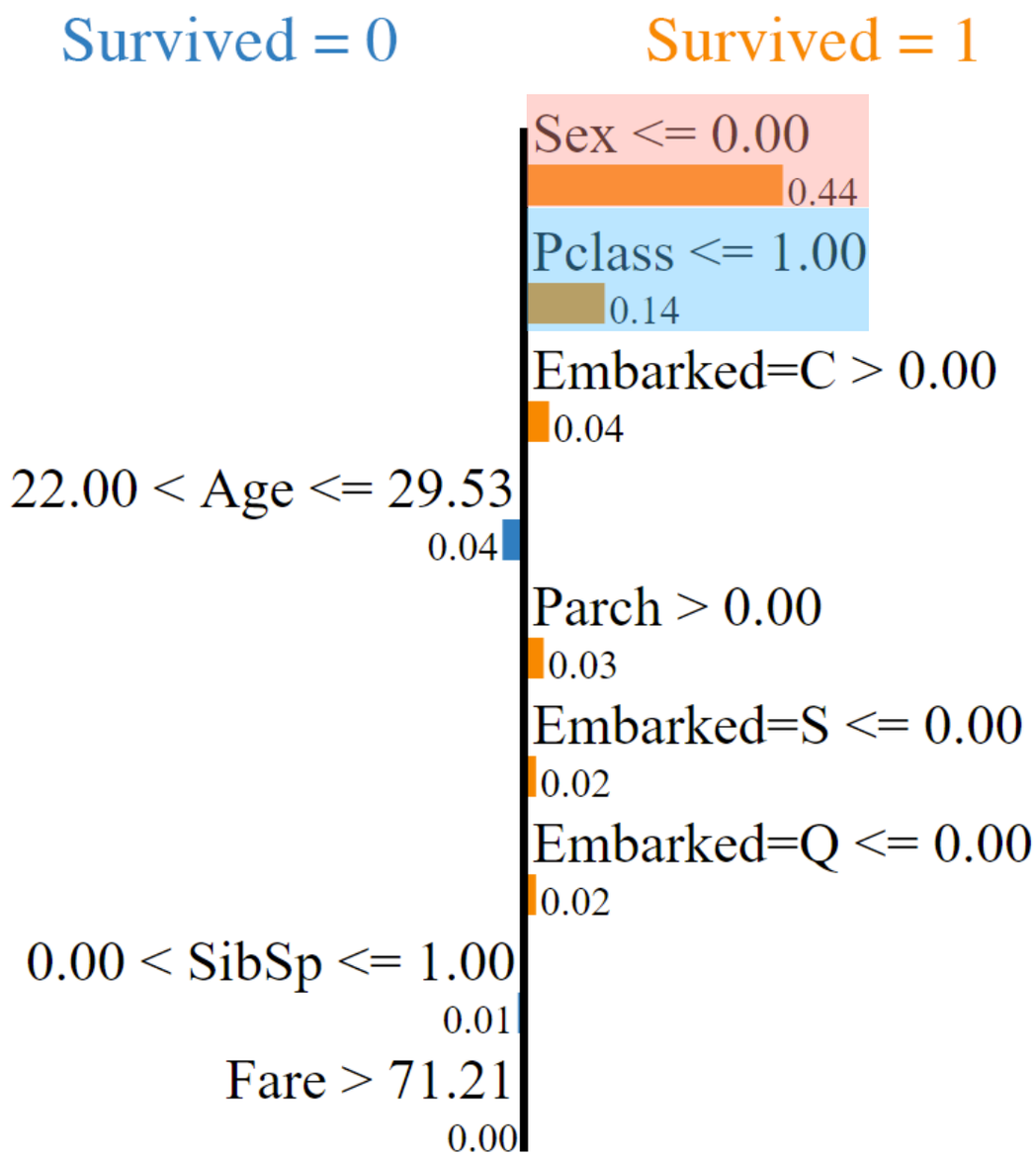
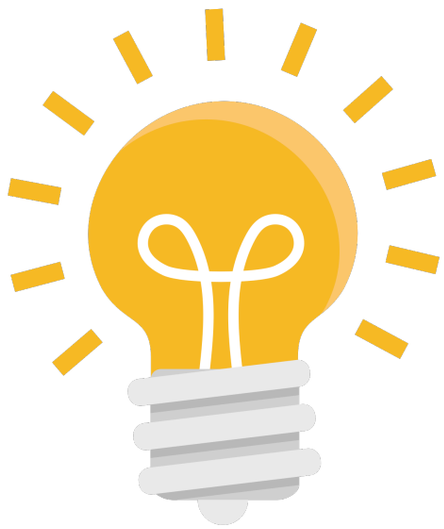


Future Work

- Three research lines:
  - Derive causality between features (break symmetric relations)
  - Techniques for detecting spurious correlation
  - Devise efficient algorithms for probabilistic semantics



THANK YOU FOR YOUR ATTENTION

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