

The challenges of card fraud prevention

...

Or, why **Machine Learning** is a pretty good answer to it

About me



Adriano Oliveira

Tech Lead @ Konduto
adrianor.2112@gmail.com



Work with fraud since 2014 ;
Help building the product since before it was online ;
Java + Python engineer ;
ML & Big Data engineer ;

Brazilian fraud prevention startup ;
Started on 2014 ;
First solution to bring Buying Behaviour
to Latin American market ;

Outline

- What is a card fraud?
- The fraud market
- How to identify (and prevent) fraud
- Enter machine learning
- Final remarks

What is a card fraud?

Does a fraudster look like this?



Not really ...

A card fraud is **simply**
when someone makes a purchase
using someone's else card
without their consent.

Acquiring credit card numbers

Facebook search results for "venda cc".

Filter results

POSTS FROM

- ☒ Anyone
- ☐ You
- ☐ Your friends and groups
- ☐ Choose a source...

POSTED IN GROUP

- ☒ Any group
- ☐ Your groups
- ☐ Choose a group...

TAGGED LOCATION

- ☒ Anywhere
- ☐ São Paulo, Brazil
- ☐ Mairiporã
- ☐ Choose a location...

DATE POSTED

Post by Mikael DejaySp (Venda e trocas SP Zona Sul, Cidade Ademar e Região)

Yesterday at 02:53 · 🌐

VENDA DE CC PELA DEEP WEEB ! SIGILO ABSOLUTO

FREE

📍 Estação Sé

VENDA DE CC PELA DEEP WEEB ! SIGILO ABSOLUTO
LINK, E DUVIDAS CHAMA NO CHAT LINK #BRASILEIRO



Testador de Info CC | by: Jhon Vitto

Adriano

Home

Testador de Info CC
| by: Jhon Vitto

Public group

AboutDiscussionMembersEventsPhotos

Search this group

Shortcuts

Prezent dla Magdalena ...

Ex-Alunos POLI-USP [20+]

Grupa srebrna - Teach ...

+ Join group

... More

Join this group to post and comment.

About this group

Description

Testador de InfoCC | by: Jhon Vitto

* Testa InfoCC FULL & Geradas

* Com 3 servidores diferentes para testar

* Valores: R\$0,01 - R\$10,00 - R\$50,00

* CVV Personalizavel conforme você desejar

* Cadastro único de clientes

* ... See more

Group Type

Close friends

Members · 507

CREATE NEW GROUPS

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Acquiring identities

COMPUTERWORLD
FROM IDG

Home > Security

NEWS

Yahoo data breach affects at least half a billion users

Yahoo blames the breach on 'state-sponsored'



By
U.S.



tech

BUSINESS

CULTURE

Cyber-Safe

'Sony-pocalypse': Why the Sony hack is one of the worst hacks ever

by Jose Pagliery @Jose_Pagliery

🕒 December 29, 2014: 1:47 PM ET

ars TECHNICA

BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE

JUST THE FAX, MA'AM —

Equifax breach exposed millions of driver's licenses, phone numbers, emails

17.6 million driver's license numbers, thousands of ID images stolen in breach.

SEAN GALLAGHER - 5/8/2018, 5:13 PM



Recommend 1.9K



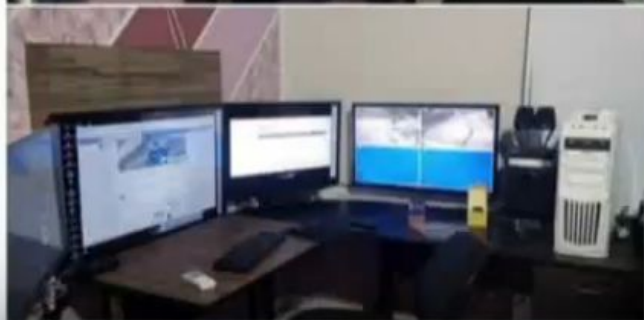
Having your setup running...



10 Feb · 🌐

Haha, só vagabundo, que amor que nada
Eu sou piloto
Aqui é [redacted]

[See Translation](#)



January 15 at 7:43pm

Of trampando "



[Like](#) · [Comment](#)

👍 11 people like this.

✓ Seen by 87

Who actually loses if a fraud attempt is successful?

- Mostly the seller bears the **financial loss**
- In most cases the cardholder will have the **money back**
- Shops and payment systems are required by card brands (MasterCard, Visa, etc) to keep their **chargeback rate lower** than a certain amount (between 1% to 3%), on risk of having their affiliation canceled

Card fraud is a relatively low risk *business*

- There are little incentives for authorities to go after individual fraudsters
- You essentially don't need to be a *hacker*
- Tools for making fraud get better and easier to use
- Enormous gains
- Online shopping is continuously growing

The fraud market

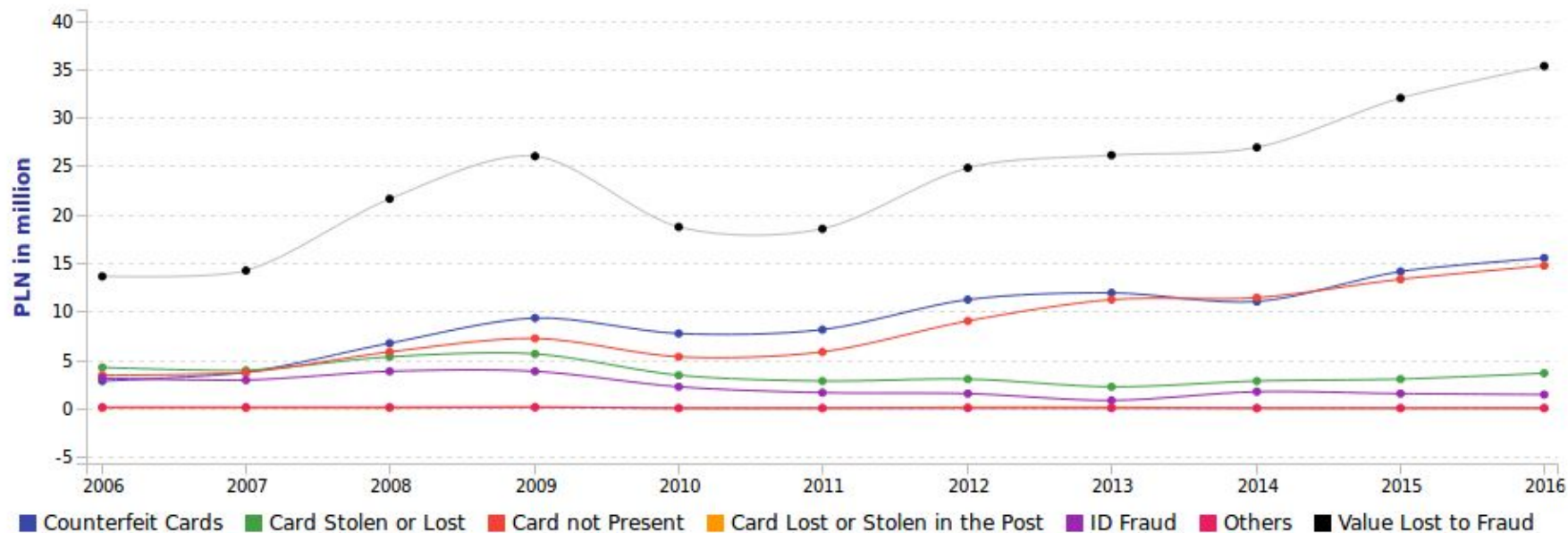
Card-Not-Present Fraud Losses to Exceed \$7 Billion by 2020

innovation and Aite Group reports EMV switchover will lead to doubling of CNP fraud losses; sees big spike in recent counterfeit fraud

May 6, 2016 / Portland, OR and Boston, MA

POLAND

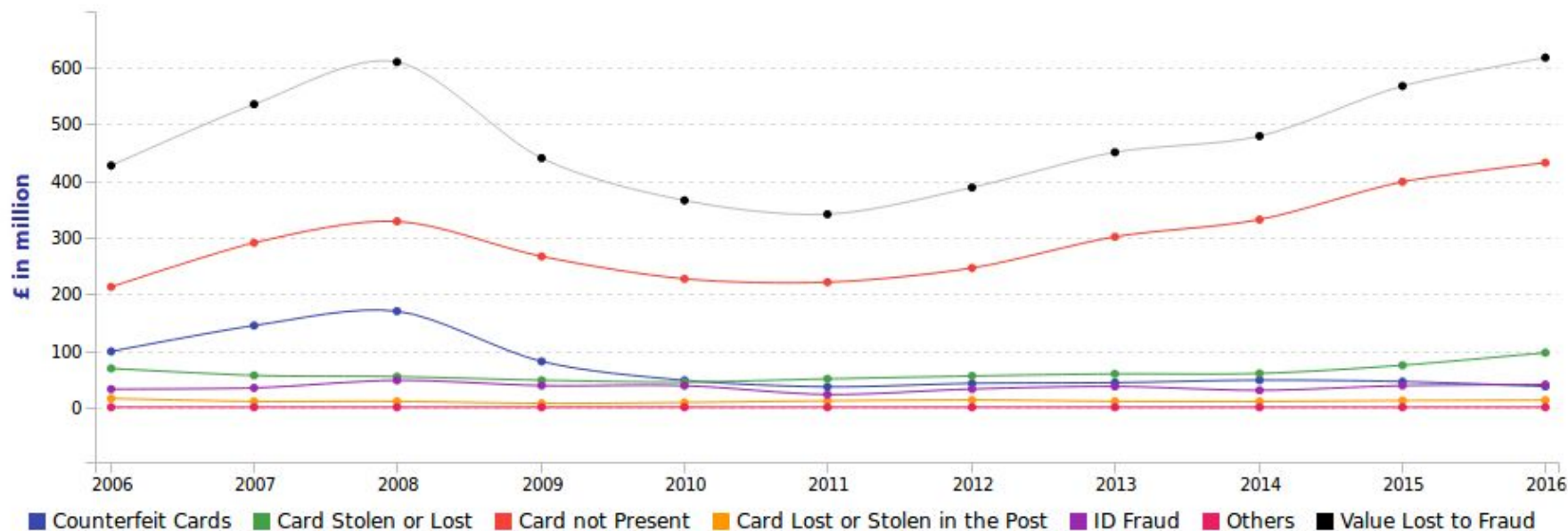
⬆ Increase in Fraud YoY



Data provided by [Euromonitor International](#)

UNITED KINGDOM

↗ Increase in Fraud YoY



Data provided by [Euromonitor International](#)

The top countries by chargeback rate

1. Brazil - 3.55%
2. Mexico - 2.82%
3. Russia - 0.82%
4. France - 0.65%
5. Germany - 0.54%

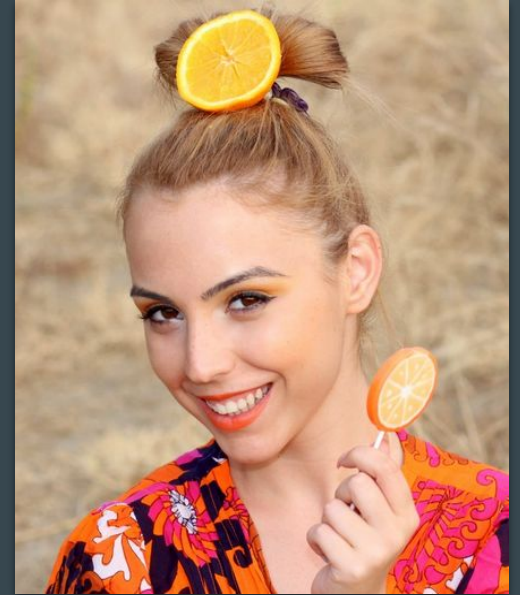
How to identify (and prevent) card fraud?

Every transaction tells a story...

- The goal of an anti-fraud process is to find **loopholes** in the story
- A customer is buying something for a reason
- Everyone follows a pattern

Let's play a game

Who's the fraudster? - They are all buying a new TV set costing 2500 zł



Let's play a game

Who's the fraudster?



Name

George Kishi

Age

62

Time on site

71 minutes

Last purchase

Never

Browser

Firefox

OS

Windows 10

ID status

Inexistent

Referral

facebook.com

Instalments

Lump sum

E-mail domain

hotmail.com

Page views

20

Shipping service

A cheap one

Let's play a game

Who's the fraudster?



Name

Marek Nowak

Age

35

Time on site

10 minutes

Last purchase

1 day ago

Browser

Opera

OS

Ubuntu

ID status

Ok

Referral

google.com

Instalments

Lump sum

E-mail domain

outlook.com

Page views

5

Shipping service

Most expensive

Let's play a game

Who's the fraudster?



Name

Mariana Urbe

Age

27

Time on site

23 minutes

Last purchase

7 days ago

Browser

Safari

OS

iOS

ID status

Ok

Referral

direct

Instalments

6 months

E-mail domain

yahoo.com

Page views

25

Shipping service

Cheapest

Place your bets!

Let's play a game

Who's the fraudster?



Name

Marek Nowak

Age

35

Time on site

10 minutes

Last purchase

1 day ago

Browser

Opera

OS

Ubuntu

ID status

Ok

Referral

google.com

Instalments

Lump sum

E-mail domain

outlook.com

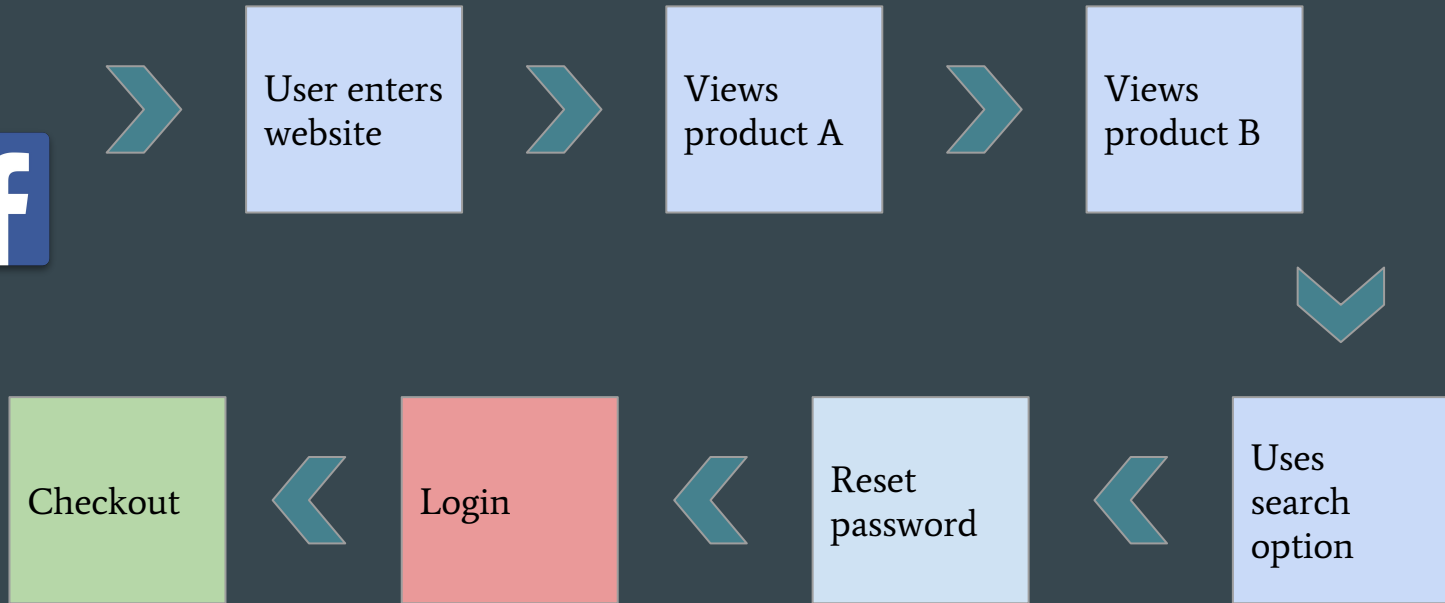
Page views

5

Shipping service

Most expensive

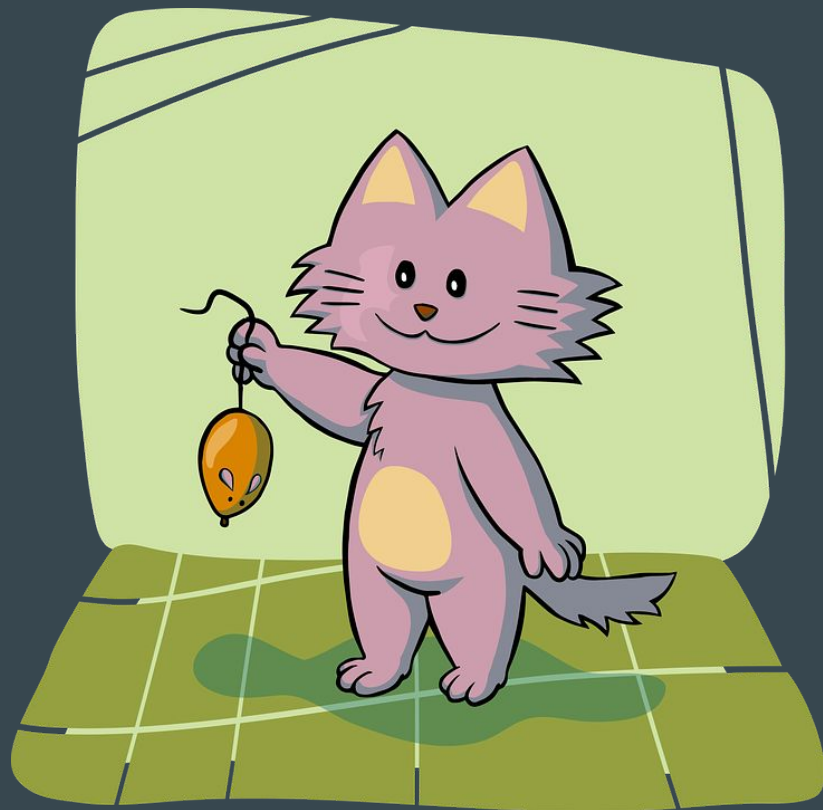
The flow of a purchase



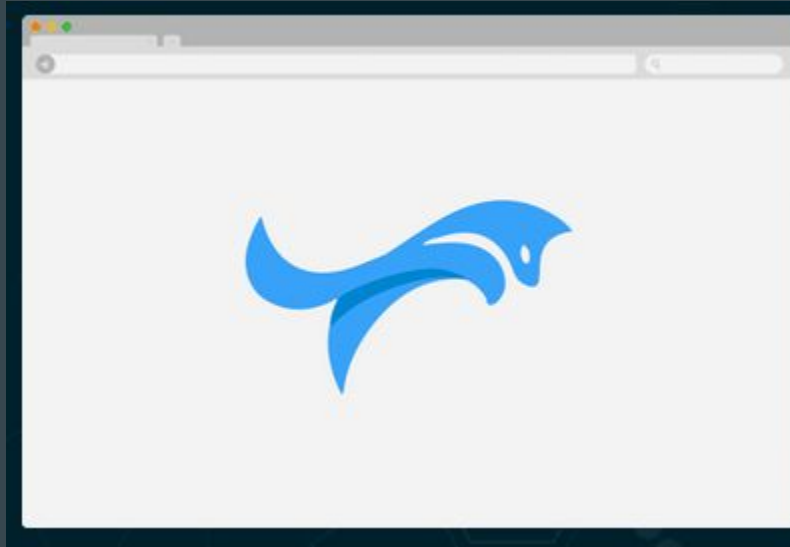
Things get more complicated

- Fraudster will try to disguise their identity
- Usage of multiple accounts
- Cookies and fingerprint
- When you simply make *rules* to detect fraud, fraudster can game them

Learn & Adapt



FraudFox

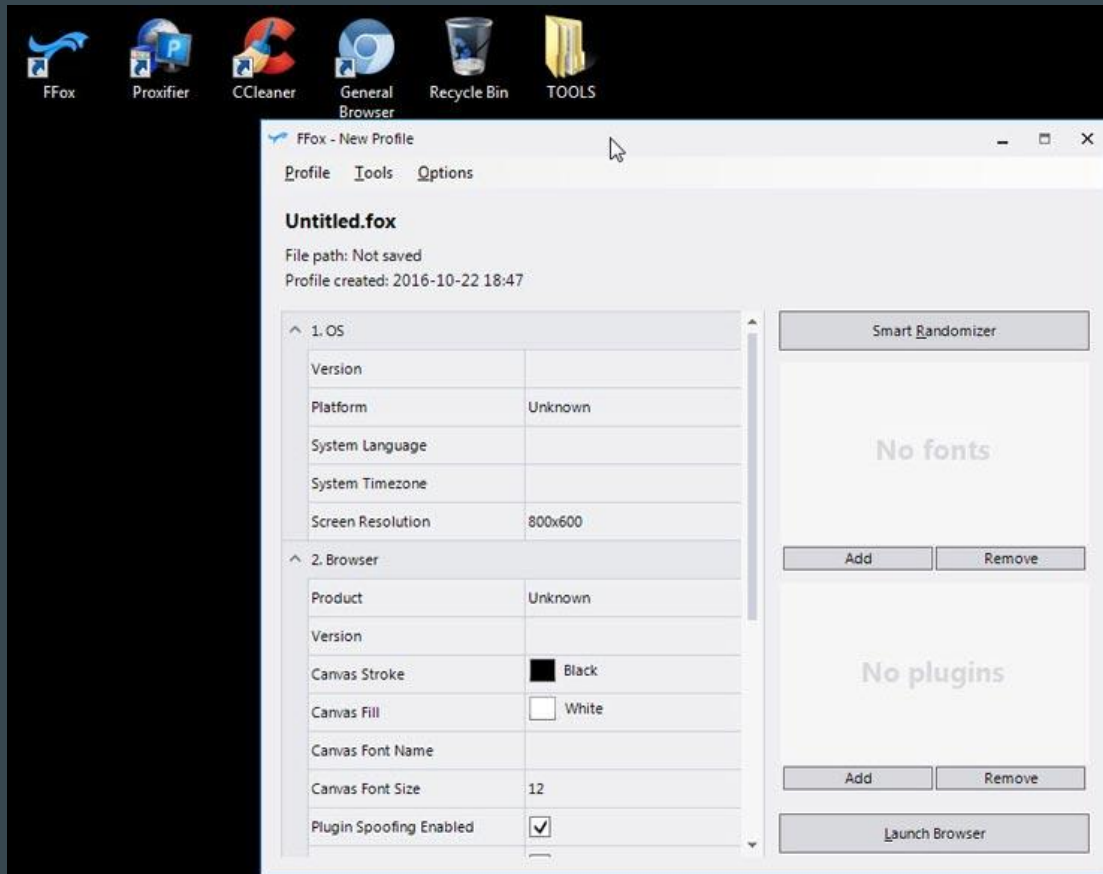


ULTIMATE INTERNET PRIVACY

VIRTUAL MACHINE BASED SOLUTION TO BEAT
BROWSER FINGERPRINTING



FraudFox



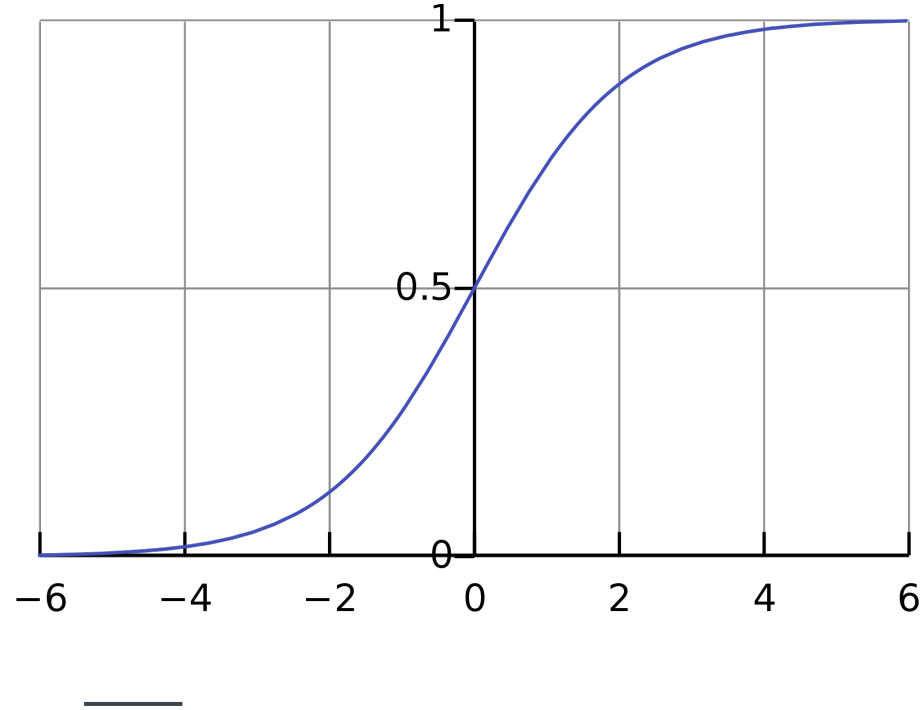
Characteristics of a good fraud prevention system

- Able to detect and use subtle characteristics in transactions
- Make decisions at scale!
- Avoid common biases
- Be adaptable, constantly evolve
- Take into account profitability, false positives
- Real-time?

Enter machine learning

Ham or spam - 0 or 1?

- It's mostly a supervised learning problem
- Label the data accordingly
- The prediction is a risk level (score) between 0 and 1



Choose your features, build your dataset

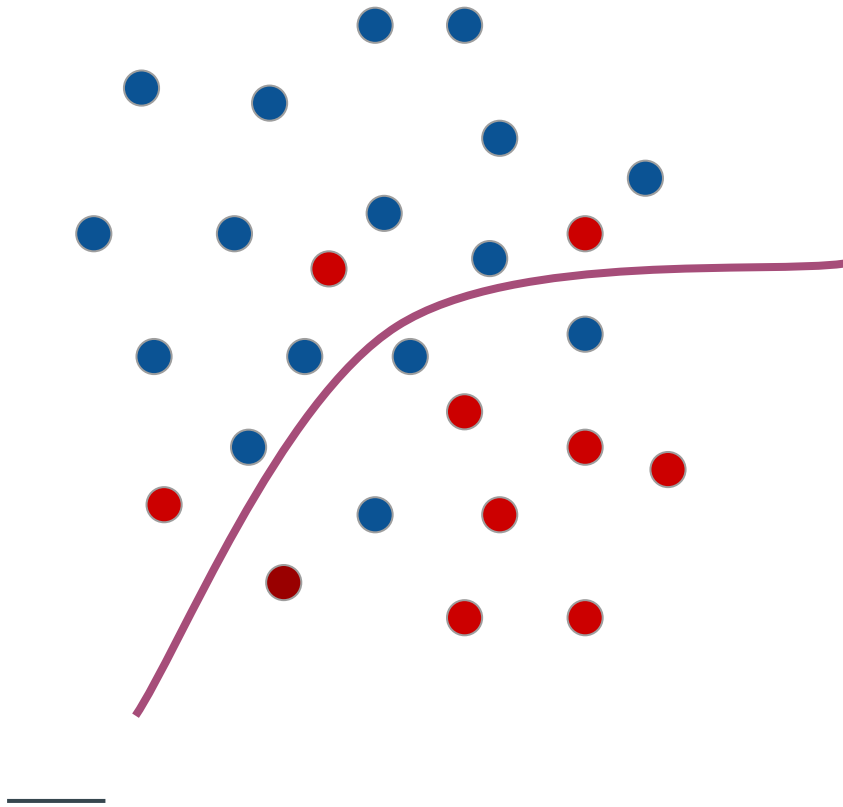
- All characteristics possible must be accounted for analysis
- Transactional data (payment, customer, products data...)
- Browsing data (analytics)
- Buying behaviour (history of customer, device)
- Identification and fingerprint
- External sources of information (social media, government data, credit bureaus, ...)
- Relationship between sales (velocity counters, trust measurements)

Define the urgency and priorities

- Does it need to be real time? (e.g. food delivery, transportation tickets)
- VIP customers
- Gather more data when required
 - Query an external system
 - Contact the customer (e.g. is it worth a call to the customer?)

Chargeback rate is the key measurement

- There's no thing as fraud *zero*
- If your fraud is zero, you're most likely missing good deals
- Distinguish between types of chargeback
 - Friend or foe?



Model reevaluation

- Take care of your model, so it doesn't deteriorate over time
- Explore vs Exploit
- Human review of transactions is valuable and cannot be dismissed
- Mis-labeling data can be costly, but it is inevitable
- The manual review vs model health trade-off

Final remarks

Final remarks

- Fraud behaviour is always changing
- Creativity and domain knowledge is crucial
- Machine learning is for now the best answer to address it
- Human input for training the algorithm is indispensable
- Machine learning-only fraud prevention is not optimal

EOF.

Questions?