



National Tax and  
Customs Administration

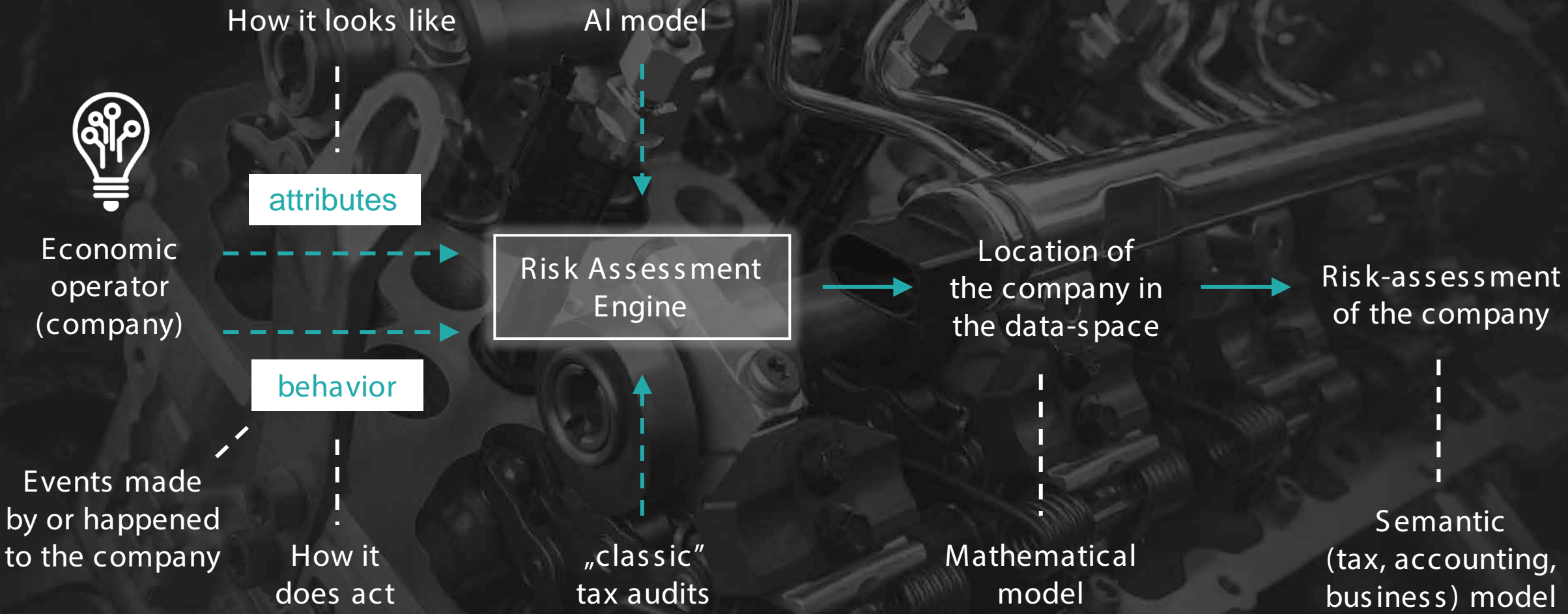


# TRANSACTION BASED TAX ADMINISTRATION

Mr. Ferenc VÁGUJHELYI

State Secretary,  
Commissioner for the NTCA  
Hungary

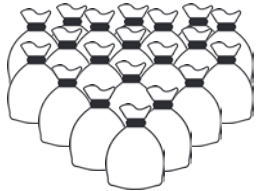
# THE ENGINE OF TAXATION IS RISK ASSESSMENT AND THE FUEL IS DATA



# TAX DATA THROUGH THE AGES

Development of information technology

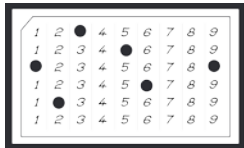
## TAXPAYER



GRAIN SACKS



„BOOKS“



TABULATING SYSTEMS



ACCOUNTING SYSTEMS



ERP CLOUD

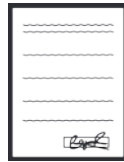


DIGITAL IDENTITY  
FINTECH CUSTOMER

## DATA SUPPLY



TITHE



„FREE FORMAT“  
TAX RETURNS



TOTALS REPORTED  
ON FORMS



E-FORMS



STILL: TOTALS  
ON E-FORMS

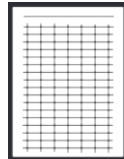


STILL: TOTALS  
ON E-FORMS

## TAX AUTHORITY



COUNTING



TOTALS REPORTED  
VS. PAYED



STORED IN  
ARCHIVES



DATABASES



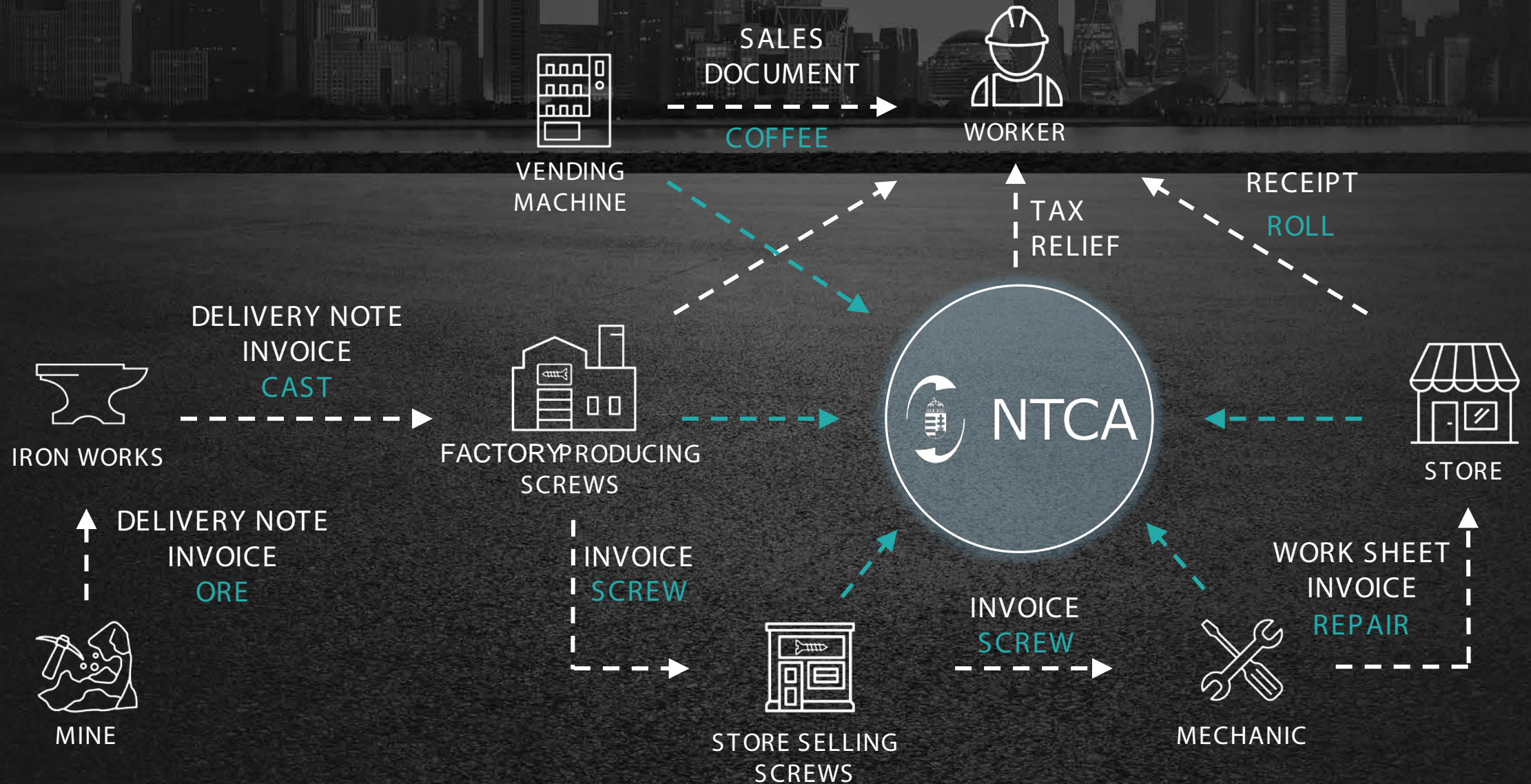
DATA  
WAREHOUSES



DATALAKE AND AI,  
RISK MODELS



# DATA FLOW OF AN OPERATING ECONOMY



FILING TAX RETURNS  
IN TRADITIONAL WAY

aggregates  
for declaration period

accounting entries

analytics

Invoices in accounting

Tax returns

accounting  
documents



Data warehouse

DATA DISCLOSURE  
IN THE 21<sup>st</sup> CENTURY

In real time  
By transactions

Online Invoice

online cash registers

eKÁER

VAT on imports

online vending machines





FILING TAX RETURNS  
IN TRADITIONAL WAY

aggregates  
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Data warehouse



ANALYSIS / AI

semantic data asset cadastre



deep learning models



morphological analysis of graphs  
classification  
clustering  
neural networks



potential contradictions



deviance indicators



logical contradictions  
super-optimum indicators  
classis risks



TAXPAYER

FINDING



tax audit

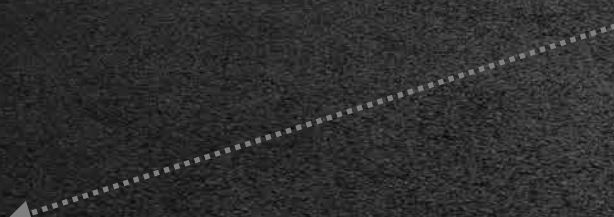


CRIMINAL PROCEDURE

supporting procedure



RESOLVED CONTRADICTIONS



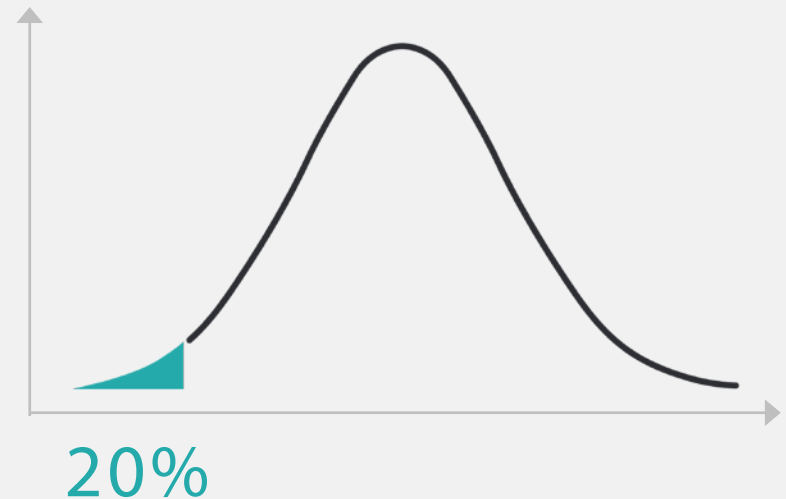
# UNCONTROLLED DEEP LEARNING

$$(1) \quad d_j(X_k, X_l) = \begin{cases} 0 & \text{if } X_k^j, X_l^j \text{ belong to the same class.} \\ 1 & \text{else} \end{cases}$$

$$(2) \quad d_j(X_k, X_l) = \frac{|X_k^j - X_l^j|^{w_j}}{r_j^{w_j}}$$

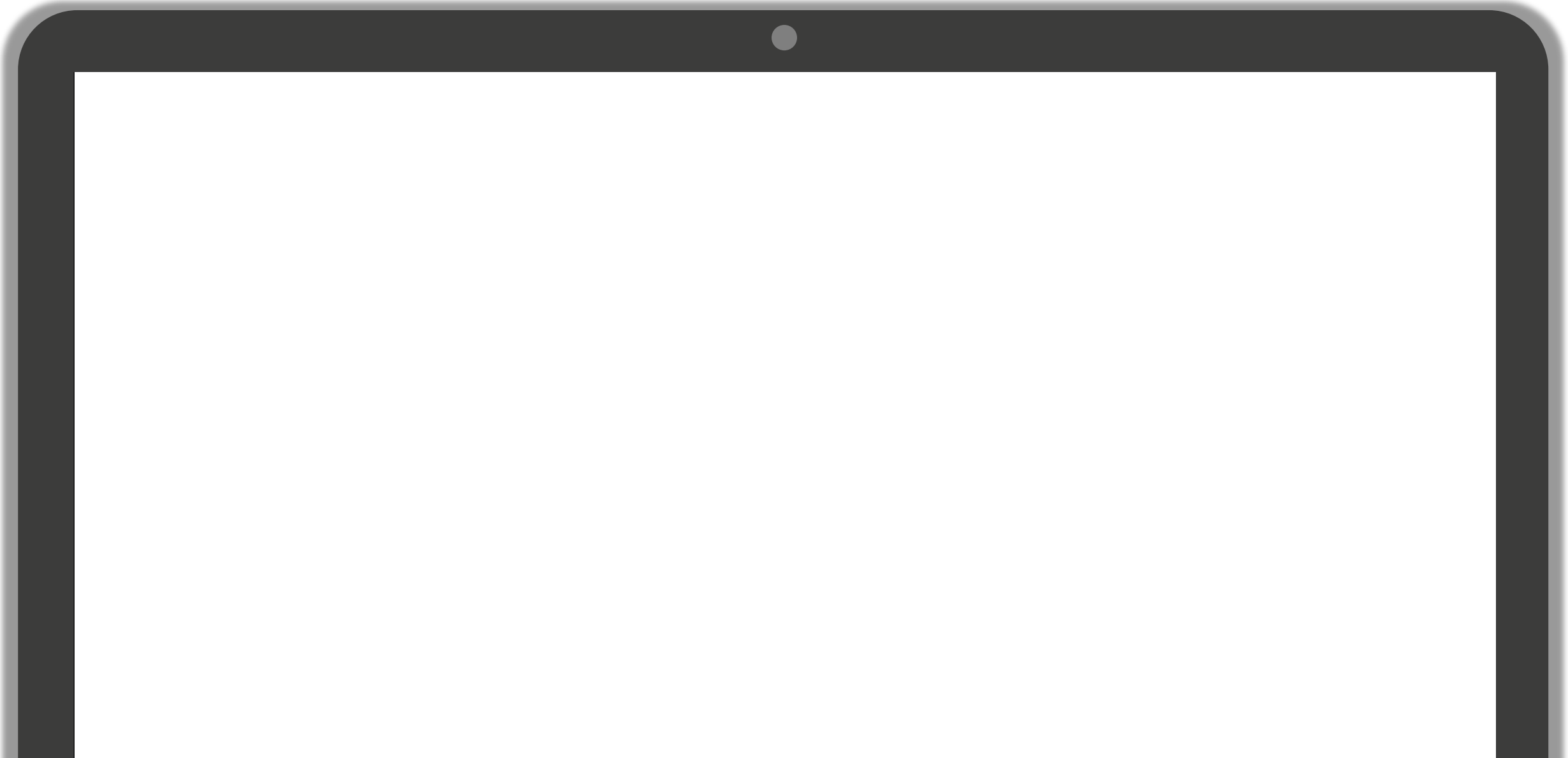
$$(3) \quad d(X_k, X_l) = \sum_j \alpha_j d_j(X_k, X_l)$$

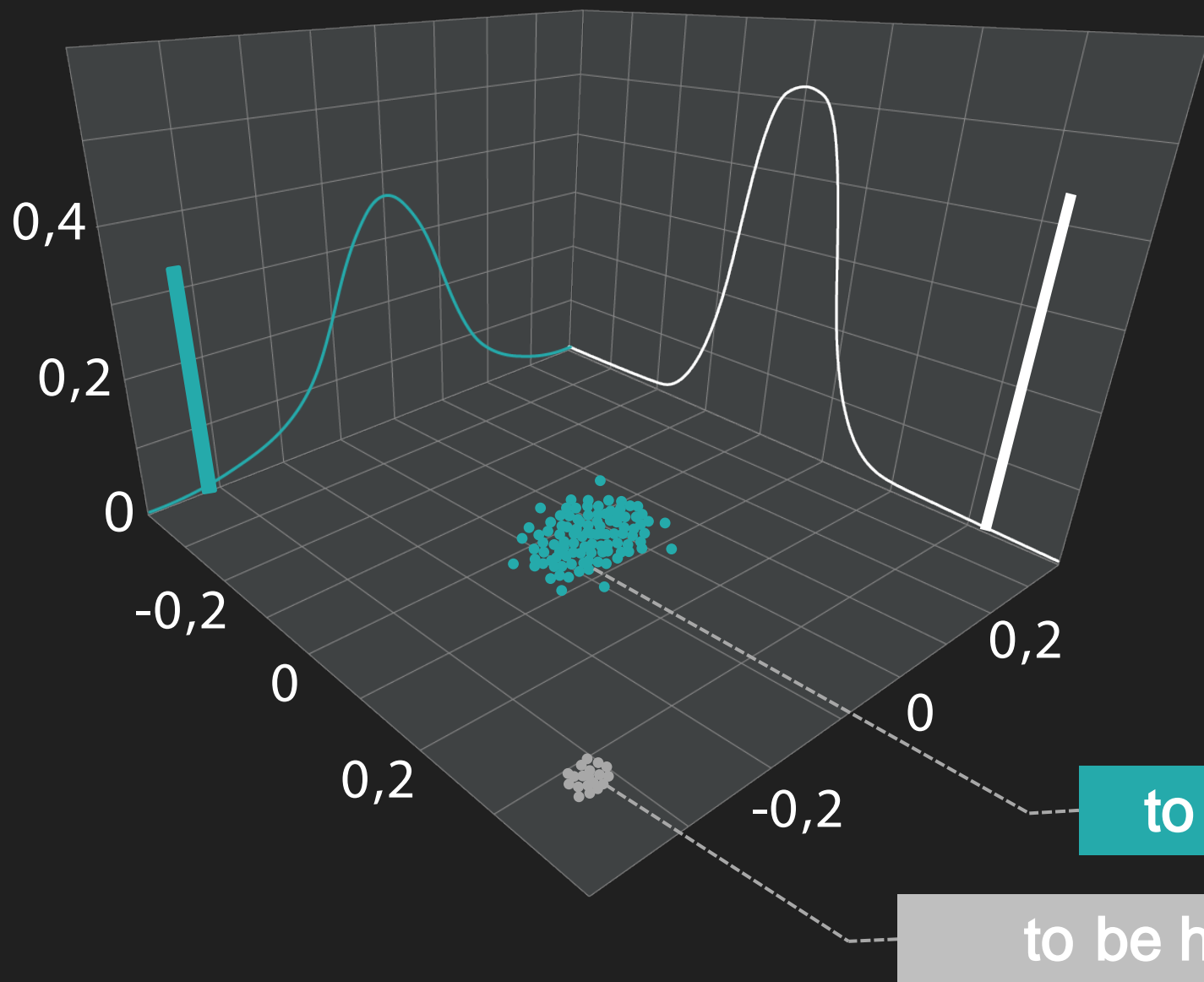
$$(4) \quad A_{kl} = d(X_k, X_l)$$





# UNCONTROLLED DEEP LEARNING





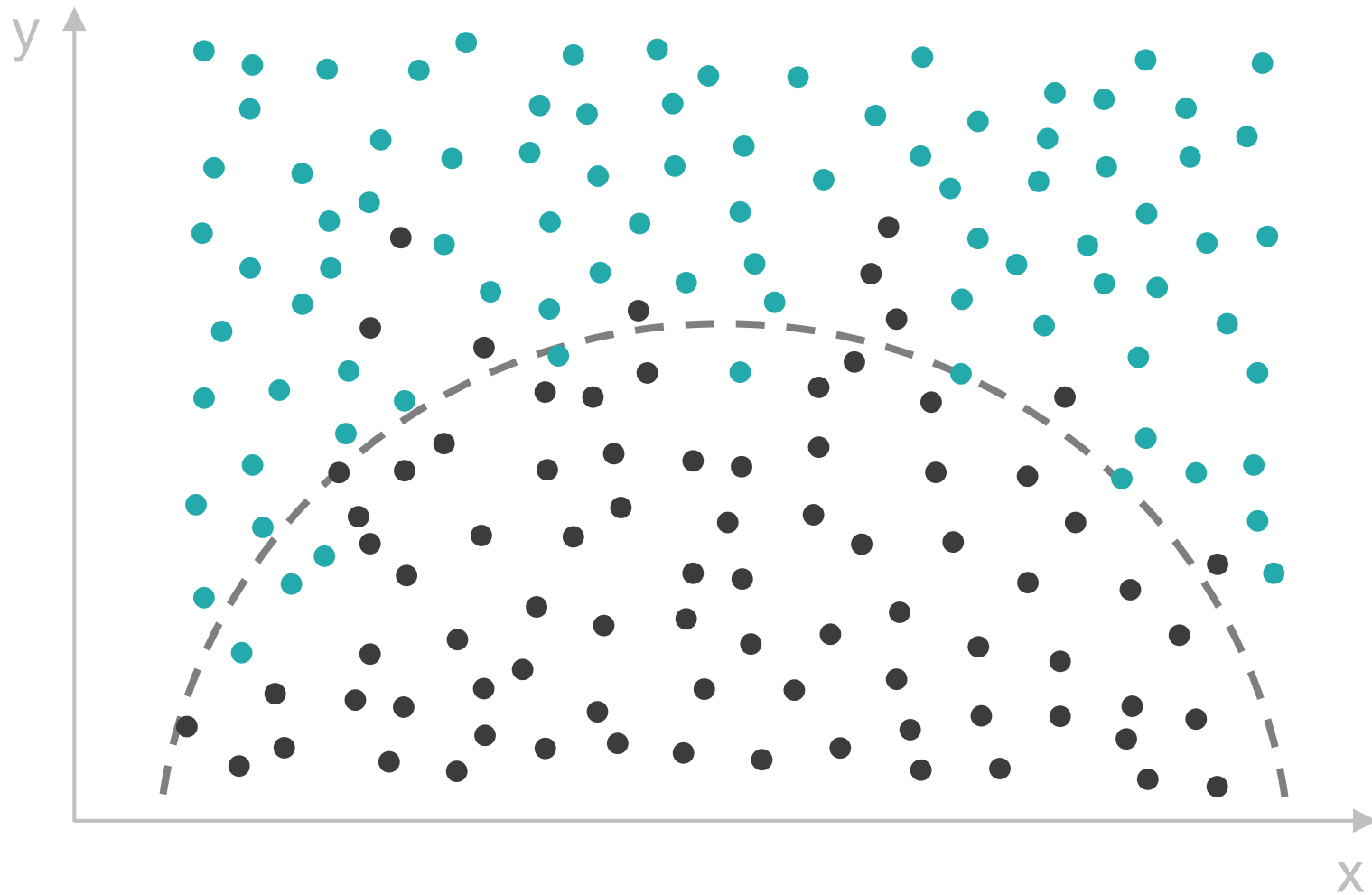
The task of  
a „cunning” fraudster

it is not enough  
to commit a fraud,  
one should look fair

to appear here

to be here

# CONTROLLED DEEP LEARNING

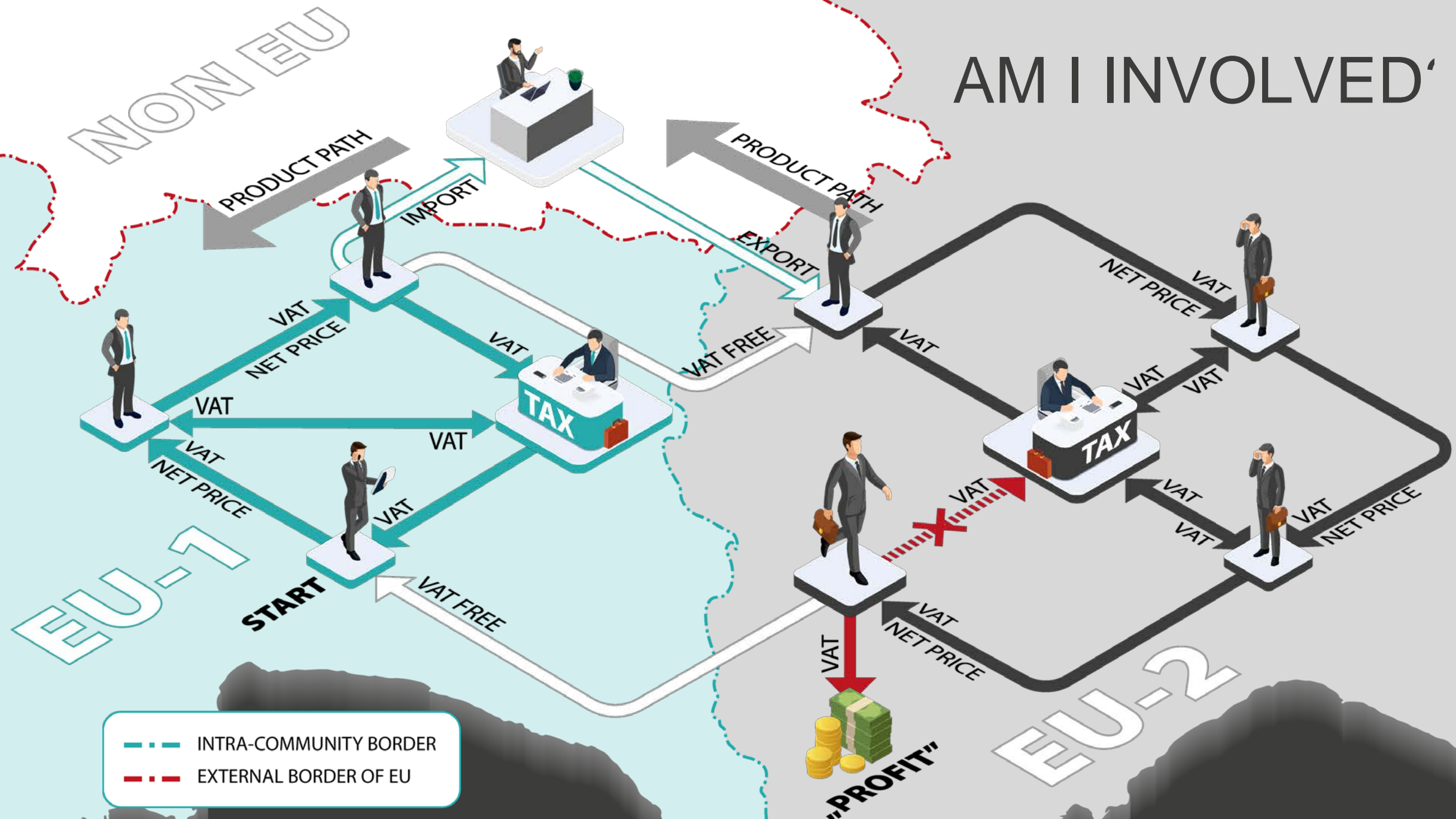


DEVELOPMENT  
OF DEEP  
LEARNING  
MODELS



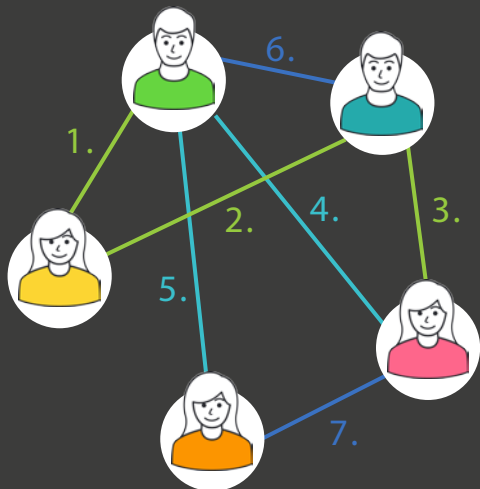
DEVELOPMENT  
OF DEEP  
LEARNING  
MODELS

# AM I INVOLVED?

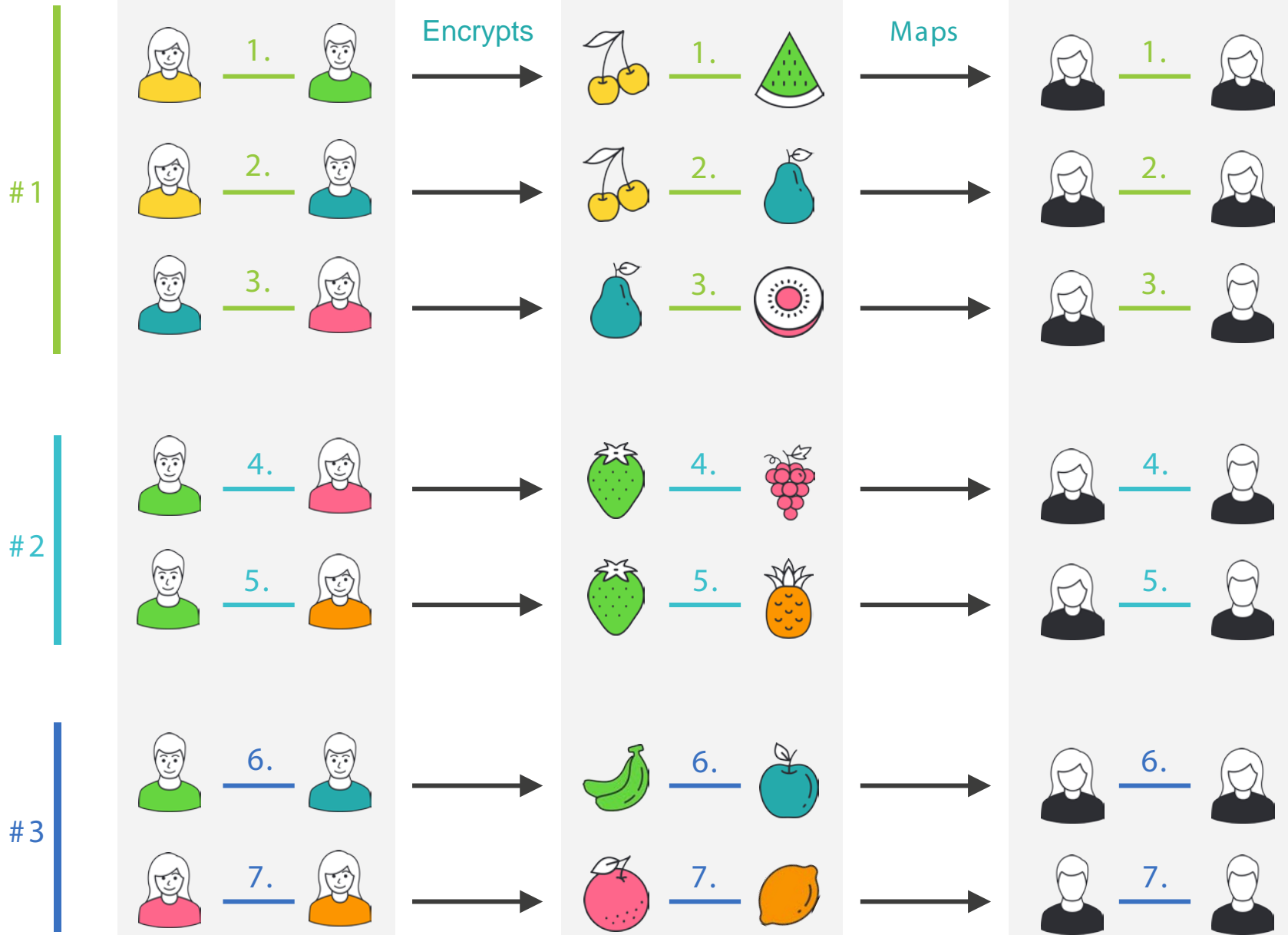
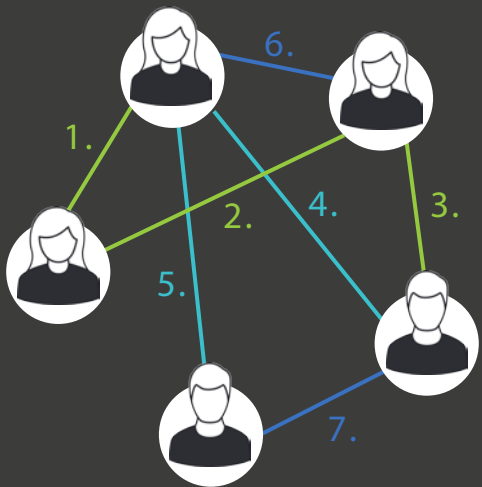


- INTRA-COMMUNITY BORDER
- EXTERNAL BORDER OF EU

## Connections in Database of User #1, #2 and #3

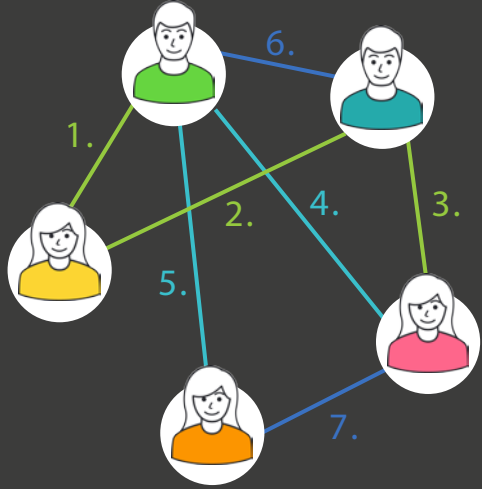


## Anonymous Connections Mapped into the AI Engine

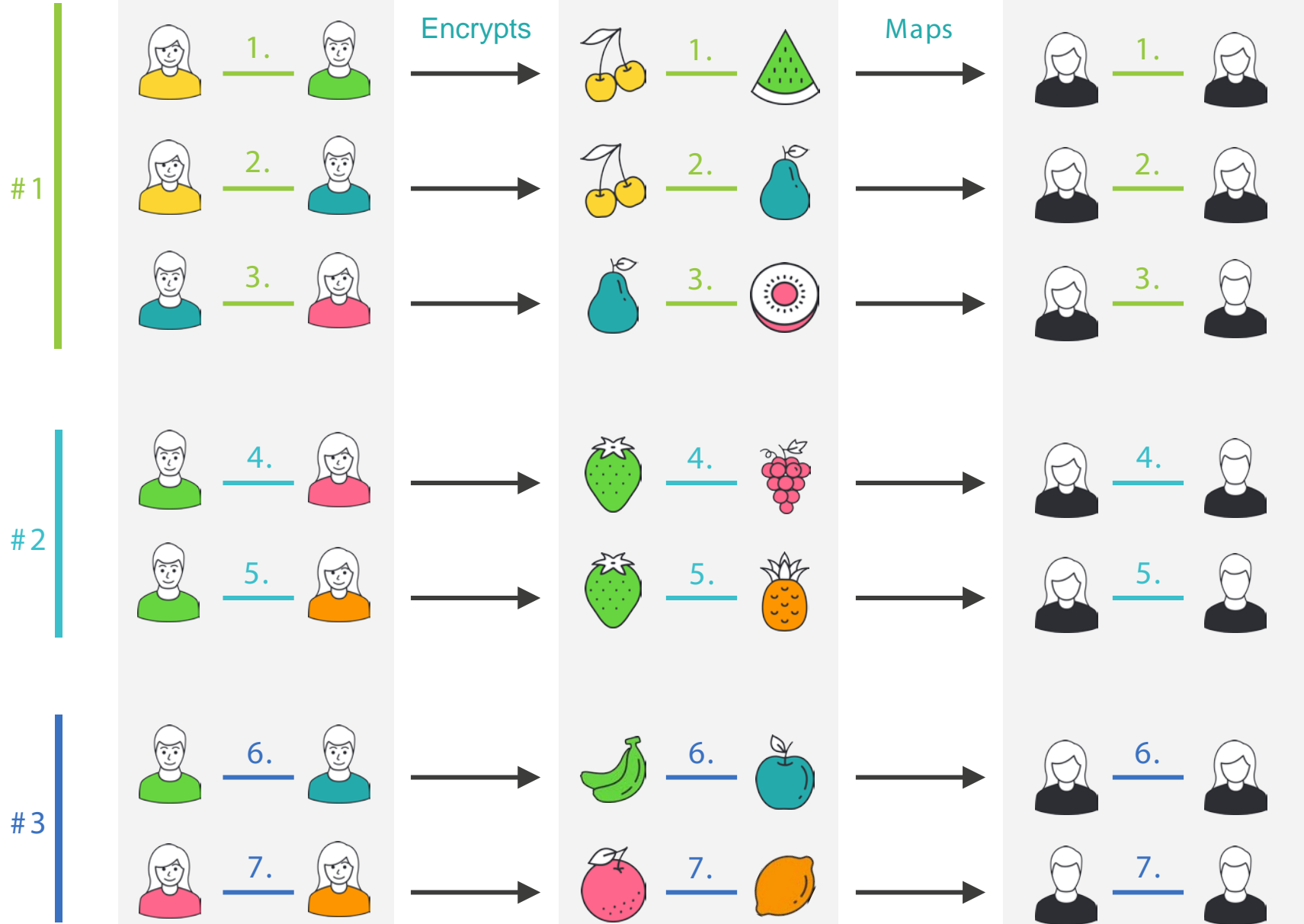
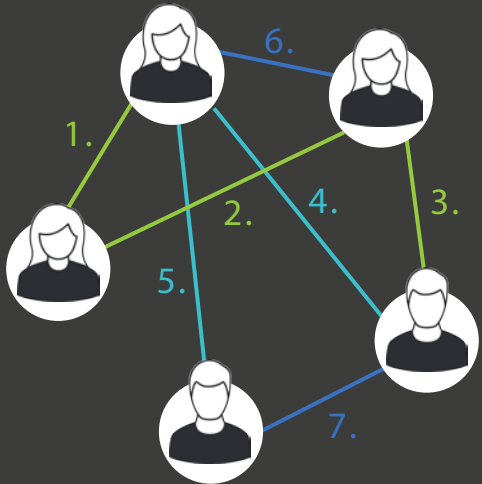




## Connections in Database of User #1, #2 and #3

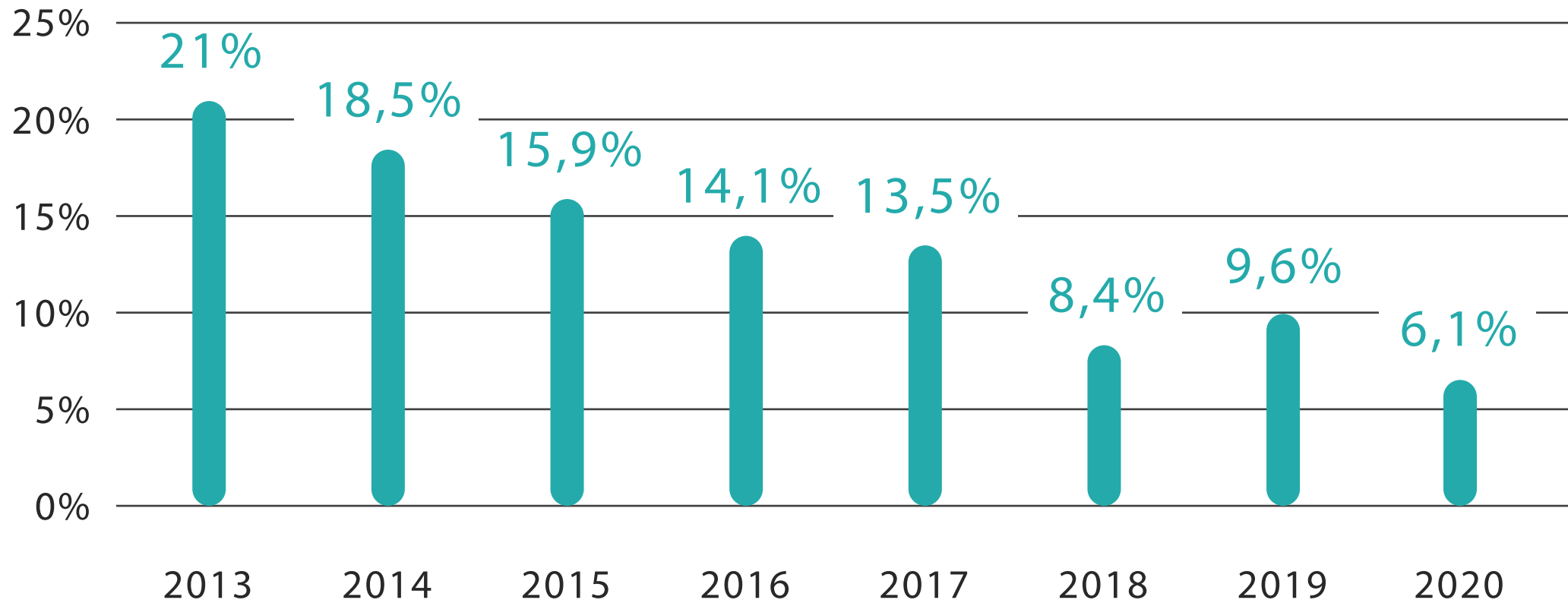


## Anonymous Connections Mapped into the AI Engine



# FALLING VAT GAP

## VAT GAP IN HUNGARY



According to the VAT gap report published by the European Commission



National Tax and  
Customs Administration

