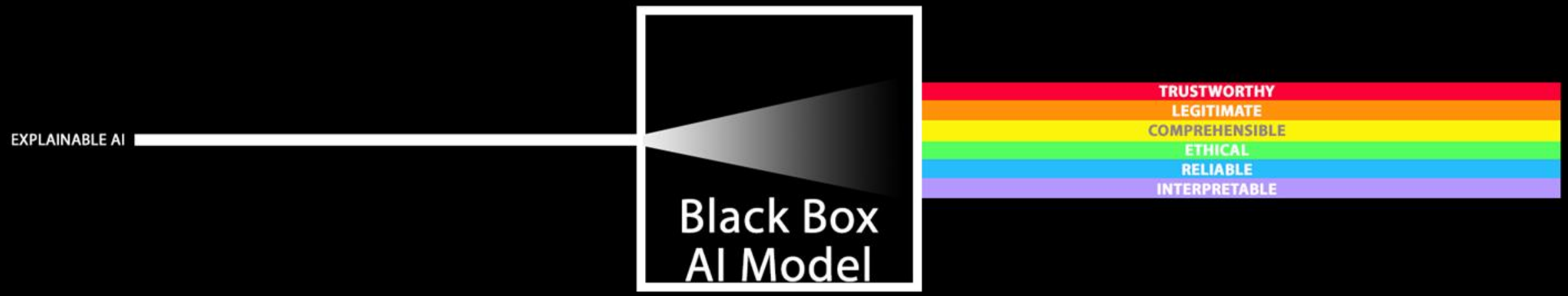

Explainable AI – Interpretable ML

Ioannis Mollas, iamollas@csd.auth.gr, PhD Student
Supervisors: Nick Bassiliades, Grigorios Tsoumakas

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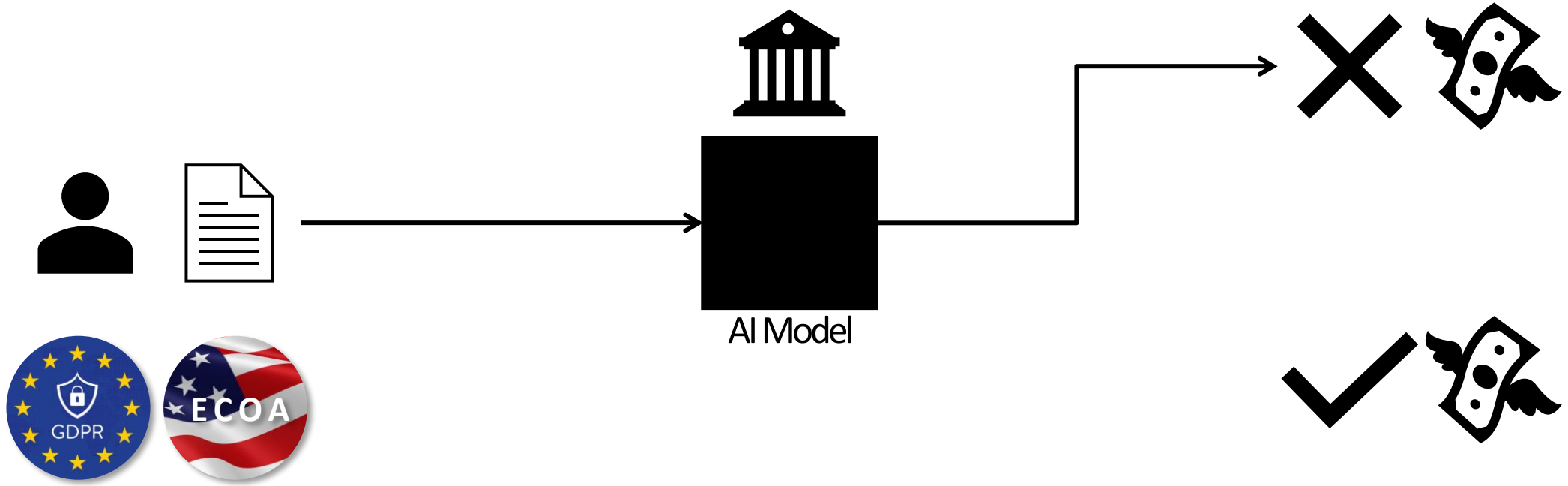
CSD AUTH


GDPR
ECOA
AI Model

AI APPLICATIONS

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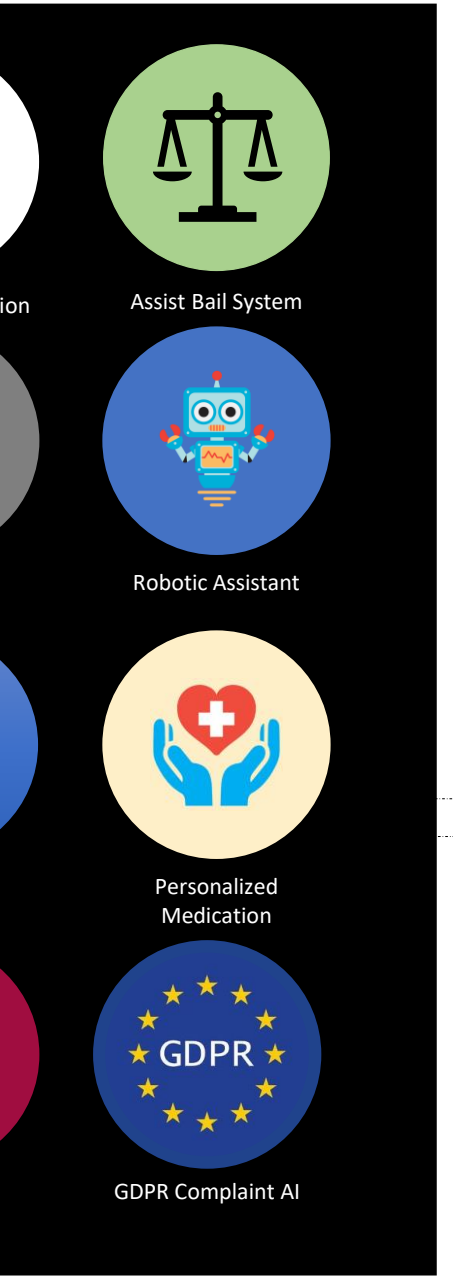


XAI

Explainable AI (XAI) refers to methods and techniques in the applications of artificial intelligence such that will shed light to reasons of the decision-making of such systems

What we want to tackle or achieve with XAI?

Tackle

- Gender biases
- Racial and religious discrimination
- Data errors and misclassifications
- Loss of life

Achieve

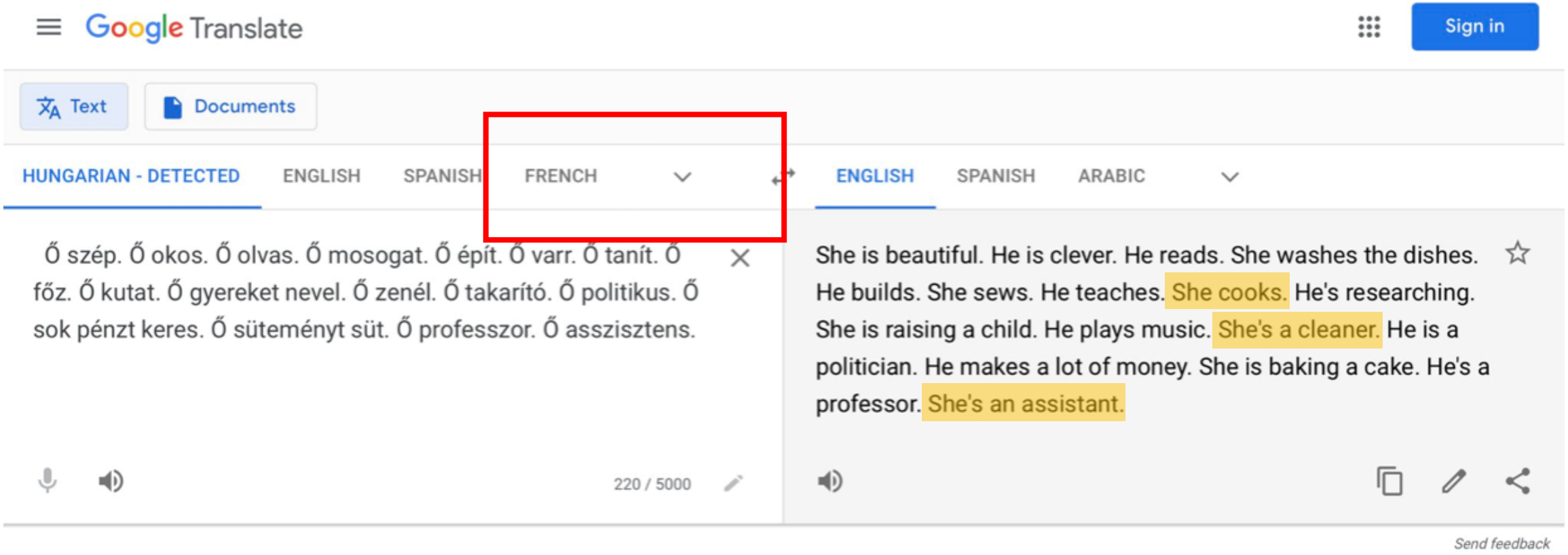
- Acquisition of new knowledge
- Robust systems
- Trustworthy systems

Real case examples

”Google Translate automatically chooses the gender for you”

Real case examples

”Google Translate automatically [redacted]]



Source: https://twitter.com/DoraVargha/status/1373211762108076034?s=20
Related Publication: https://link.springer.com/article/10.1007/s00521-019-04144-6

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Real case examples

”Google Translate automatically chooses the gender for you”

“Inappropriate patient treatments by Watson AI”

Real case examples

”Google Translate automatically chooses the gender for you”

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“Trippy T-Shirt Makes You Invisible to AI”

Real case examples

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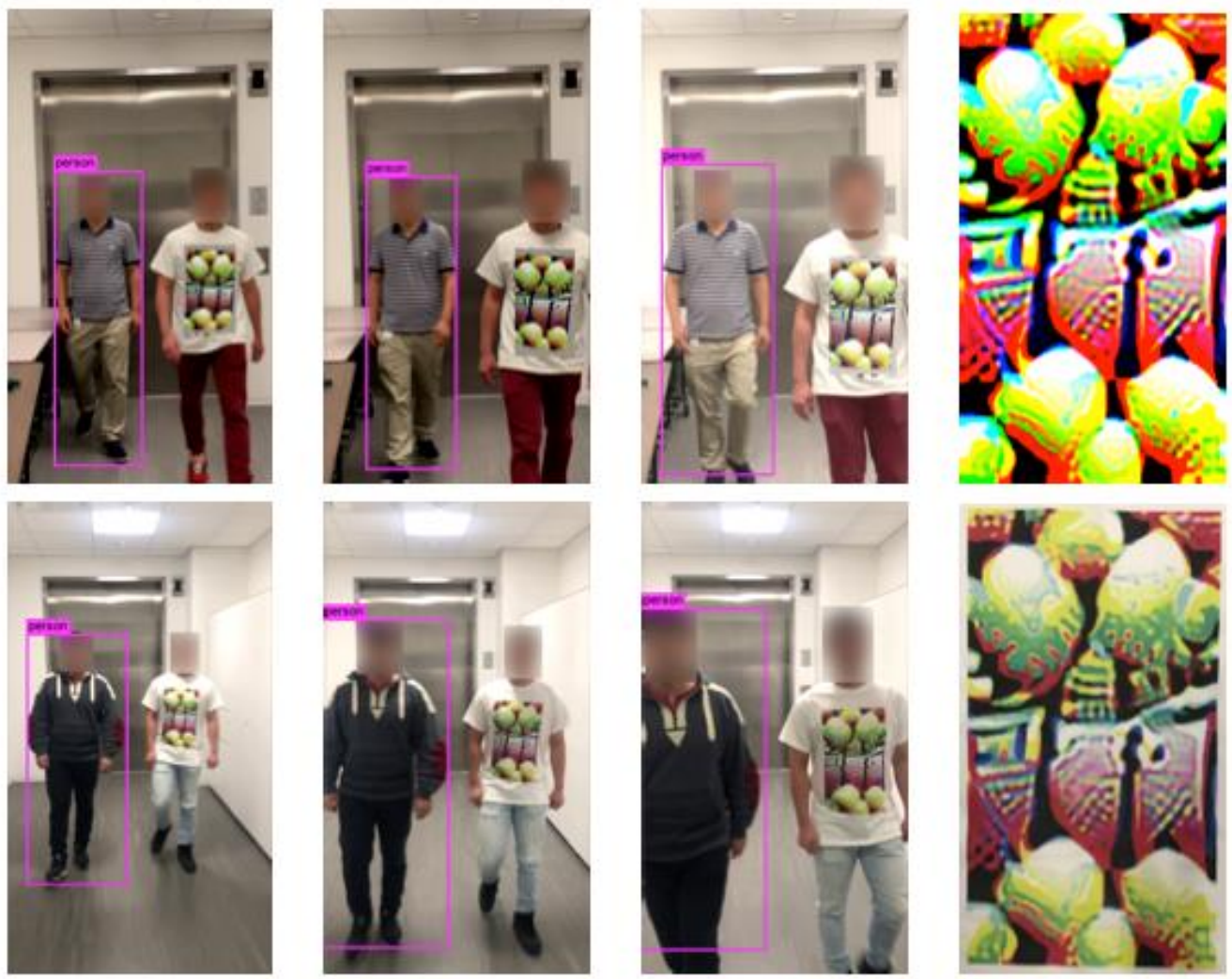

Source: https://www.vice.com/en/article/evj9bm/adversarial-design-shirt-makes-you-invisible-to-ai
Related Publication: https://arxiv.org/pdf/1910.11099.pdf

Real case examples

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Real case examples

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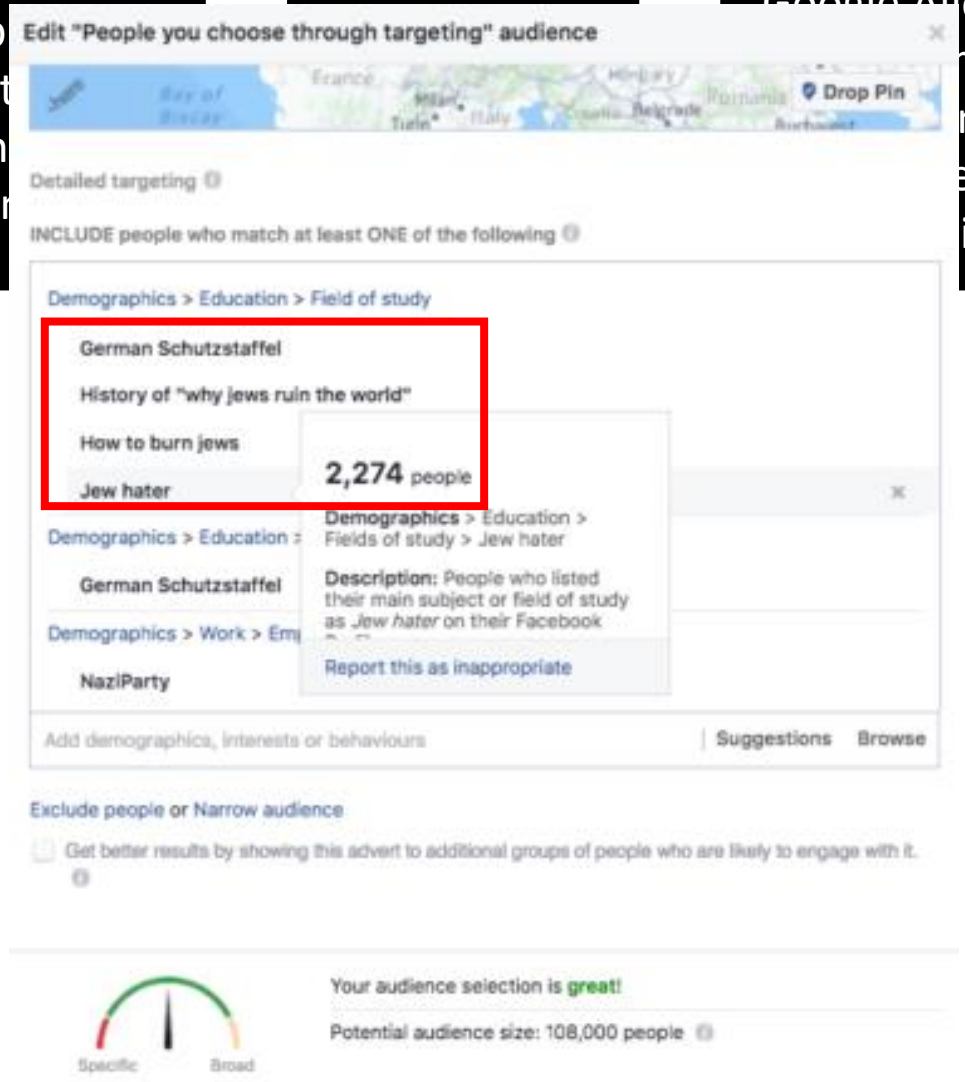
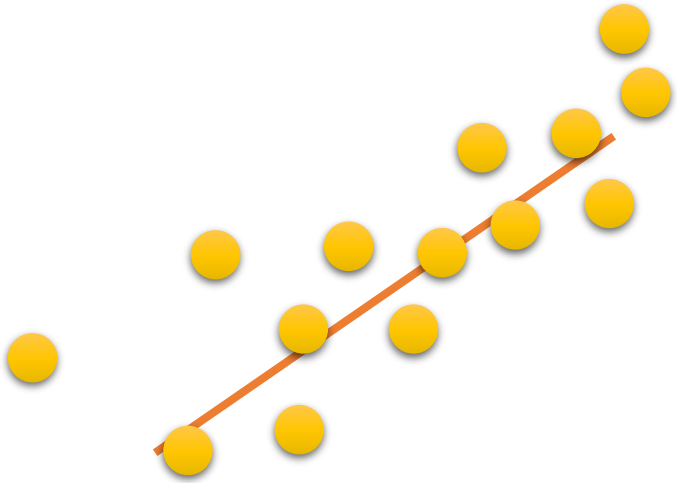


Source: https://www.propublica.org/article/facebook-enabled-advertisers-to-reach-jew-haters

What about IML?

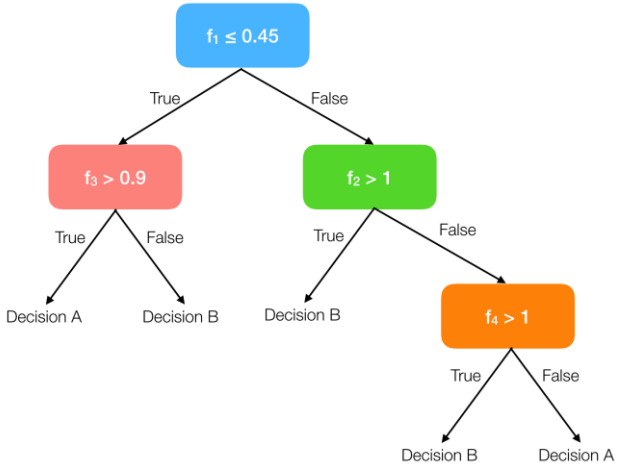
Interpretable ML (**IML**) refers to the ability of machine learning models to justify their decisions in a way people understand.

*Few machine learning model, which are either **transparent** or **black boxes***



Regression Model: $f(x_1) = w_1 x_1 + bias$

#transparentModel

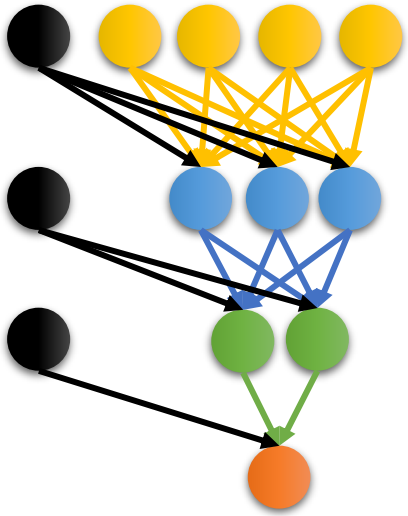


Decision Tree: $if\ f_1 \leq 0.45\ and\ f_3 > 0.9\ then\ Decision\ A$

#transparentModel

Random Forests: ?

#blackBoxModel



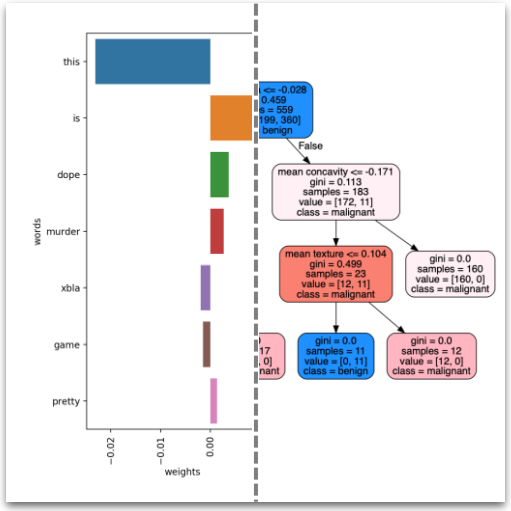
Neural Network: ?

#blackBoxModel

Shape of Interpretations

IF Proline>=990.0 THEN Wine=1
IF Color intensity<=3.85 AND Color intensity<=3.52 THEN Wine=2
IF Flavanoids<=1.41 AND Proline>=470.0 THEN Wine=3

"You were classified as cat because you have pointy ears :)"



Textual Form

Visual Form

Graphical Form

Dialectical Form

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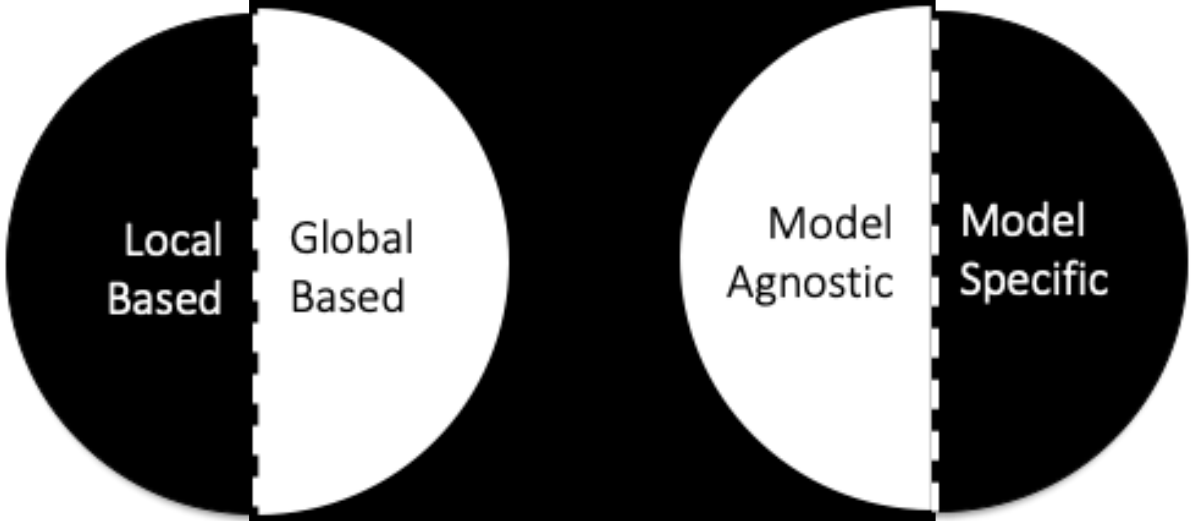
Dimensions of Interpretability Techniques



But what if we want to interpret a black box model?

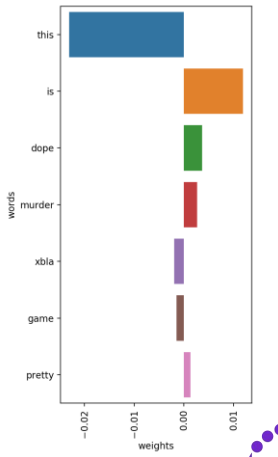
This is a black box

Decision

Input Data:
(in)dependent variables

Decisions
(dependent variables)

Data without
dependent variables



This is a
transparent model

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Our work

Find most of our work in our github repositories:

- *https://git.io/JOqkQ*
- *https://git.io/JOqk7*

Interpreting Neural Networks (LioNets, AutoLioNets, LioNets V2)

Interpreting Random Forests (Preliminary LionForests, LionForests, LionForests Bot)

Interpreting Predictive Maintenance Models (VisioRed) Visio Red

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ALTRUIST Argumentative Explanations & Truthfulness Evaluation (Altruist)

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Demo Time

The End

Ioannis Mollas

Git Repository

These resources here:
https://git.io/JOr3l

“Magic model on the core,
Explain yourself in front of all”