How do we operationalize data science to fight financial crime?

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But first, let's talk

money laundering

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$2.5 Trillion

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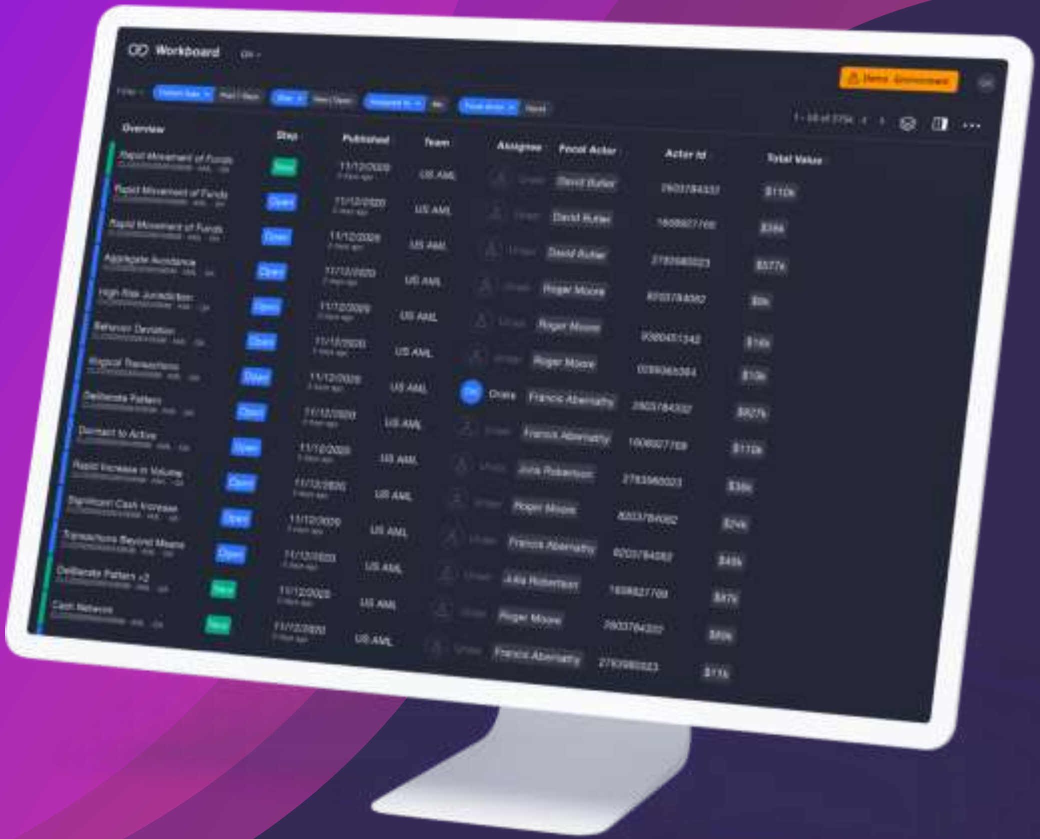
$2.5 Trillion

$232 Billion

< 1%

We bring productivity to AML by **operationalizing data science** and **augmenting humans**



*Case Study Lucinity: Based on a 12 month run of all transactions, compared to the replaced system.

but...
what does that even **mean**?

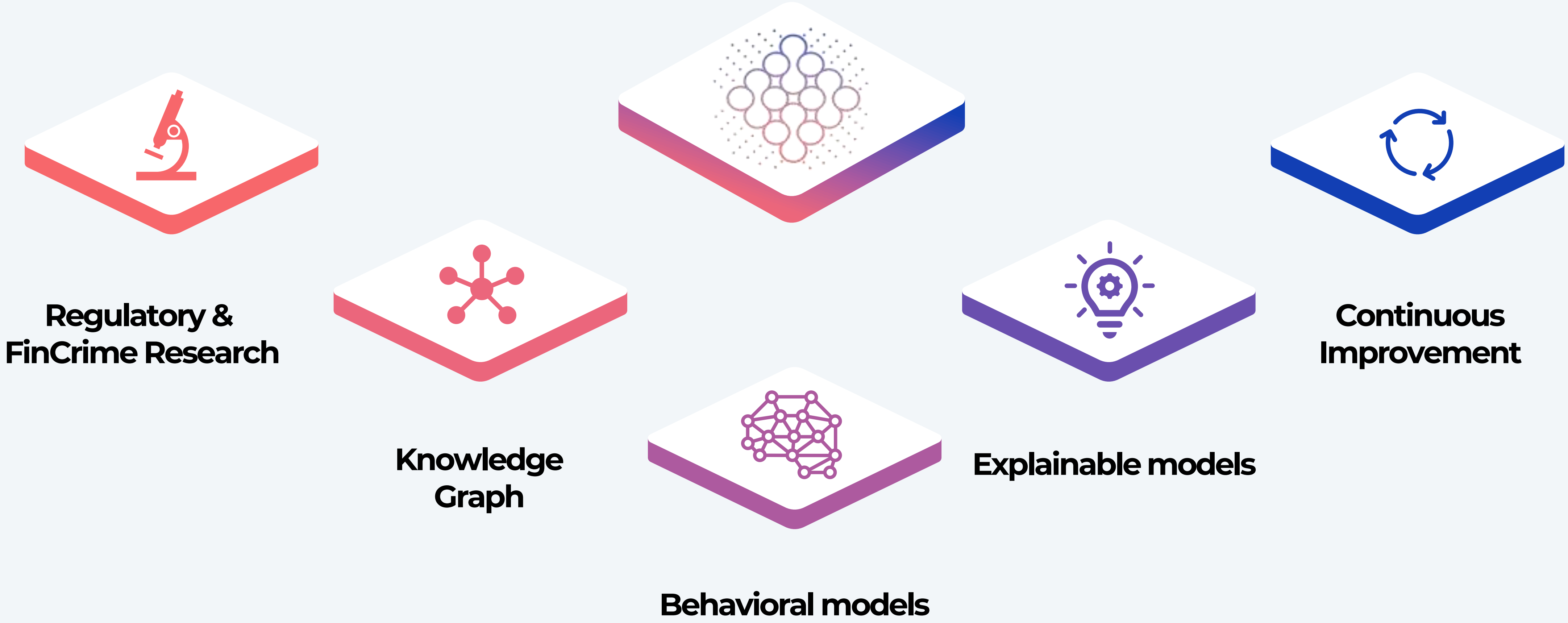
We use data science to find the money laundering **needle in the haystack**

Analysing

Interpreting

and we let humans do the **evaluation and interpretation**

Data Science in operations



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TAXONOMIES

A. **Avoiding reporting requirements**
   Layering schemes, structuring and placement schemes, consideration of spatial and temporal dimensions, thresholds.

B. **Concealing customer or beneficiary information**
   Identity and beneficiary obfuscation, unjustified use of intermediaries and payment processors, shell companies

C. **Customer activity does not match customer profile**
   Comprehensive behavioral profiling, deviation from expected and peer group behavior, abnormal shift in transaction activity.

D. **Exhibiting a deliberate pattern of transactions**
   Rapid movement of funds, regular and irregular transactional patterns, round amount and systematic patterns.

E. **Unusual or suspicious customer activity**
   Circular fund movements, increased activity after dormancy, unusual device patterns, suspicious references.

F. **Transacting in high-risk jurisdictions or sectors**
   Jurisdictions and sectors analyzed along multiple dimensions utilizing trusted sources to determine high risk transactions.

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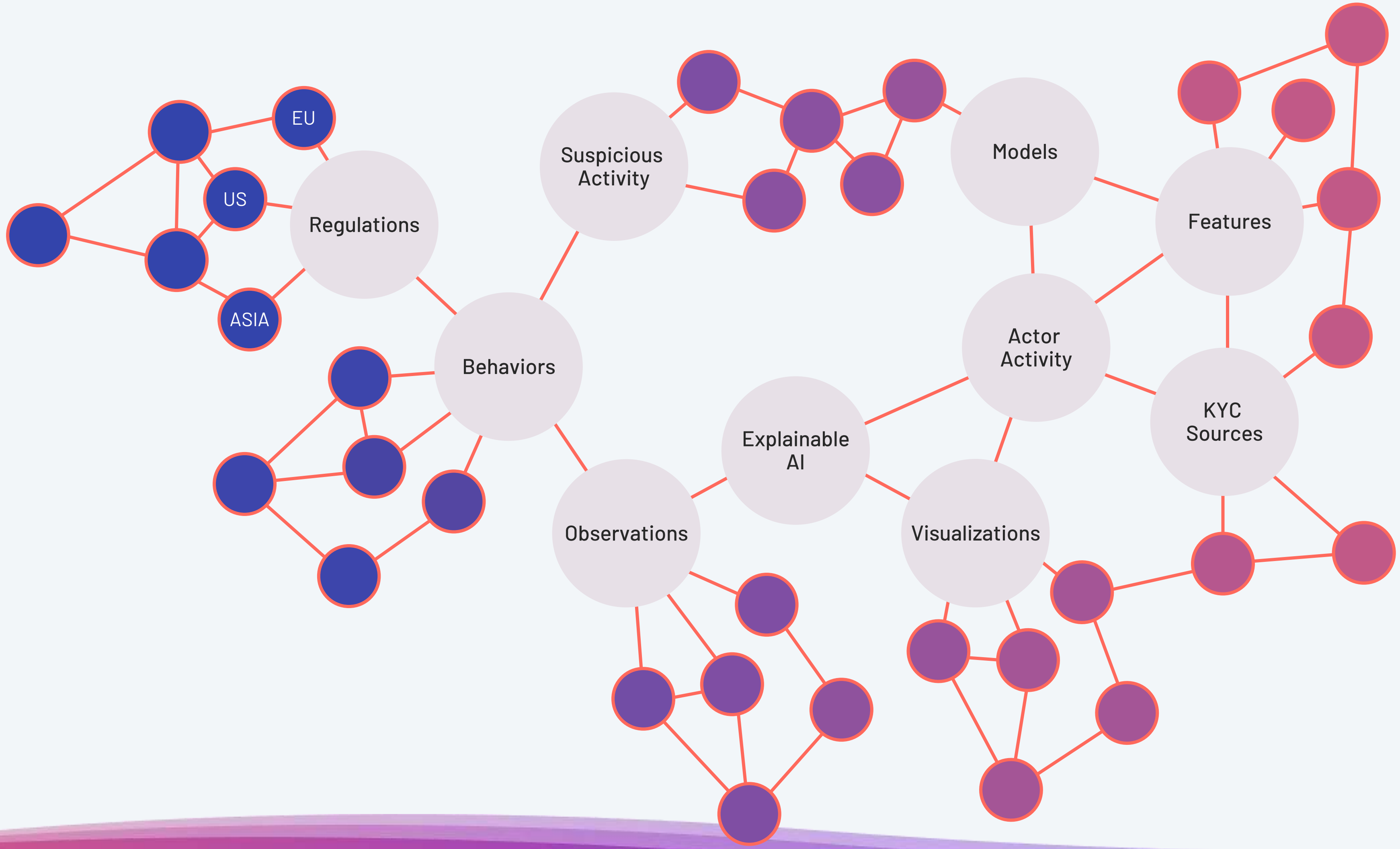
KNOWLEDGE GRAPH



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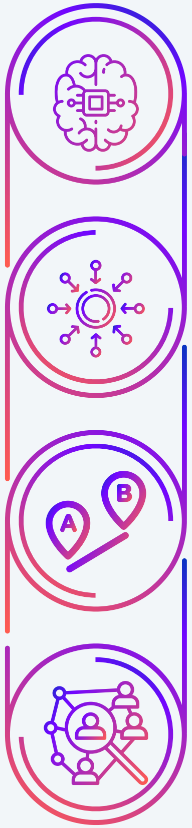
BEHAVIOURAL MODELING

relies on

building **features** that are designed to measure **suspicious activity** and make outliers and patterns **visible**

and

applying those features into a **data sciene** model that can score and rank actors on a given time interval.



models are trained

using an **unsupervised learning** approach in absence of labeled or enriched data

and

semi-supervised learning with feedback and labeled data

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Unsupervised learning model selection

Features are used as inputs into models that score and rank each actor

Various unsupervised learning models are applicable to the set of features

There is a trade-off between predictive power and simplicity when implementing models

Scorecards	**Logistic regression**	**Auto Encoder**	**Isolation forest**	**Neural networks**

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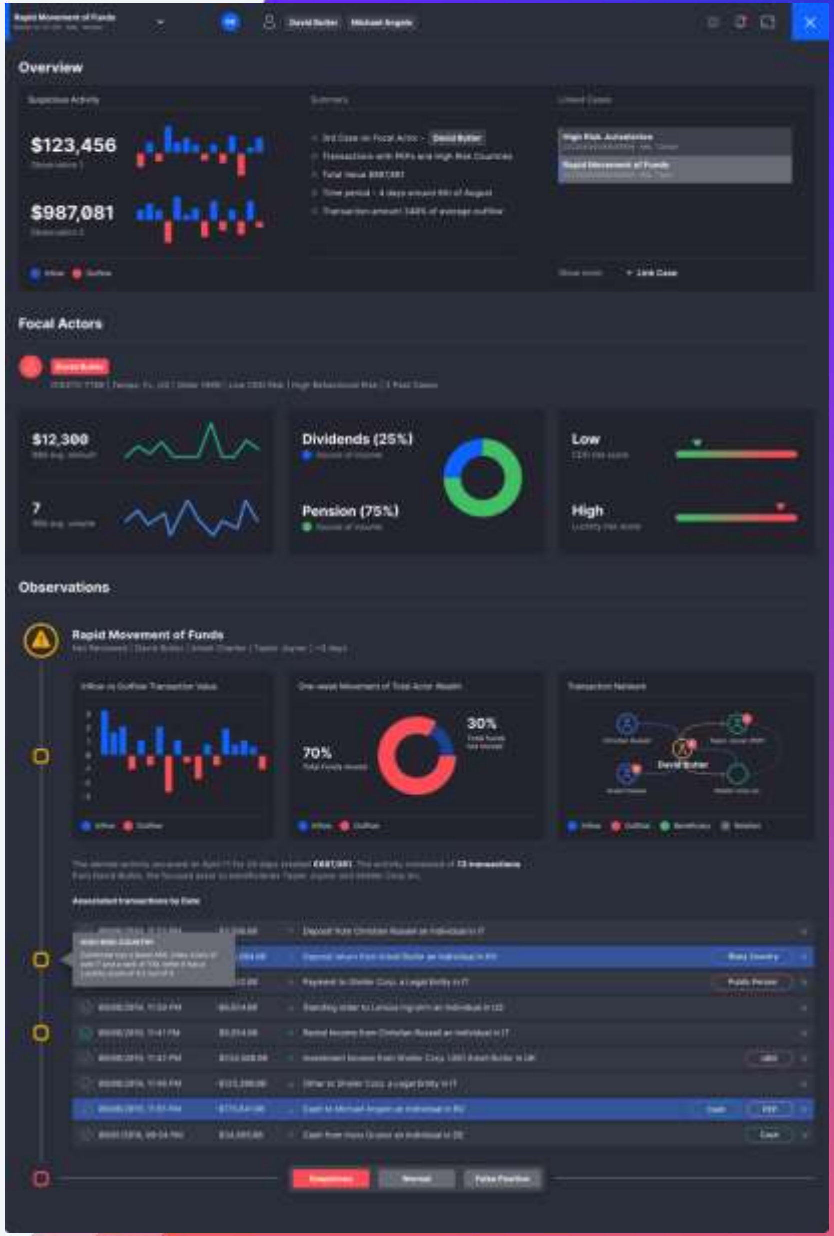
EXPLAINABLE MODELS

Driving engagement of analysts

- Overall effectiveness of AML program relies in no small measure on the analyst reviewing the observation

Analyst tool focusing on

- Encapsulate and present data in context of the observation
- Clear representation of contributing factors
- Easy to understand summarization
- Rich visualizations to provide insights
- Reduce case load by minimum 40%
- Reduced fatigue, better review
- 4-fold increase in coverage capability
- Automated Quality Assurance



DETECTING SUSPICIOUS BEHAVIOR USING DATA SCIENCE

Behaviors with increased money laundering risk

Certain transaction activity is known to increase the risk of money laundering.

Example:

- Transactions involving high usage of cash
- Transactions involving higher risk jurisdictions such as those with high financial secrecies, for example Cayman Islands
- Transactions with certain industry sectors that have historically been linked to increased risk of money laundering activity.
- Rapid move of funds through an account.

Other unusual behavior not explicitly defined

Transaction activity that is unusual compared to the majority is often a good indicator that something suspicious has taken place.

Lucinity's Knowledge Graph

FEATURE ENGINEERING

Feature Engineering is an essential part of our data science processes.

With the help of compliance we pinpoint the information that should be extracted from the raw data to get good indicators of certain activity.

Behavior:

Customer avoiding cash reporting threshold

Feature examples:

- Total aggregated value of cash transactions under cash reporting threshold.
- Weighted value of cash transactions depending on closeness to cash reporting threshold.

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DATA SCIENCE IN OPERATIONS

Data ingestion and preprocessing

Feature calculations

Train models

Scores

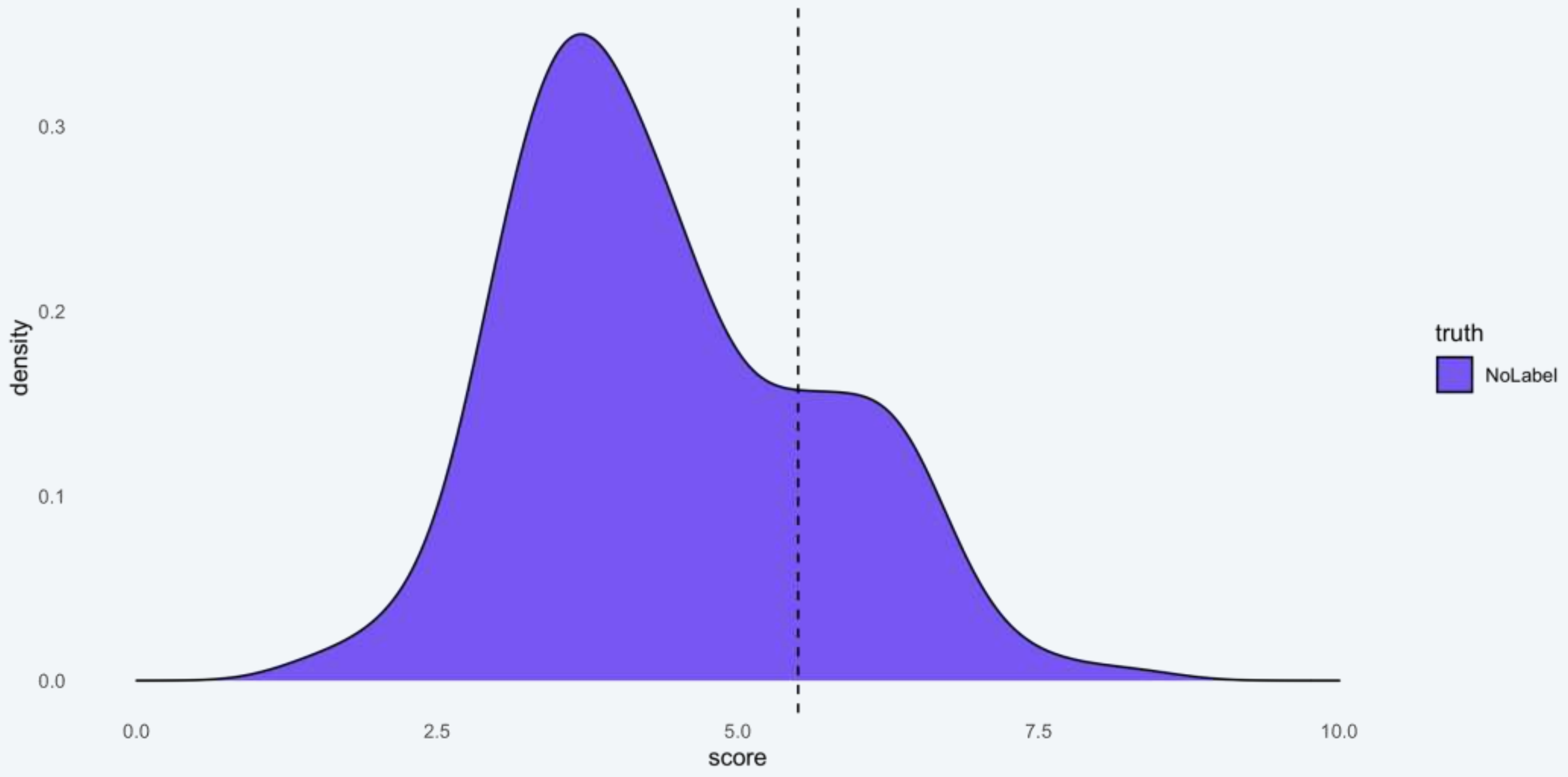
Thresholds

Observations

Investigate

Feedback

MODEL EVALUATION



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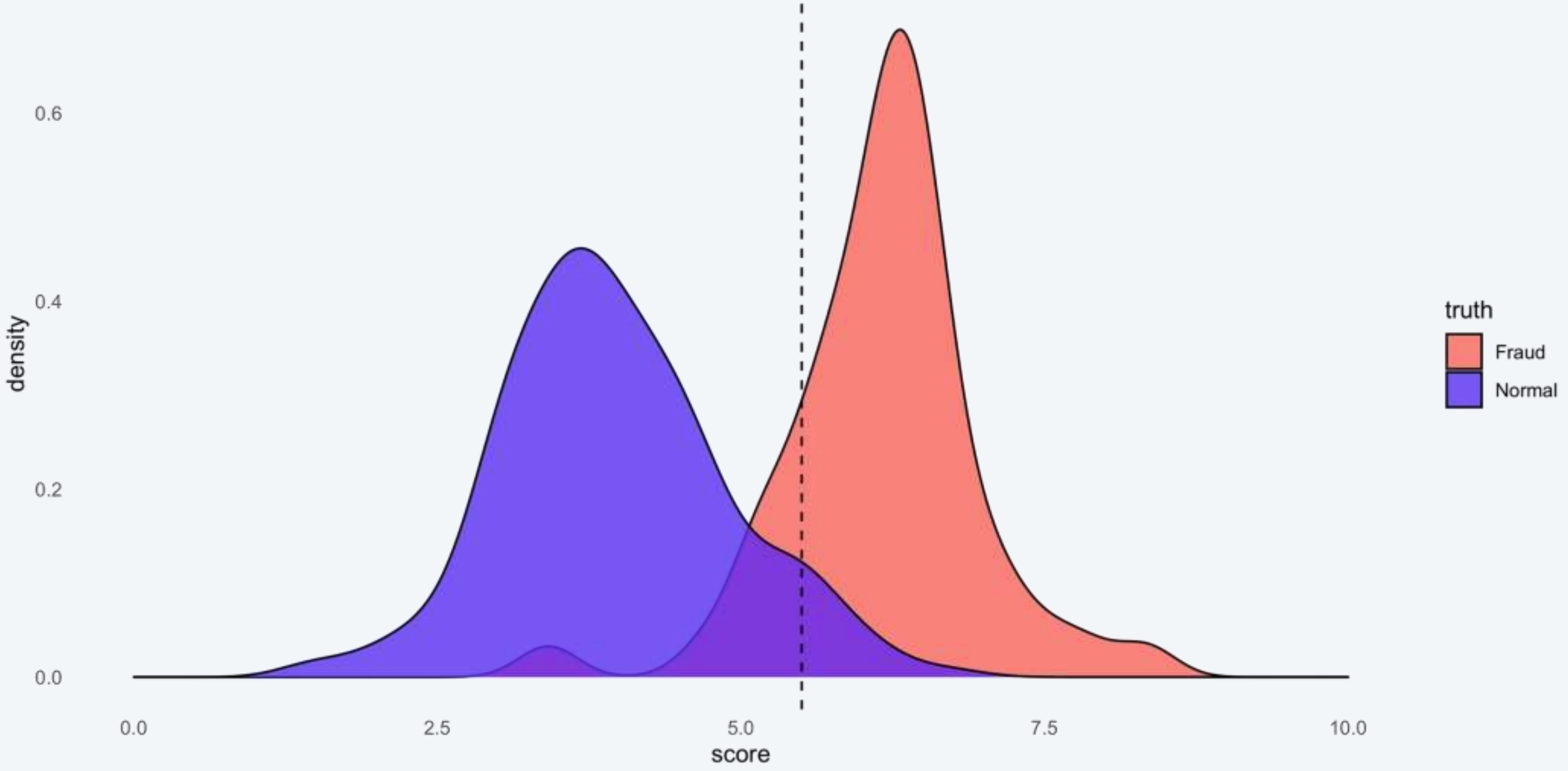
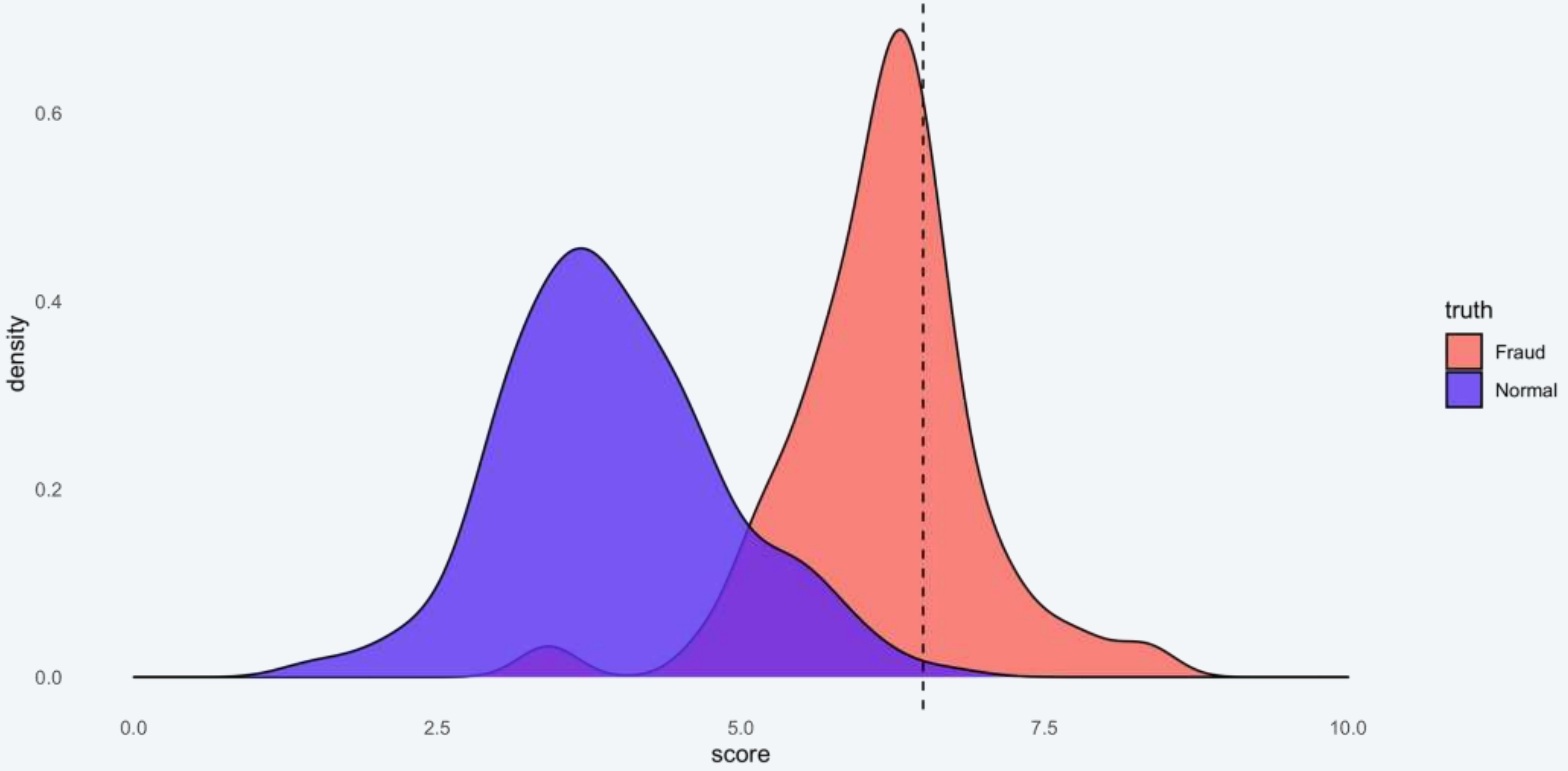
MODEL EVALUATION – WITH FEEDBACK



MODEL EVALUATION – UPDATE THRESHOLDS



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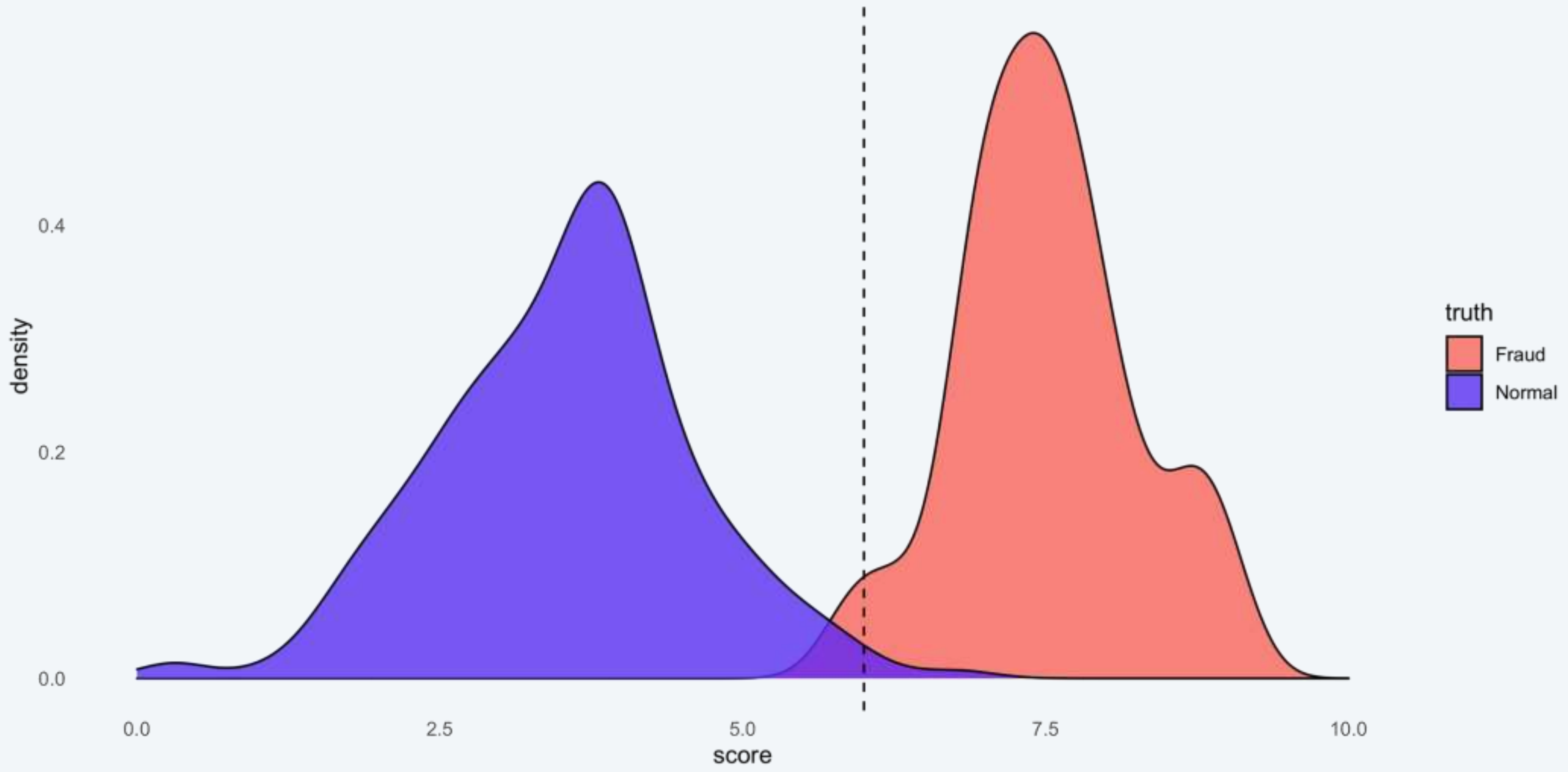
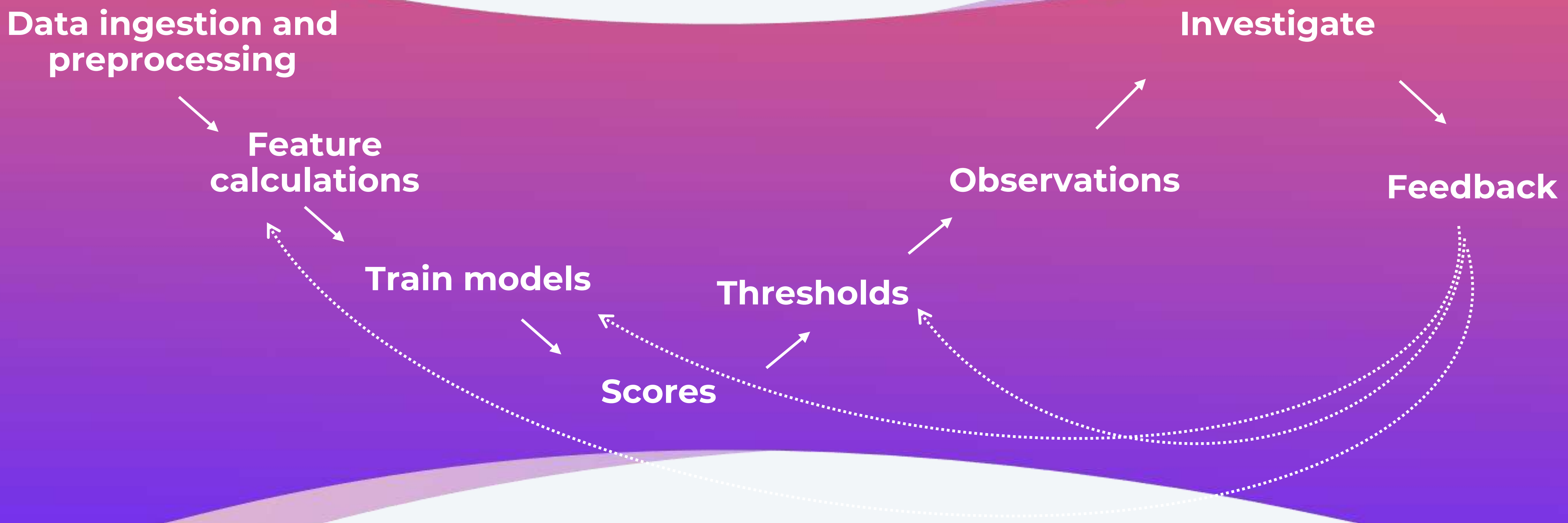
MODEL EVALUATION – UPDATE FEATURES & MODELS



DATA SCIENCE IN OPERATIONS CONTINUOUS IMPROVEMENT



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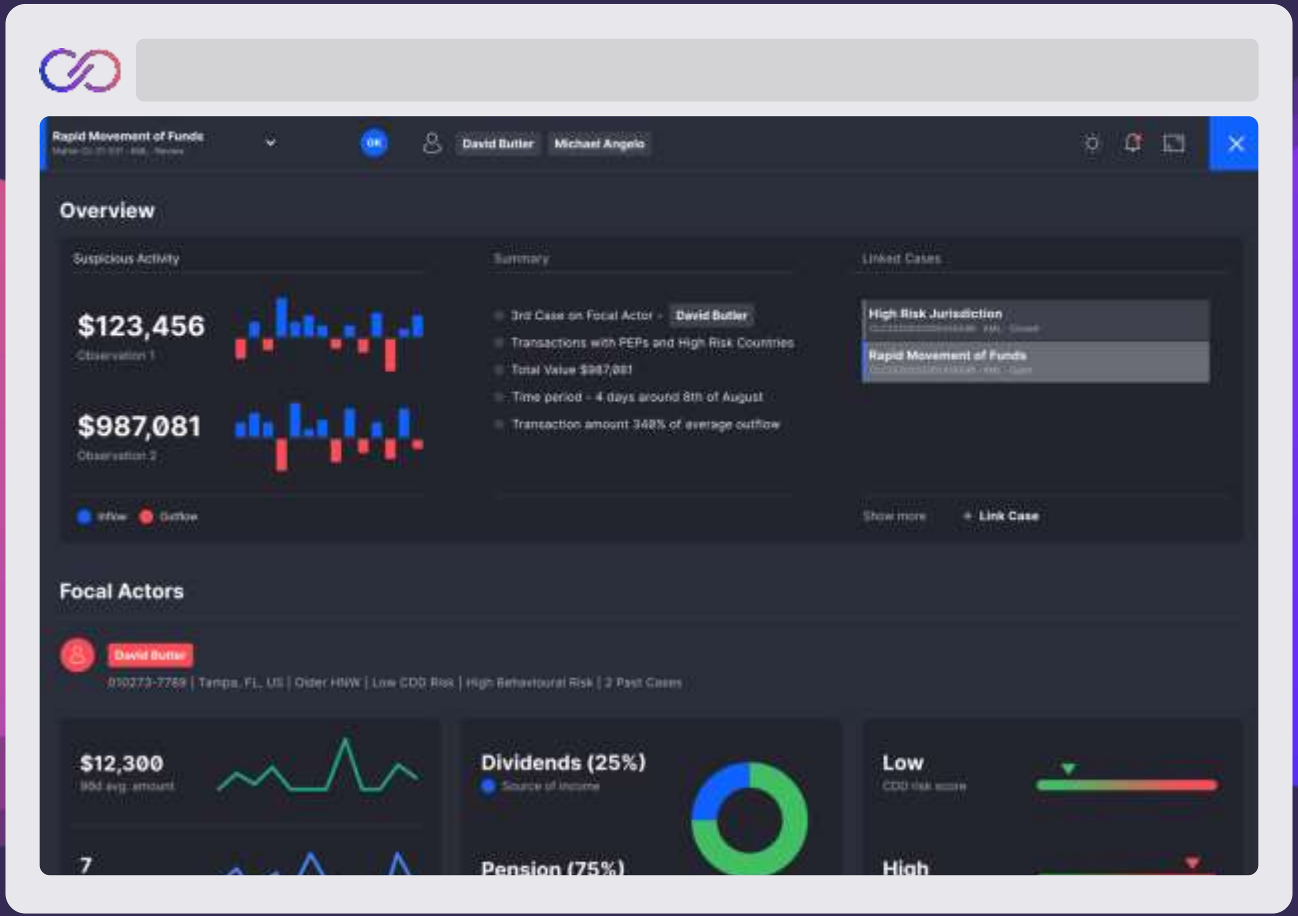
EXPLAINABLE MODELS



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EXPLAINABLE MODELS

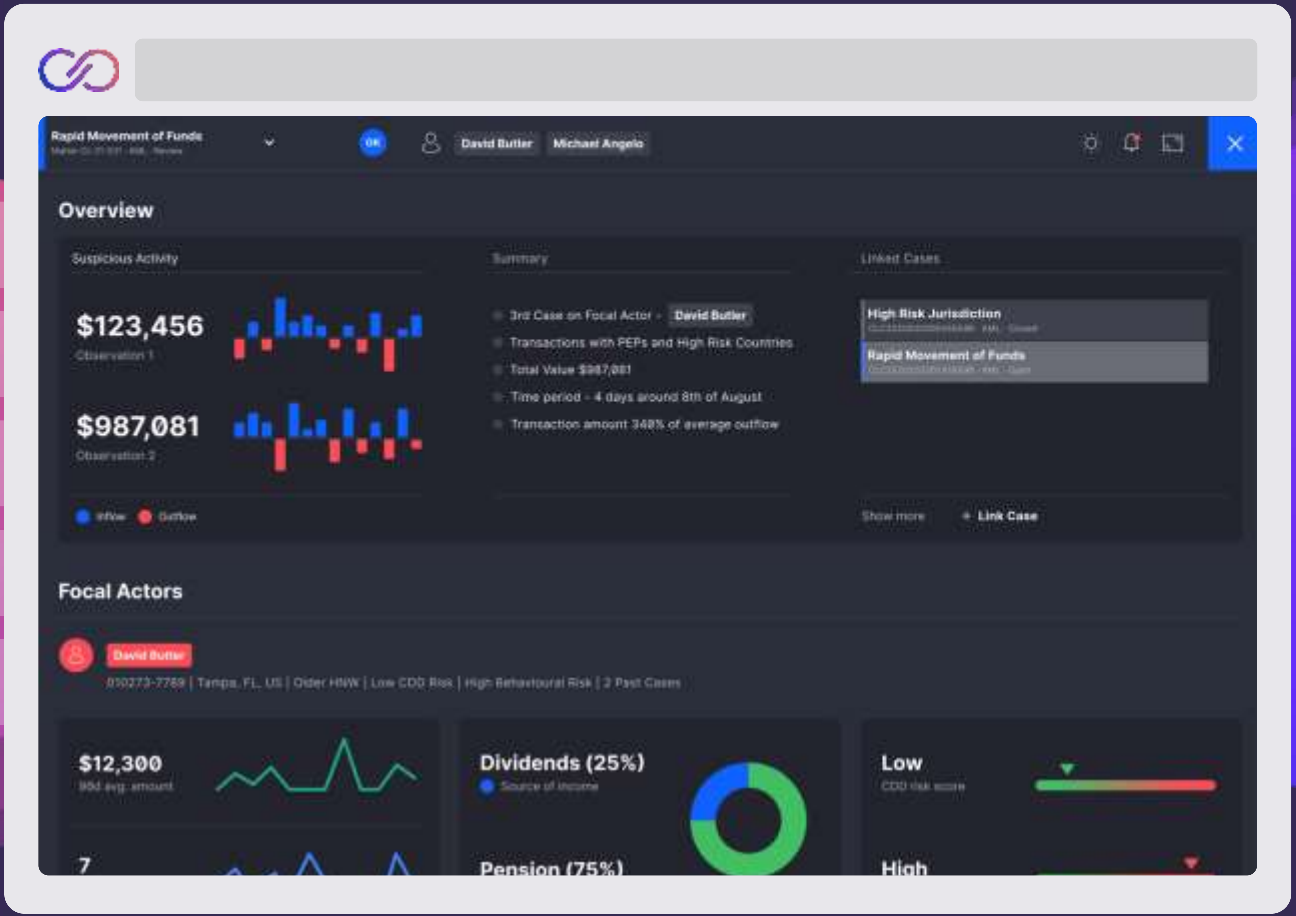
KYC Data

Risk and Credit Data

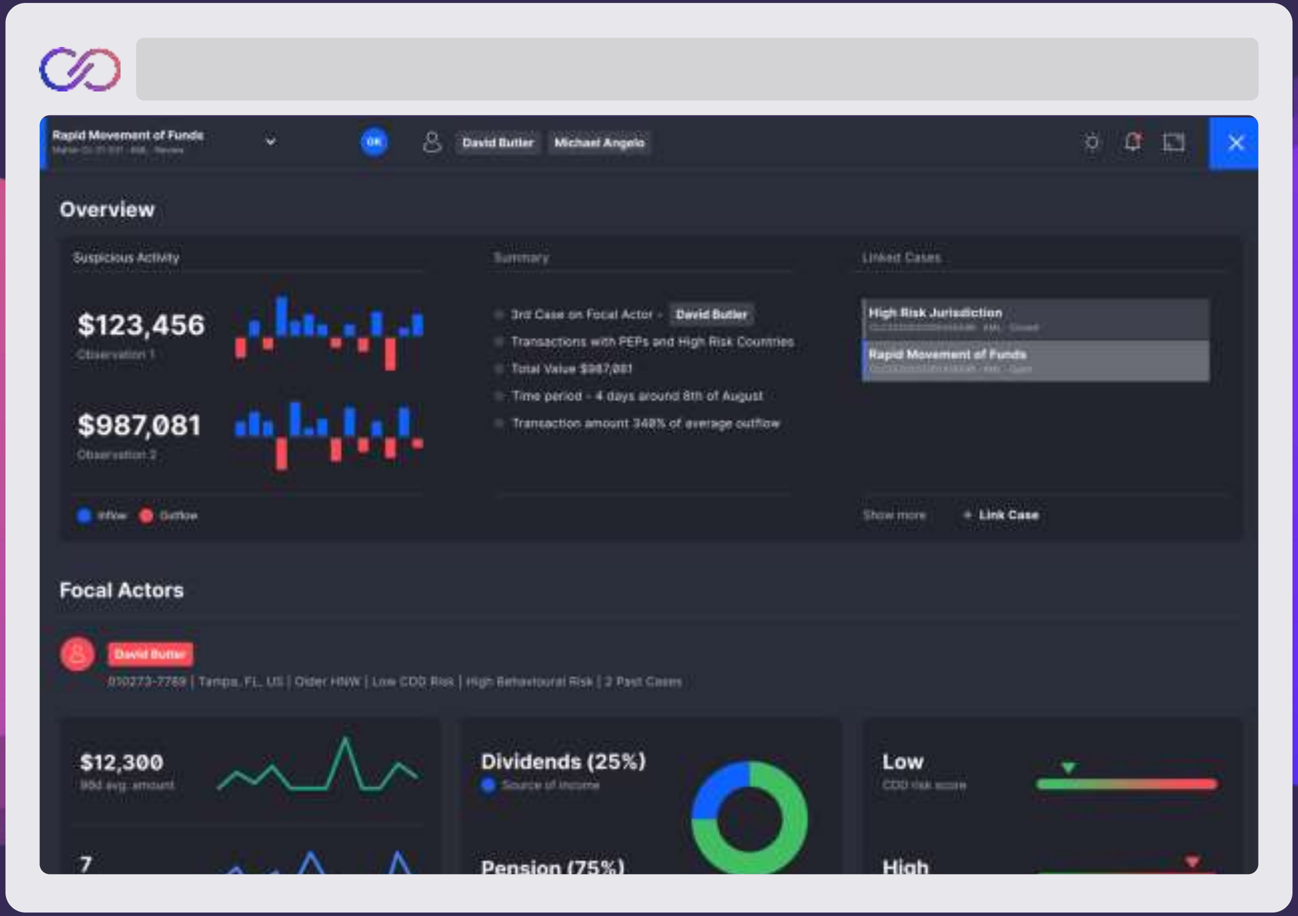
Fiat Transactions

On-chain Analytics

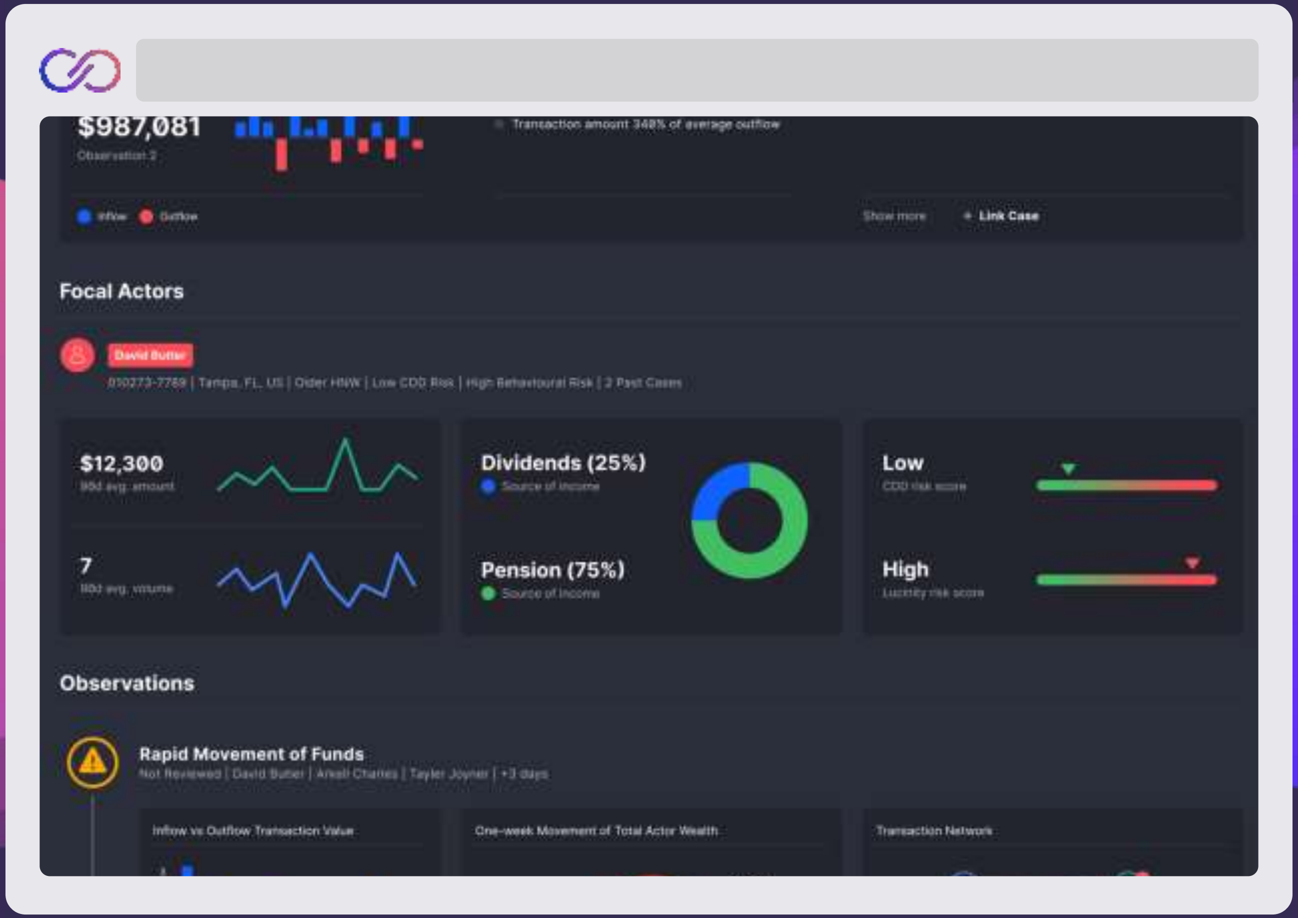
Open Banking Data



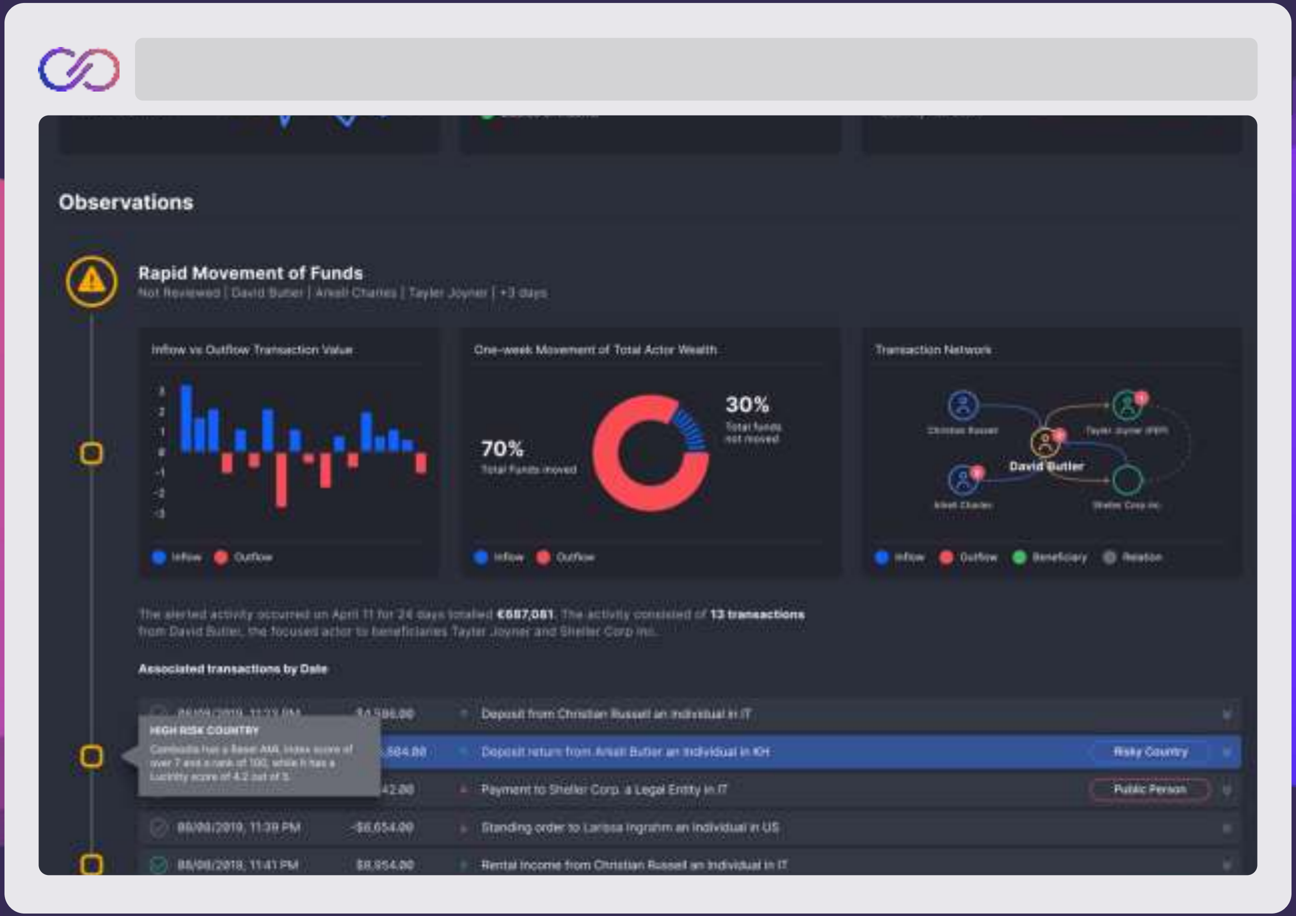
Stories



Rapid Movement of Funds
David Butler
Michael Angelo
Overview
Suspicious Activity
$123,456
Observation 1
$987,081
Observation 2
Inflow
Outflow
Summary
3rd Case on Focal Actor - David Butler
Transactions with PEPs and High Risk Countries
Total Value $987,081
Time period - 4 days around 8th of August
Transaction amount 348% of average outflow
Linked Cases
High Risk Jurisdiction
Rapid Movement of Funds
Show more
+ Link Case
Focal Actors
David Butler
010273-7789 | Tampa, FL, US | Older HNW | Low CDD Risk | High Behavioural Risk | 2 Past Cases
$12,300
90d avg. amount
Dividends (25%)
Source of income
Pension (75%)
Low
CDD risk score
High


$987,081
Link Case
Focal Actors
$12,300
Dividends (25%)
Low
7
Pension (75%)
High
Observations
Rapid Movement of Funds

Actors



Behavioral insights

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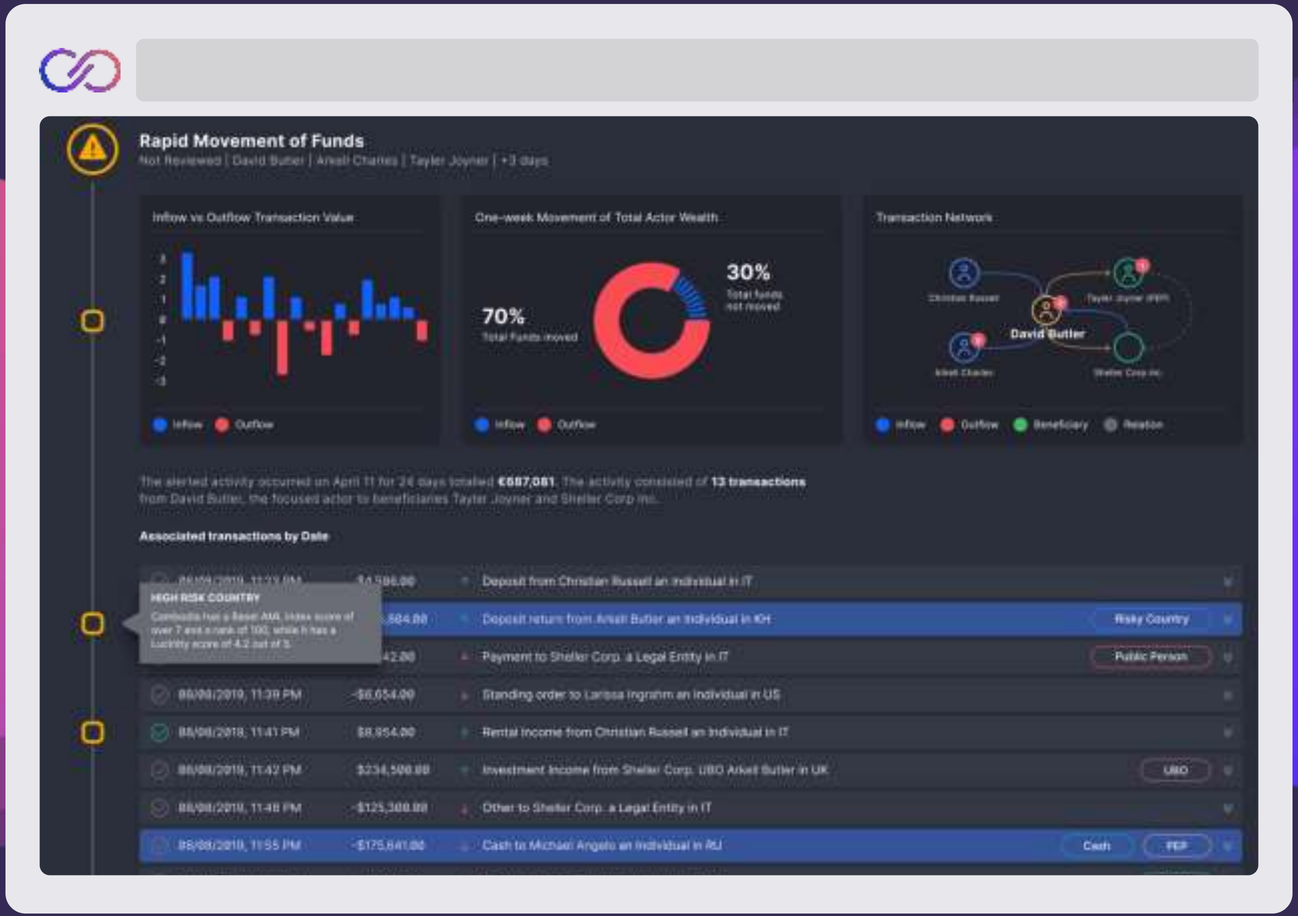
Rapid Movement of Funds
Inflow vs Outflow Transaction Value
One-week Movement of Total Actor Wealth
Transaction Network
30%
70%
David Butler
Associated transactions by Date
HIGH RISK COUNTRY
Risky Country
Public Person
UBO
Cash
PEP

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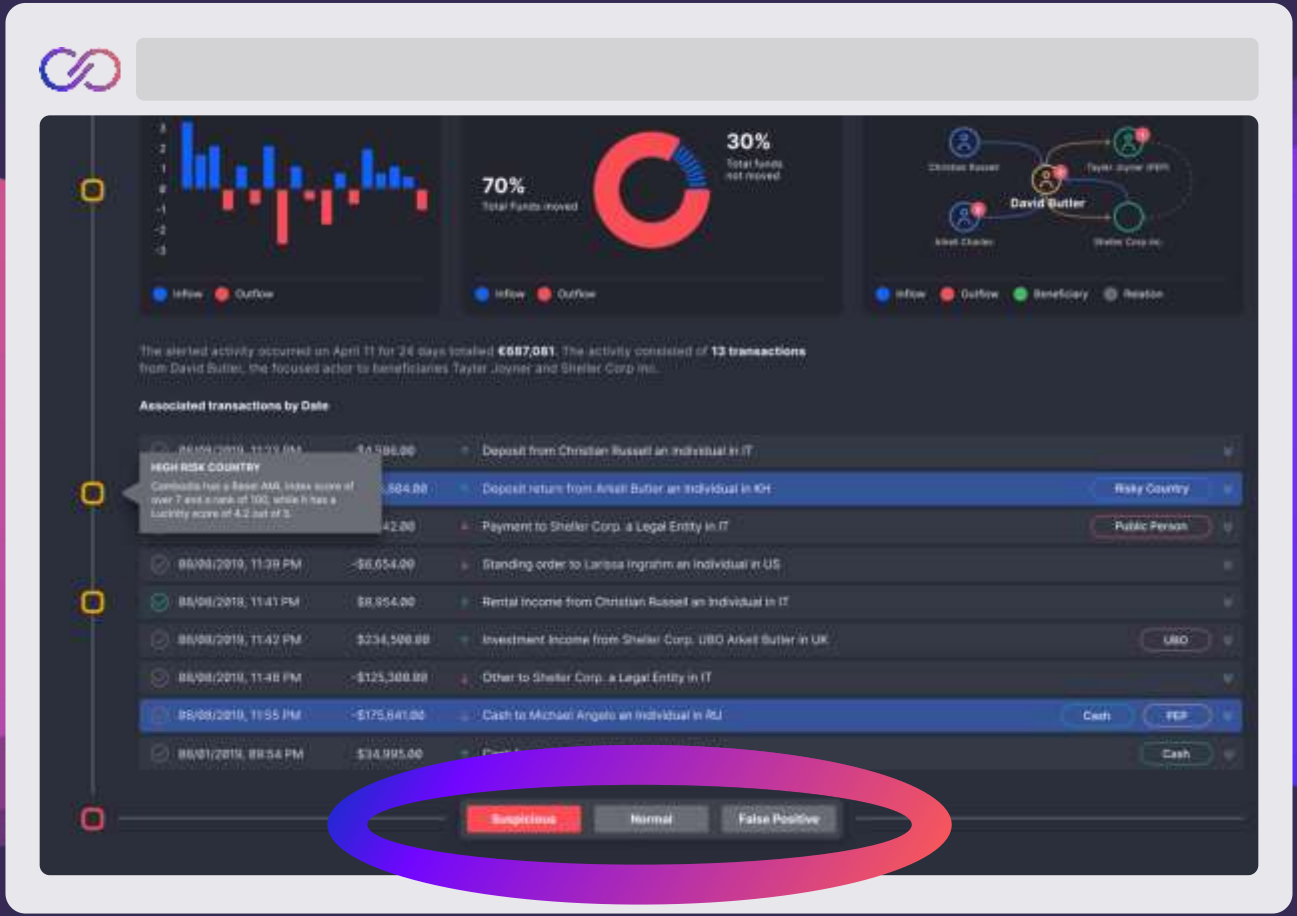

Continuous improvement
through
user feedback

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That’s how we **operationalize data science**

in t he fight against money laundering

to create a better economy

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THANK YOU

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