DreamQuark

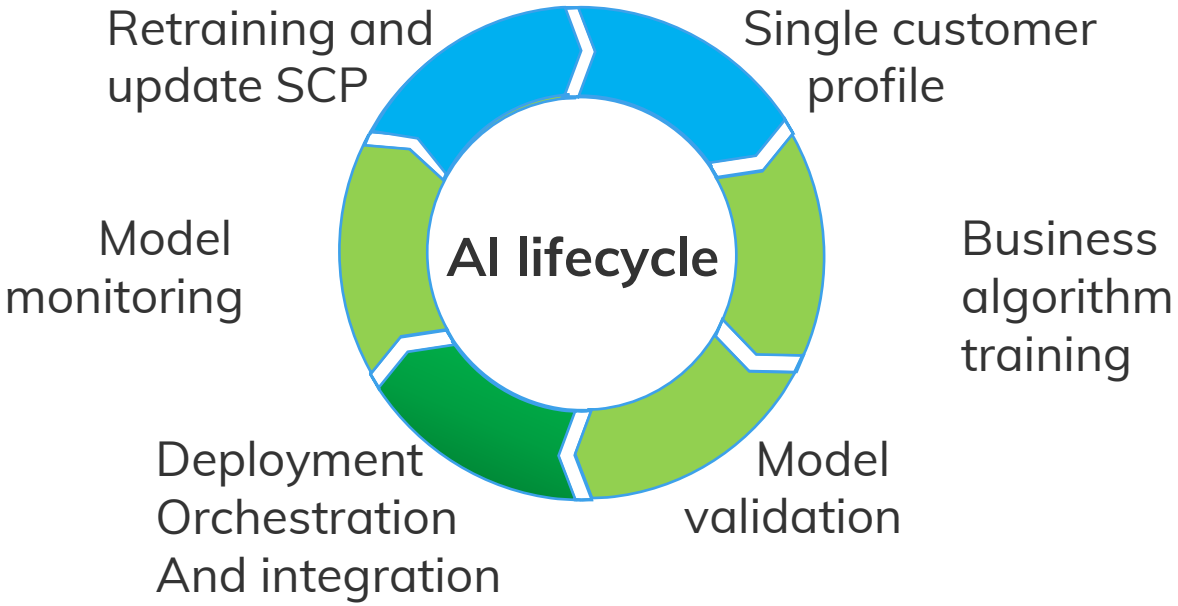
Sharpen decisions in Financial Services
with High-Scale Production & Trusted AI

Implementing AI models that are fair and explainable

Highlights on how we create a product to democratize data-science

Creating a model and deploy it, the modern approach

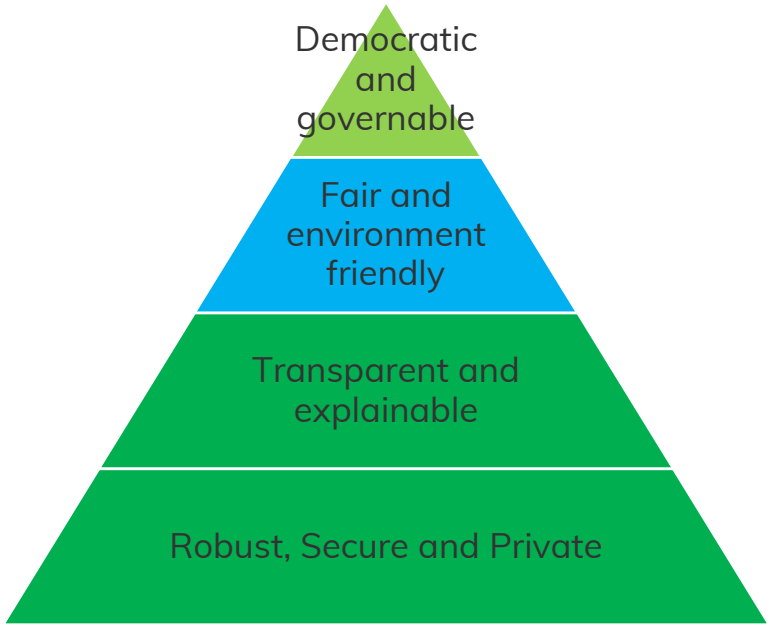
Solve → **Deploy** → **Adopt**



360° lifecycle to build, deploy, manage

How do we integrate responsible AI

Integration of modern AI governance and ethics
To ensure compliance and trust



Aim at : Why do you see that recommandation ?

You have been watching this family of products 3 times
You are a woman and we identified woman are most interested with that kind of investment
You claimed to be interested in ESG
You are 40 years and people start prepare for retirement
You invested in equity over your past 5 investments

-> ultimately explainability needs to be adapted for the audience that needs it

But that is a challenge to translate generic tabular data with (sex_client:F, prod_family:3, type_invest:equity..) into neat sentences in a completely automated way

Why you need explainability

Until recently, lots of companies claimed you didn't need it

BUT Guidelines came that prepare for incoming regulations

Joke aside :

-Create trust from the person that use the algorithm but didn't built it
-Explain a negative outcome or decision
-Audit
-Understand if the model does the things it is expected to do
-Identify biais
-Because an intelligent system is able to explain (GAI)

What we do around explainability at DQ?

Started to work on explainability around 2016 to help physicians understand medical recommendations

Approach of deep-learning explainability through saliency maps

Generalized to tabular data in 2017

Built a generalized platform in 2018 with global and local explainability on deep-learning only

Since 2019 :

Explainability on a wide number of models (classification, regression, recommendation)

Explainability for leakage detection

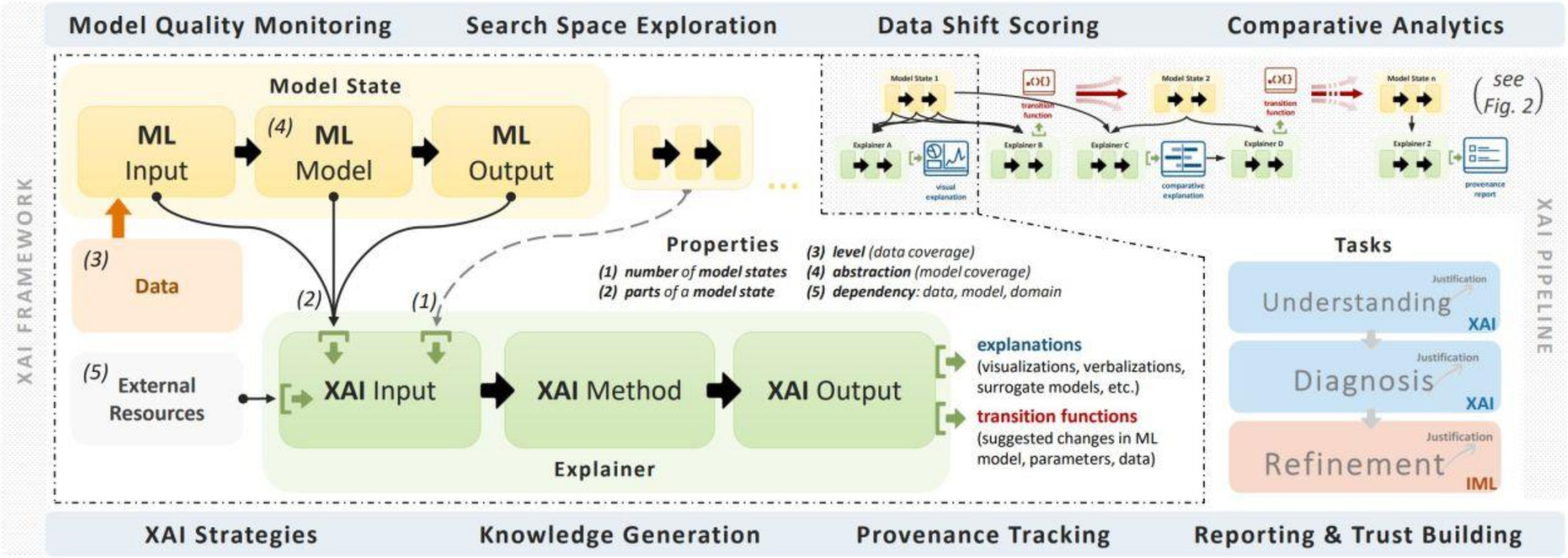
PDE – play with explainability, attention based methods

Model stability and data drift

Explainability metrics

Fairness

Move towards generate text to explain single decisions


Model Quality Monitoring
Search Space Exploration
Data Shift Scoring
Comparative Analytics
XAI FRAMEWORK
Model State
ML Input
(4) ML Model
ML Output
(3) Data
(5) External Resources
(2)
(1)
XAI Input
XAI Method
XAI Output
Explainer
Properties
(1) number of model states
(2) parts of a model state
(3) level (data coverage)
(4) abstraction (model coverage)
(5) dependency: data, model, domain
explanations
(visualizations, verbalizations, surrogate models, etc.)
transition functions
(suggested changes in ML model, parameters, data)
see Fig. 2
XAI PIPELINE
Tasks
Understanding
Justification
XAI
Diagnosis
Justification
XAI
Refinement
Justification
IML
XAI Strategies
Knowledge Generation
Provenance Tracking
Reporting & Trust Building

Explainability

Model specific
Model agnostic

Local explainability
Global explainability

Methods :

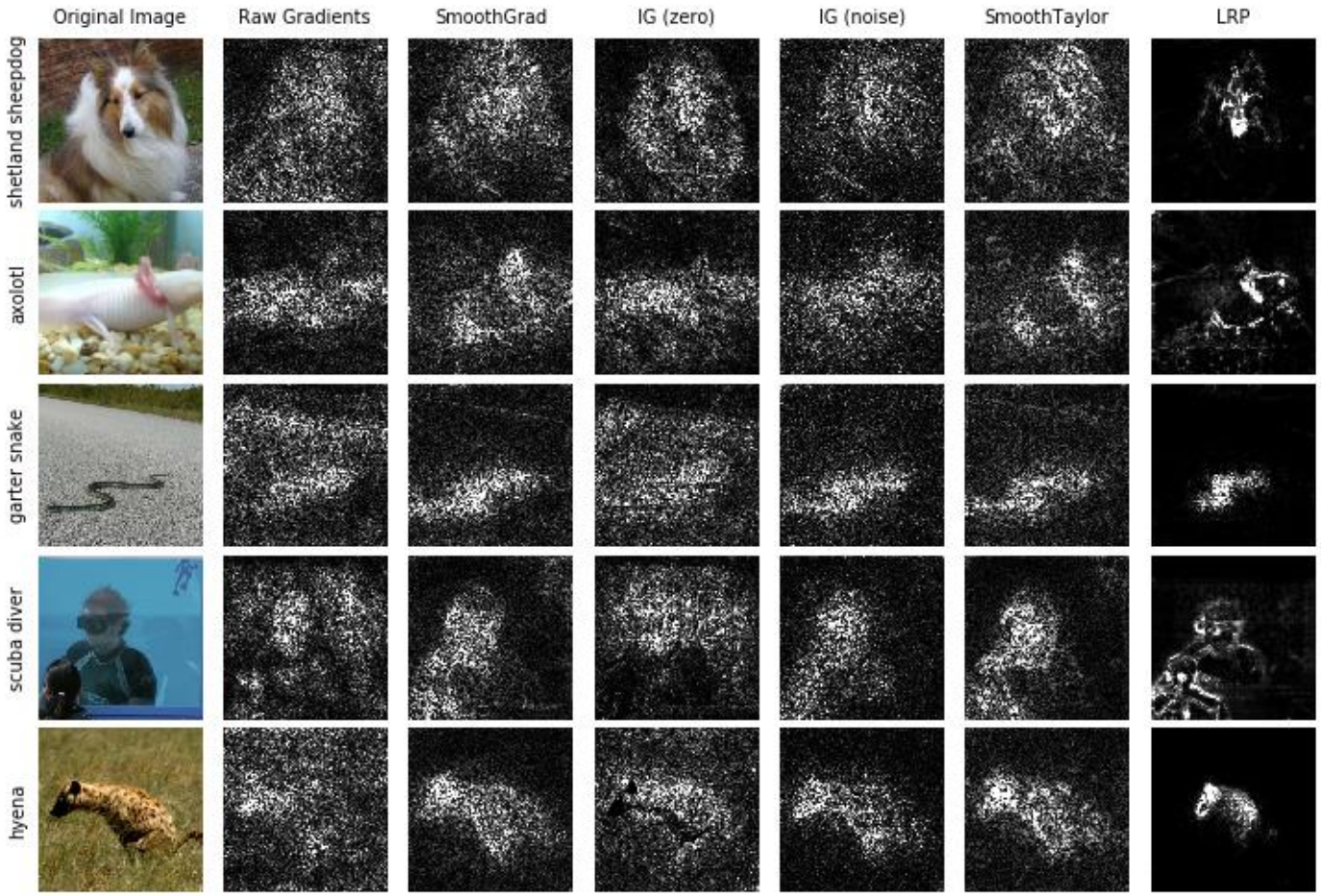
Feature ablation
Permutations
Surrogate models
Shapley values
Saliency maps
Gradient based
Attention Masks
Rules (anchors)
Text generation

Shapley value

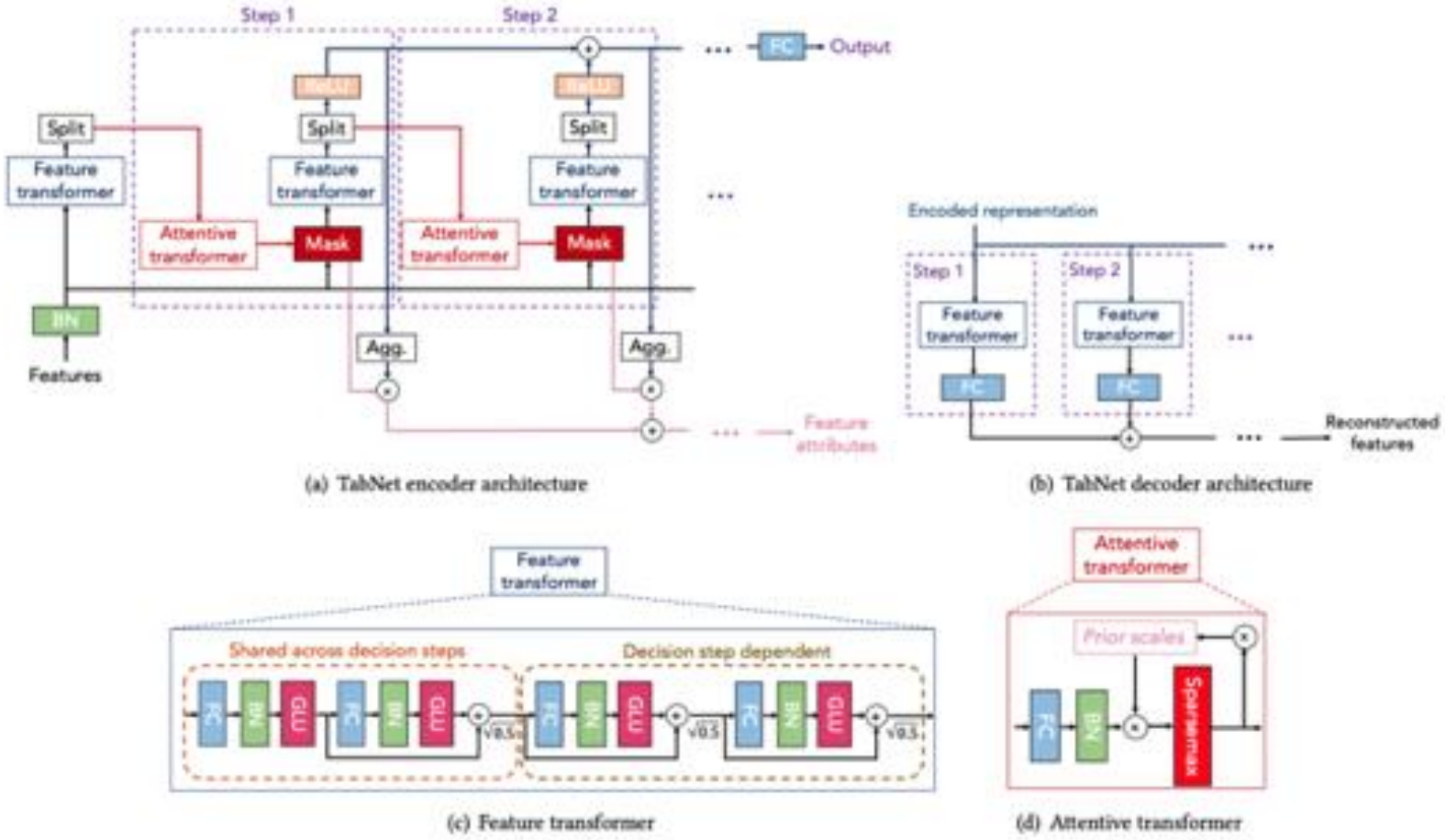
$$\varphi_i(v) = \sum_{S \subseteq N \setminus \{i\}} \frac{|S|!\,(n - |S| - 1)!}{n!} (v(S \cup \{i\}) - v(S))$$

$$\varphi_i(v) = \frac{1}{\text{number of players}} \sum_{\text{coalitions excluding } i} \frac{\text{marginal contribution of } i \text{ to coalition}}{\text{number of coalitions excluding } i \text{ of this size}}$$

Integrated gradients



Tabnet



(a) TabNet encoder architecture

(b) TabNet decoder architecture

(c) Feature transformer

(d) Attentive transformer

Anchors

(a) Original image

(b) Anchor for "beagle"

(c) Images where Inception predicts $P(\text{beagle}) > 90\%$

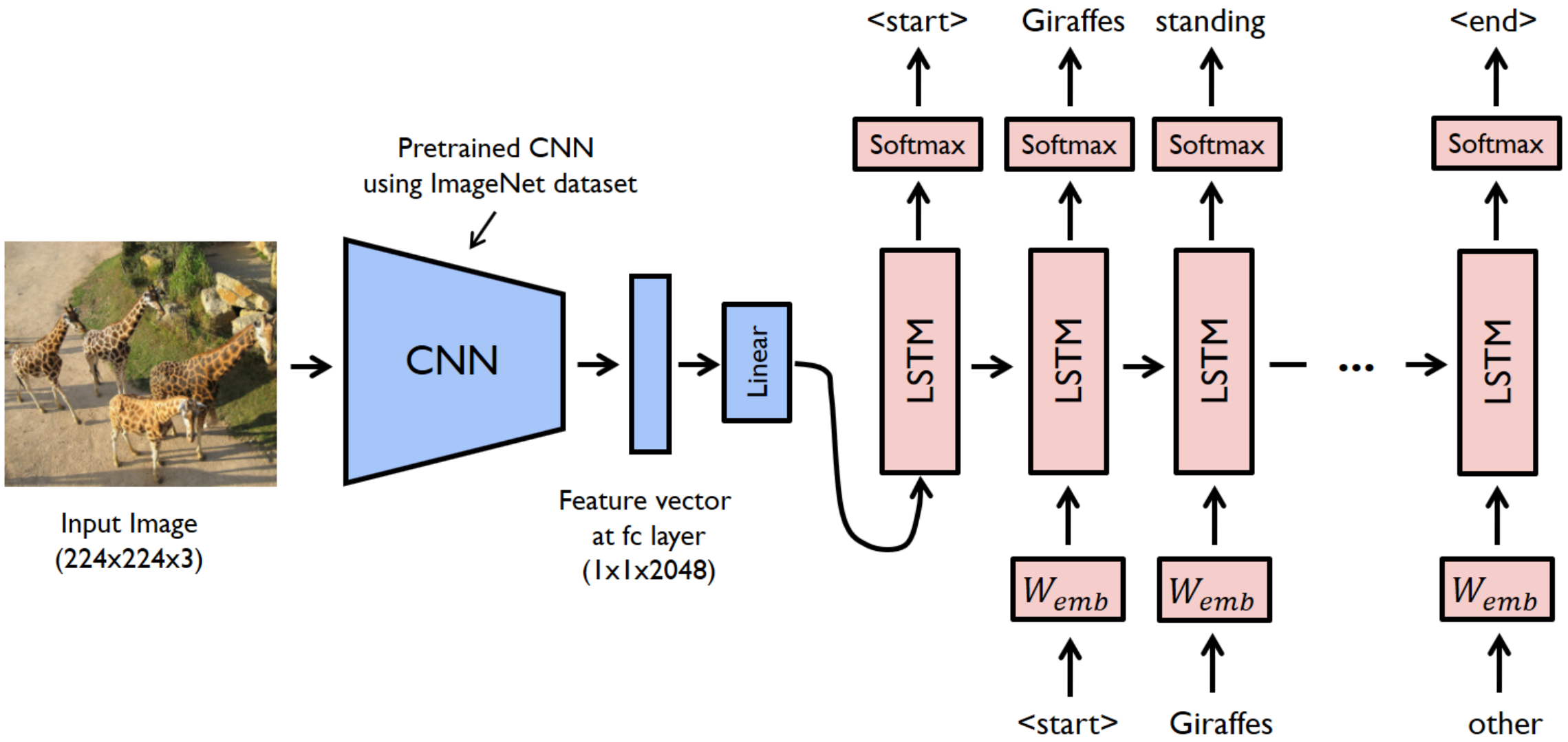
What animal is featured in this picture ?	**dog**
What floor is featured in this picture?	dog
What toenail is paired in this flowchart ?	dog
What animal is shown on this depiction ?	dog

(d) **VQA:** Anchor (bold) and samples from $\mathcal{D}(z|A)$

Where is the **dog**?	on the floor
What color is the **wall**?	white
When was this picture taken?	during the day
Why is he lifting his paw?	to play

(e) **VQA:** More example anchors (in bold)

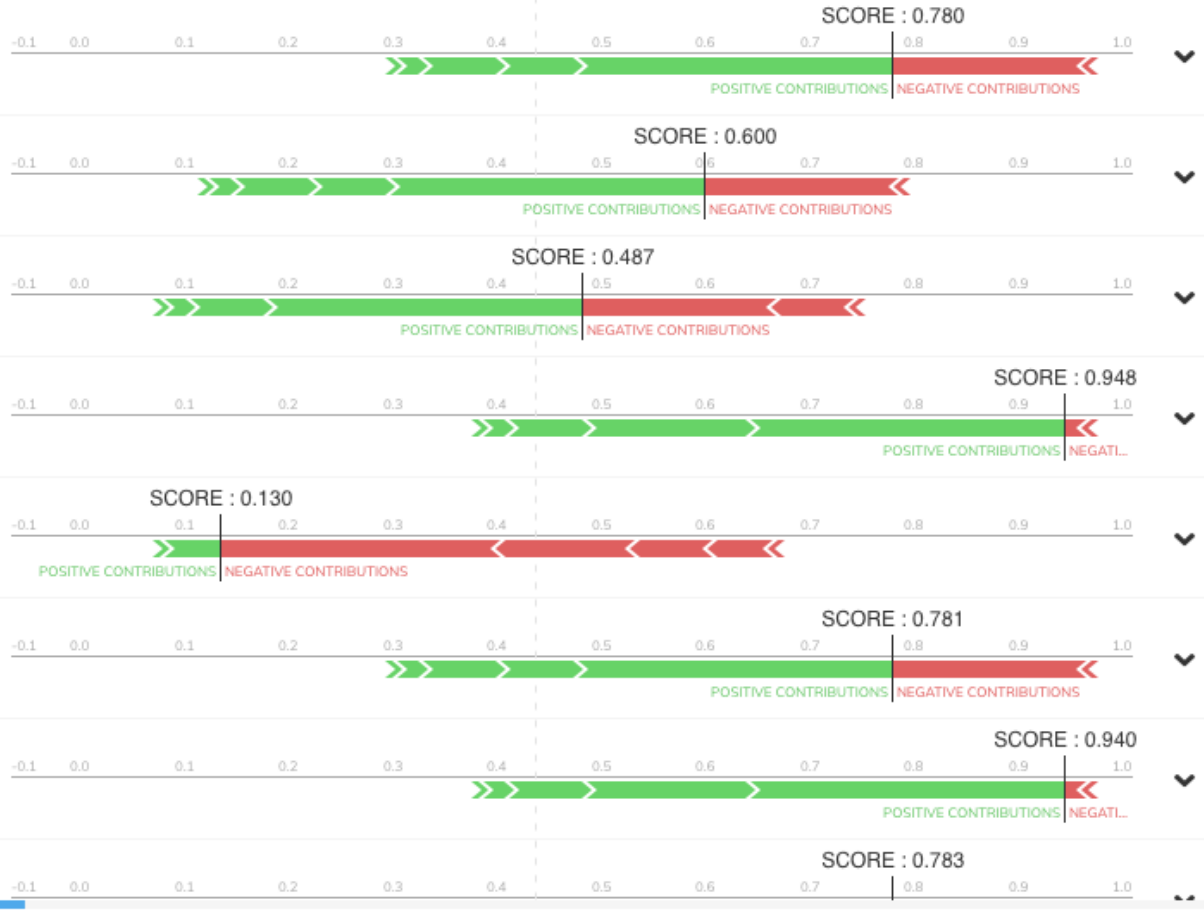
Caption generation



Individual Scores

DOWNLOAD VIEW

CLIENT ID	ALERT	SCORE & VARIABLE CONTRIBUTIONS
		Mean Score : 0.442
Mbe Tshinguta	All clear !	SCORE : 0.780
Amarachi Nkechi	All clear !	SCORE : 0.600
Sofía Alcocer	1 Empty values 32 Out of bound 2 Unknowns	SCORE : 0.487
Pan Hyuk	All clear !	SCORE : 0.948
Salomé Fernán	All clear !	SCORE : 0.130
Anaru Hakopa	All clear !	SCORE : 0.781
Emelda Scandroot	All clear !	SCORE : 0.940
Hirini Hakopa	All clear !	SCORE : 0.783



SHOW 100 MORE...

Dream

Individua

CLIENT ID

Mbe Tshinguta

Amarachi Nkechi

Sofia Alcocer

Pan Hyuk

Salomé Fernán

Anaru Hakopa

Emelda Scandroot

Hirini Hakopa

Explore decisions

DOWNLOAD EXPLORATION

Variables exploration (by importance)

Sofia Alcocer

Line number : 75

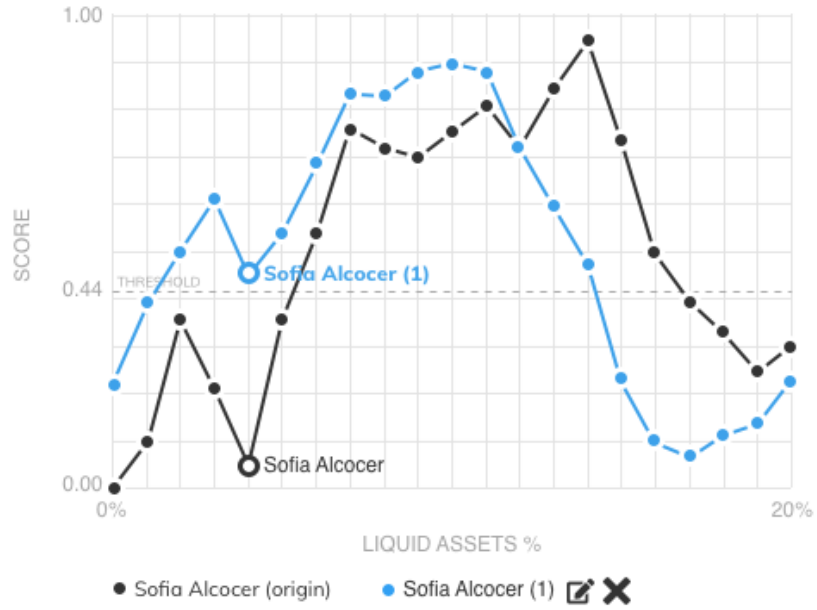
VARIABLES	MODIFY VALUES
Liquid Assets %	13%
Total AUM	420k
Qualified Individual	yes
Time Horizon	6-10 years
Risk Appetite	Low
Cash	30k
Advisory	no
Touchpoints_Nb_Last_6M	44

Name the curve (leave it blank to generate a name)...

ADD/REMOVE VARIABLES

SHOW CURVE

Live score results



VARIABLE ON ABSCISSA

Liquid Assets %

Explainability metrics

Usual fairness task

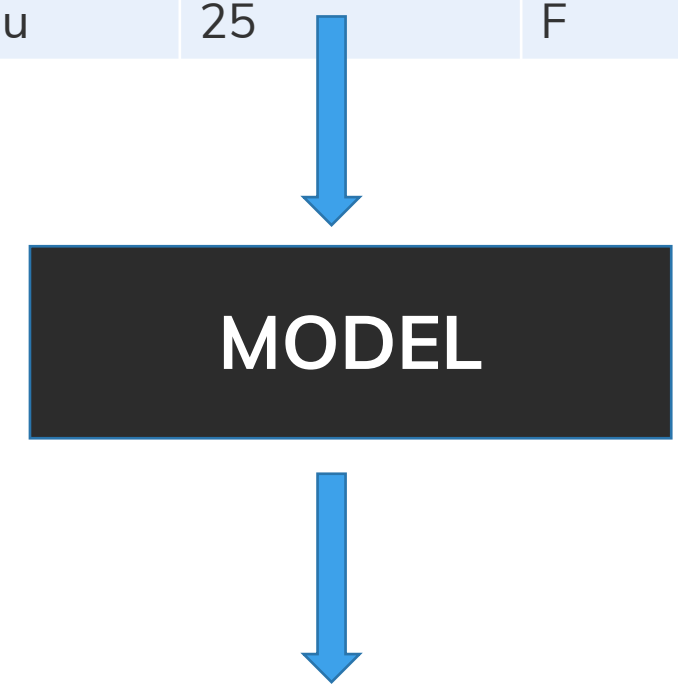
Protected attribute

NAME	SURNAME	AGE	SEX	CREDIT
Debailly	Guillaume	45	M	YES
Marina	Loiseau	25	F	YES
Hubert	Bonisseur	34	M	YES
Noel	Flantier	56	M	YES
Bob	Howard	29	M	NO
Brad	Pitt	65	M	YES
Larmina	El Akmar	23	F	NO
Dolores	Koulechov	36	F	NO
Bill	Trumendous	36	M	YES
Christina	Aguilera	53	F	NO
Von	Zimmel	42	M	YES
Marie Jeanne	Dutilleul	30	F	NO

Usual fairness task

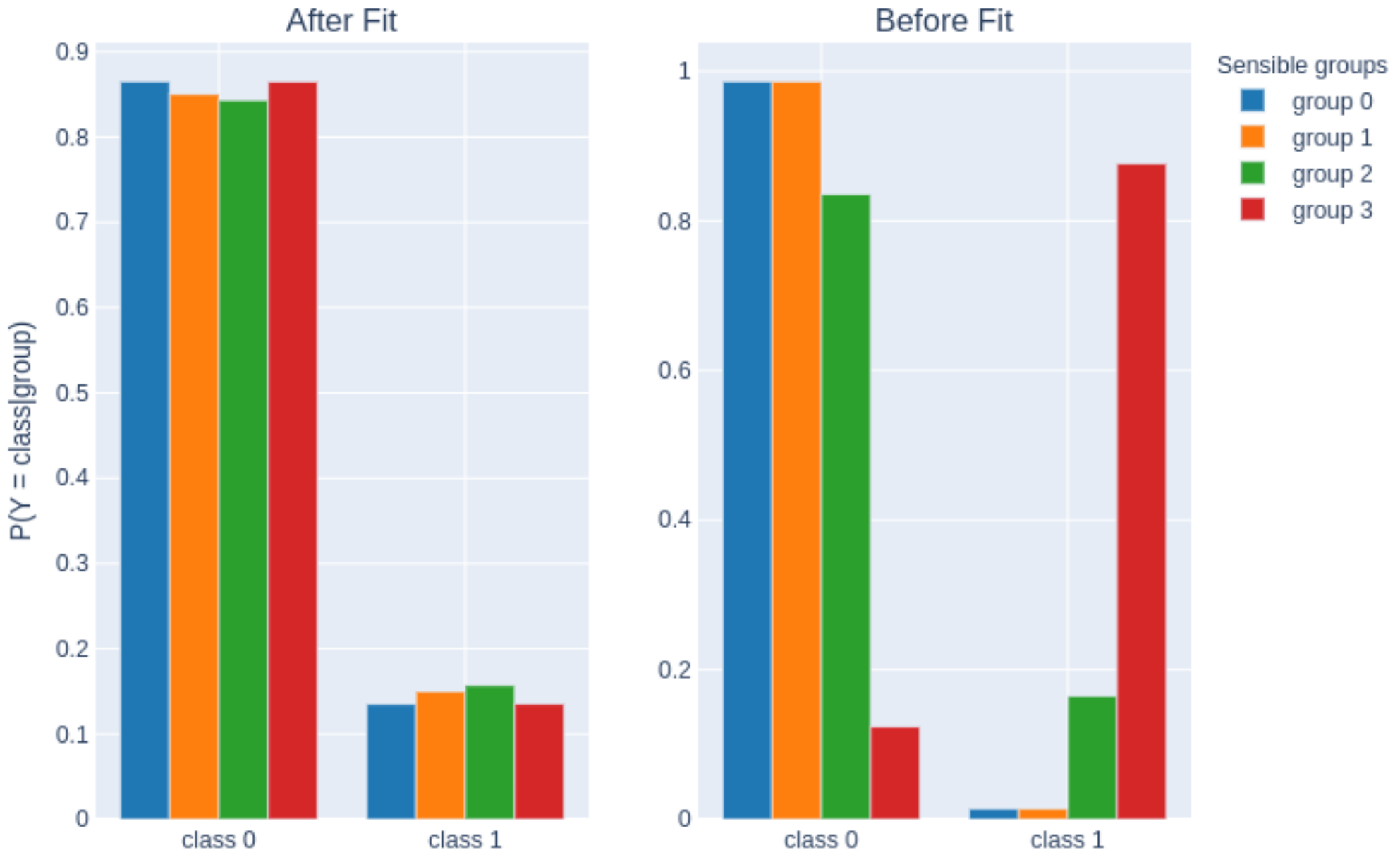
Protected attribute

NAME	SURNAME	AGE	SEX	OCCUPATION
Debailly	Guillaume	45	M	Writer
Marina	Loiseau	25	F	Seismologist



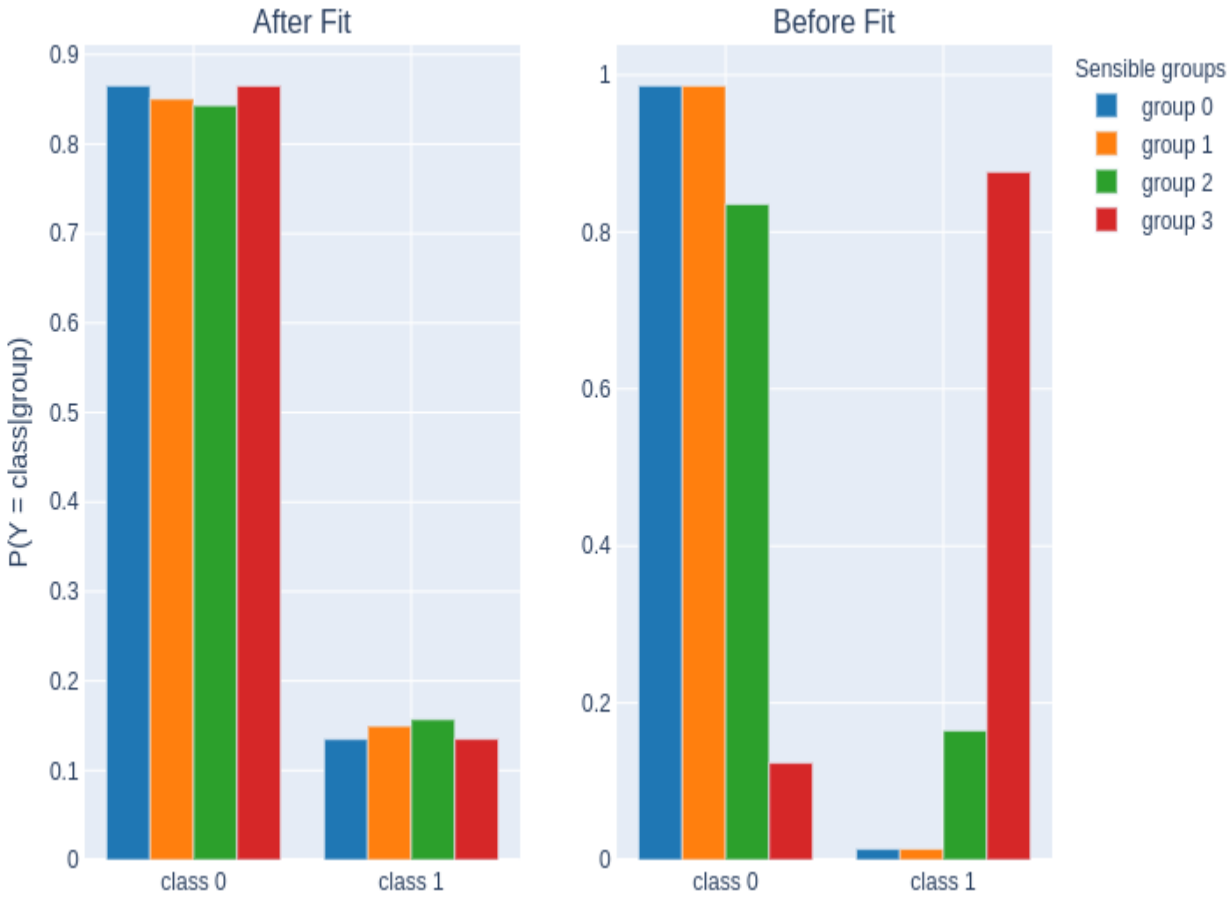
NAME	CREDIT_SCORE	PREDICTION
Guillaume Debailly	0.67	Give credit
Marina Loiseau	0.4	Refuse loan

Usual fairness task



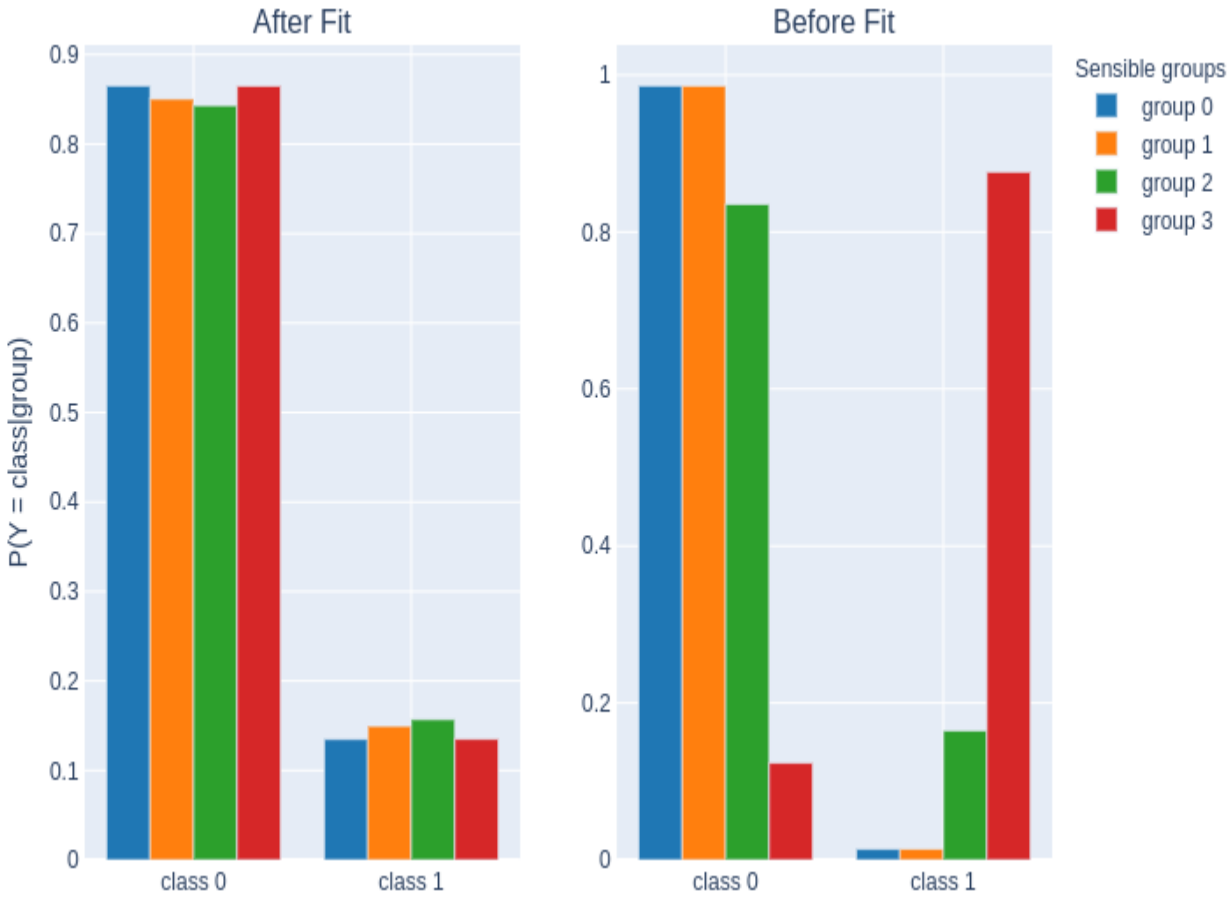
Fairness Definition

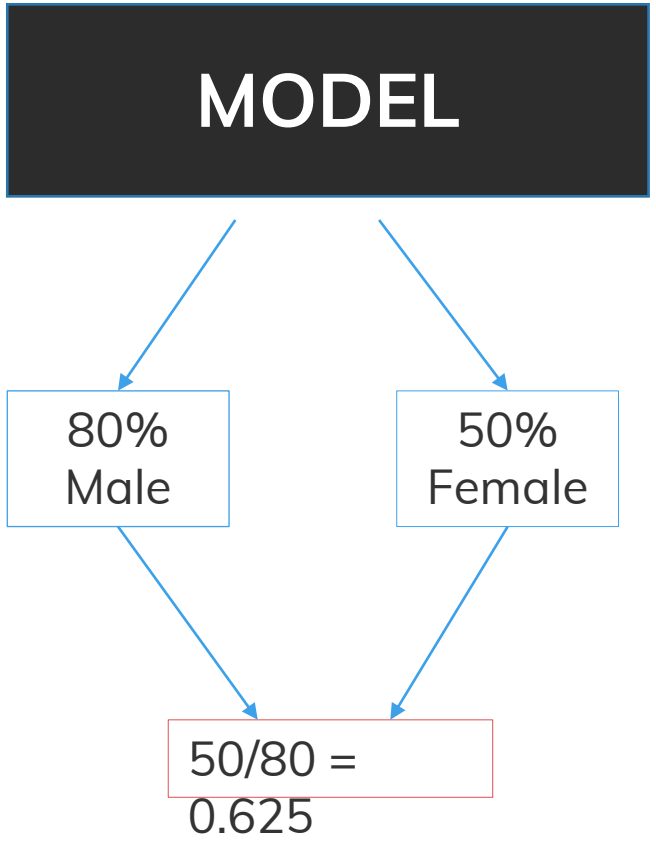
Demographic Parity



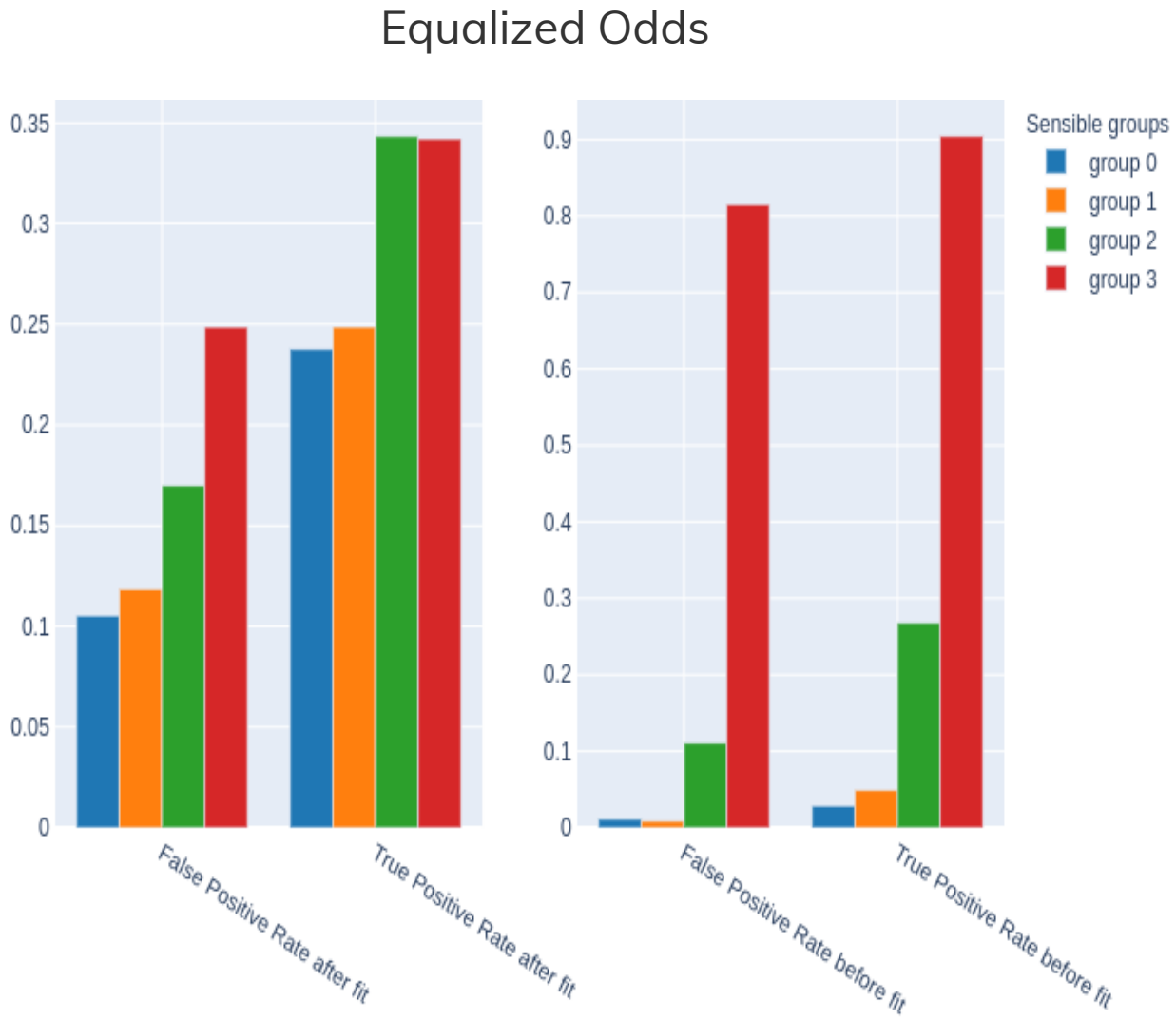
Fairness Definition

Demographic Parity





Fairness Definition



Fairness Definition

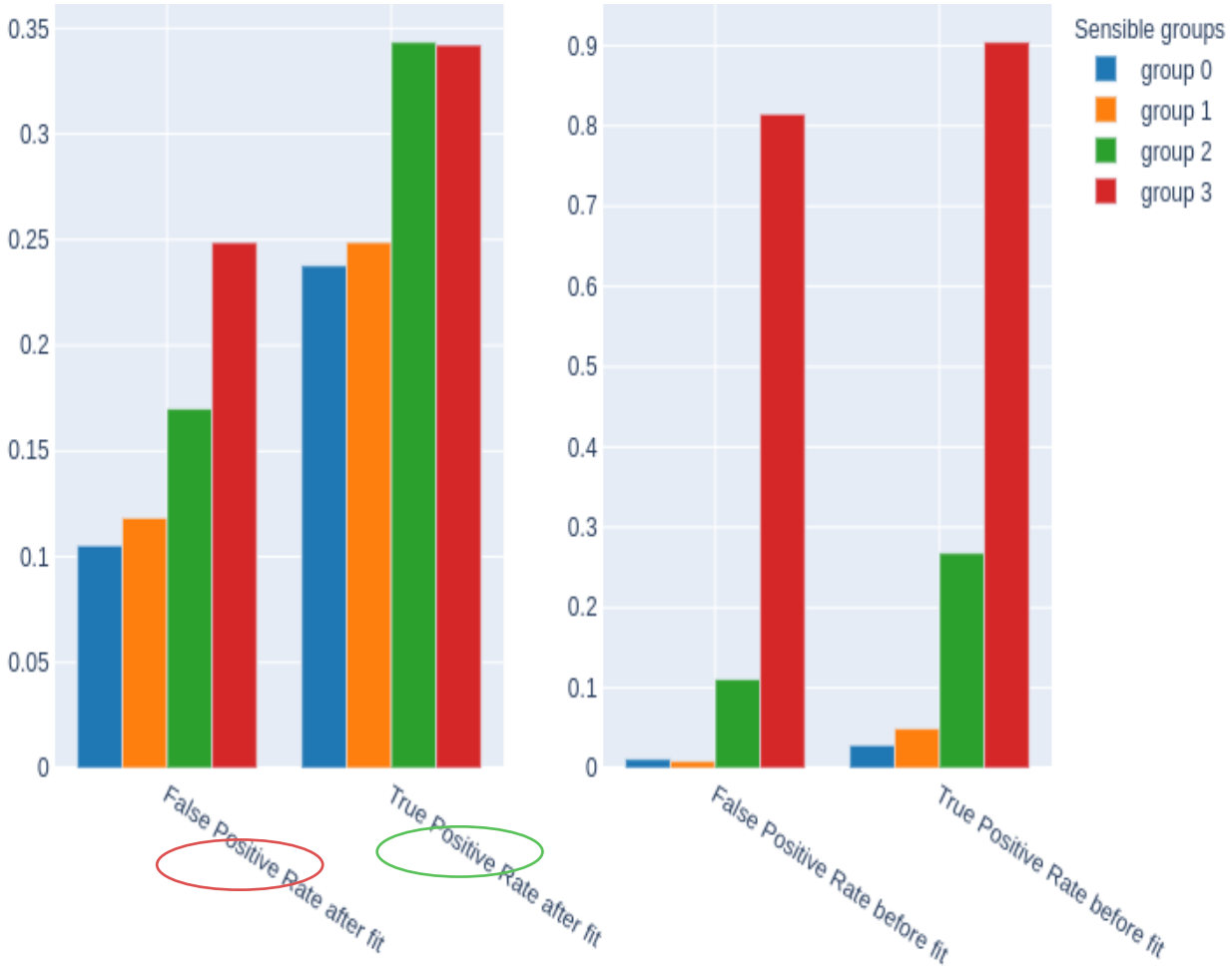
FEMALE

	0 predicted	1 predicted
0 true	0.85	0.15
1 true	0.75	0.25

MALE

	0 predicted	1 predicted
0 true	0.87	0.13
1 true	0.73	0.27

Equalized Odds



Thresholding

Protected attribute

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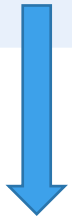
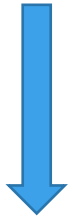


MODEL



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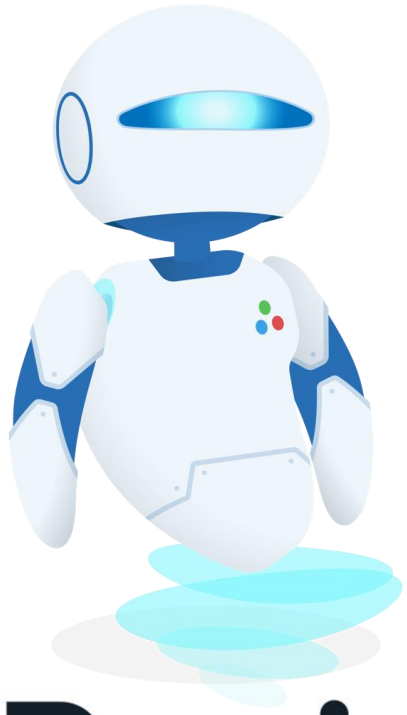
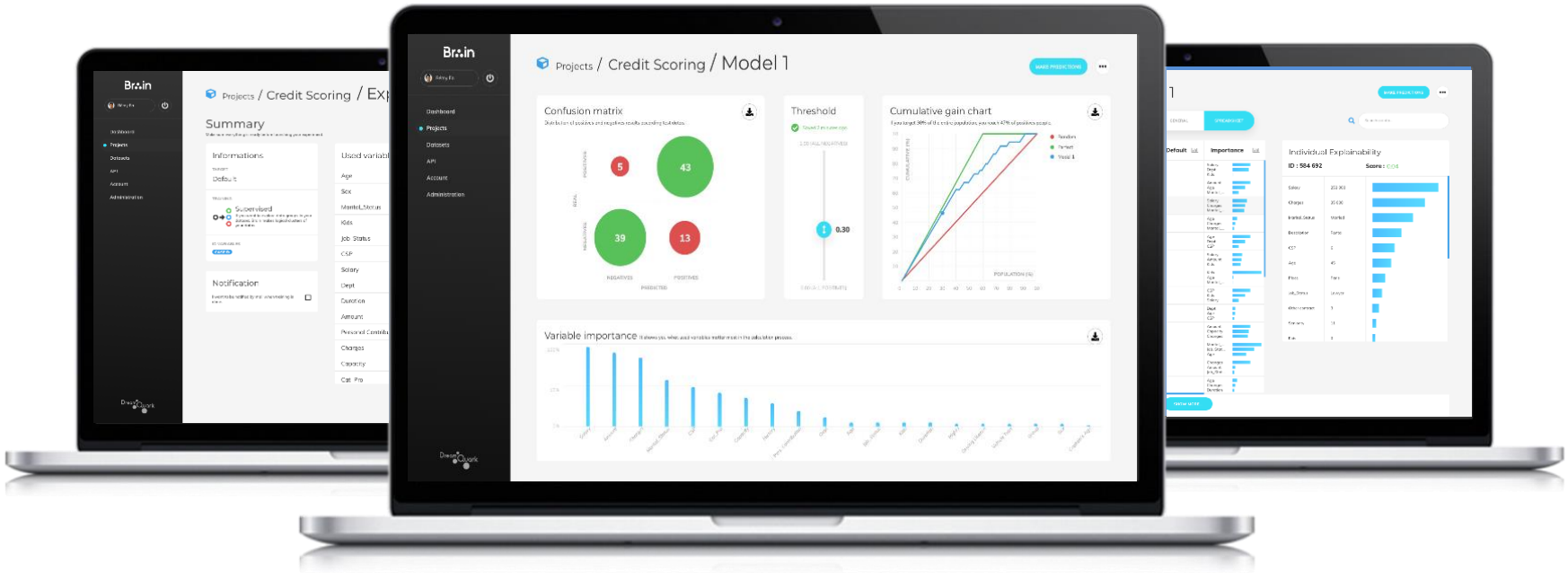
Introducing Brain

Orchestrate hyperpersonalized and consistent customer experiences for Banks and insurance customers from a unified customer view with responsible AI





Br.in

Customer single profile → Orchestrate AI models → Deploy CX apps

What DreamQuark Brings

What data is relevant?

Are data science skills available?

How do I build the best model?

How do I deploy my models?

Any customer data
KYC / Contact / Product

Business app Auto builds deep learning model

One-click to deploy Auditable Advisor API

- ✓ Reduce risk of failure
- ✓ Accelerate deployment
- ✓ Bring forward ROI
- ✓ Fully explainable, fully auditable
- ✓ End to End

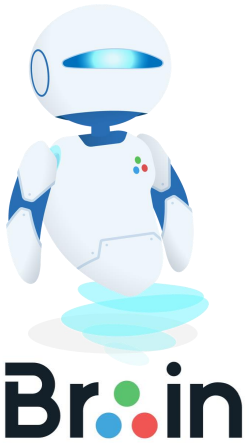
Complexity & Total Cost of Maintenance of AI Models

Time

SDK for data-scientist and integration
Collaboration
Model Stability Monitoring
Model version control
Bias Control
Explainability
One-click Deployment
Easy to Use UX and Auto-ML
Based on latest ML-libraries + proprietary developments
Data preparation features (data pipelines)
SSO & Enterprise security
Fully secured hosting (obfuscation)

Can I...
Trust My AI?
Audit It?
Maintain It?

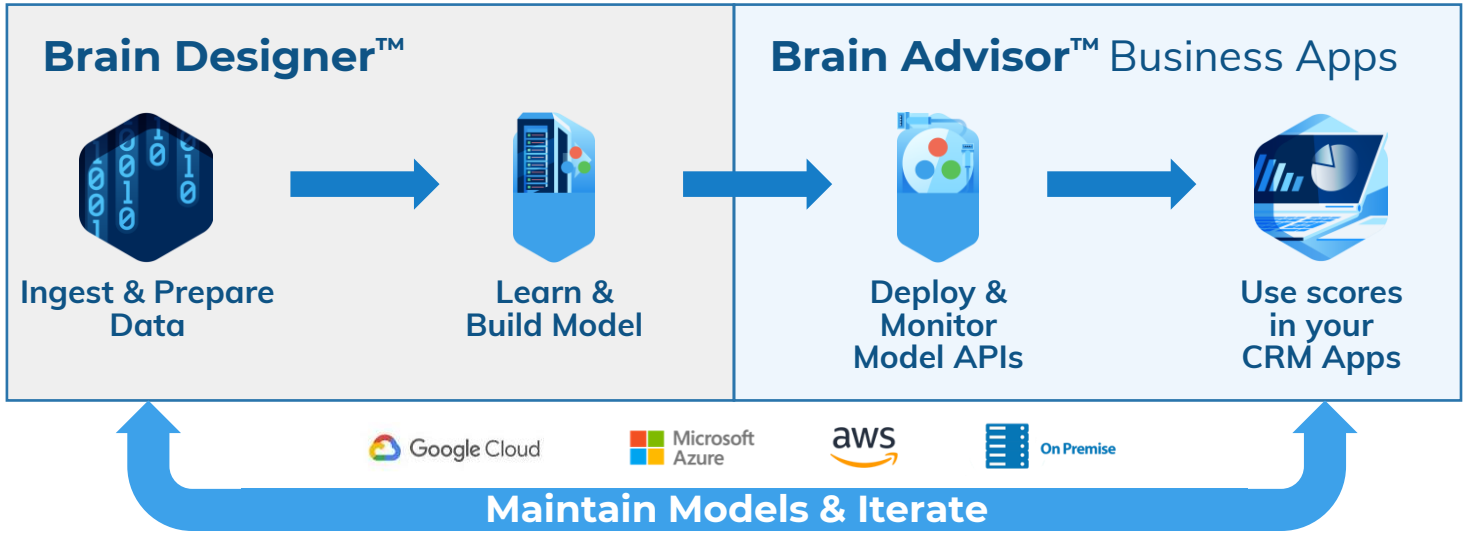
Data to Action in a Few Clicks



Brain is a No Code AI platform for business users:

With Brain, your sales & marketing teams can significantly reduce the support of data-science experts to deploy in production **business apps** that provide accurate & explainable recommendations that **grow revenues**.

Pre-built Business Apps	**Sales & Marketing, Risk & Compliance**	**Trusted AI**
Explainable & Auditable	**Deploy Use Cases in days**	**Enterprise-grade software**



BNP PARIBAS

RBS The Royal Bank of Scotland NatWest

Bâloise Assurances

AG2R LA MONDIALE

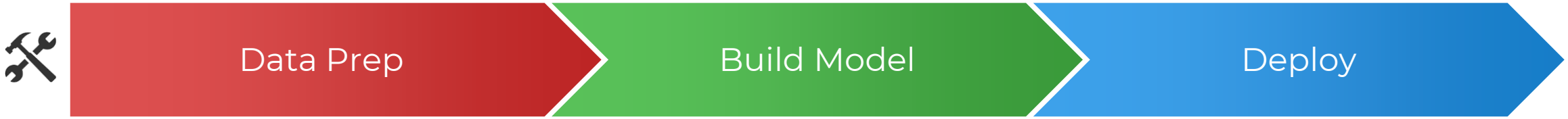
+75%
Uptake in **product recommendation**

+50%
Improvement in **campaign response rates**

-40%
Reduction in **churn**

Decrease Cost, Improve Effectiveness of Customer Engagement

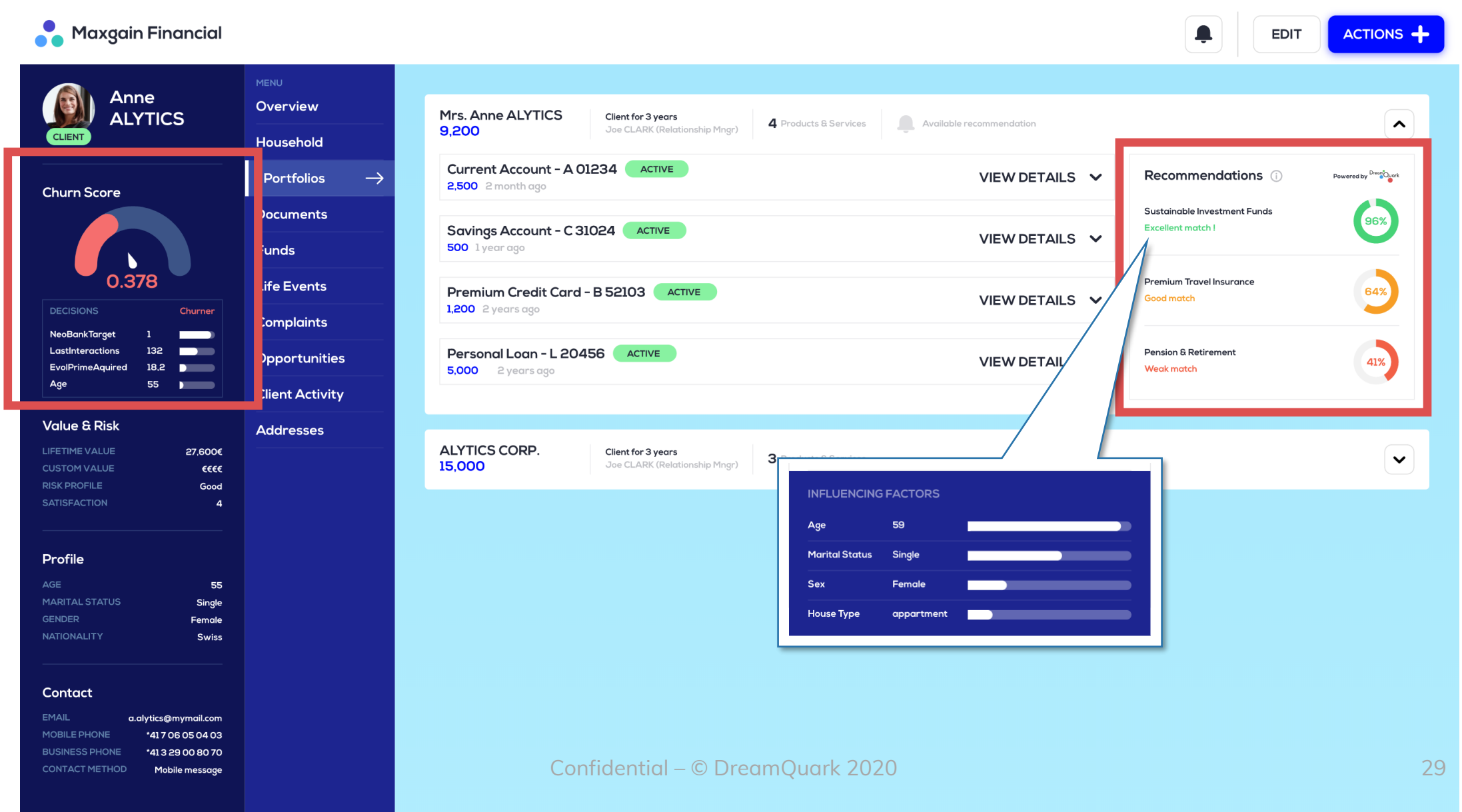
Fixed Costs: vs



-46%
Saving in data project **costs**

+48%
Improvement in **productivity**

-32%
Faster time to **production**


Maxgain Financial
EDIT
ACTIONS
Anne ALYTICS
CLIENT
Churn Score
0.378
DECISIONS
Churner
NeoBankTarget 1
LastInteractions 132
EvolPrimeAquired 18,2
Age 55
Value & Risk
LIFETIME VALUE 27,600€
CUSTOM VALUE €€€€
RISK PROFILE Good
SATISFACTION 4
Profile
AGE 55
MARITAL STATUS Single
GENDER Female
NATIONALITY Swiss
Contact
EMAIL a.alytics@mymail.com
MOBILE PHONE *41 7 06 05 04 03
BUSINESS PHONE *41 3 29 00 80 70
CONTACT METHOD Mobile message
MENU
Overview
Household
Portfolios
Documents
Funds
Life Events
Complaints
Opportunities
Client Activity
Addresses
Mrs. Anne ALYTICS
9,200
Client for 3 years
Joe CLARK (Relationship Mngr)
4 Products & Services
Available recommendation
Current Account - A 01234 ACTIVE
2,500 2 month ago
VIEW DETAILS
Savings Account - C 31024 ACTIVE
500 1 year ago
VIEW DETAILS
Premium Credit Card - B 52103 ACTIVE
1,200 2 years ago
VIEW DETAILS
Personal Loan - L 20456 ACTIVE
5,000 2 years ago
VIEW DETAIL
ALYTICS CORP.
15,000
Client for 3 years
Joe CLARK (Relationship Mngr)
Recommendations
Powered by
Sustainable Investment Funds
Excellent match !
96%
Premium Travel Insurance
Good match
64%
Pension & Retirement
Weak match
41%
INFLUENCING FACTORS
Age 59
Marital Status Single
Sex Female
House Type appartment

Thank You

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