Counterfighting Counterfeit
Detecting and taking down fraudulent webshops at a ccTLD

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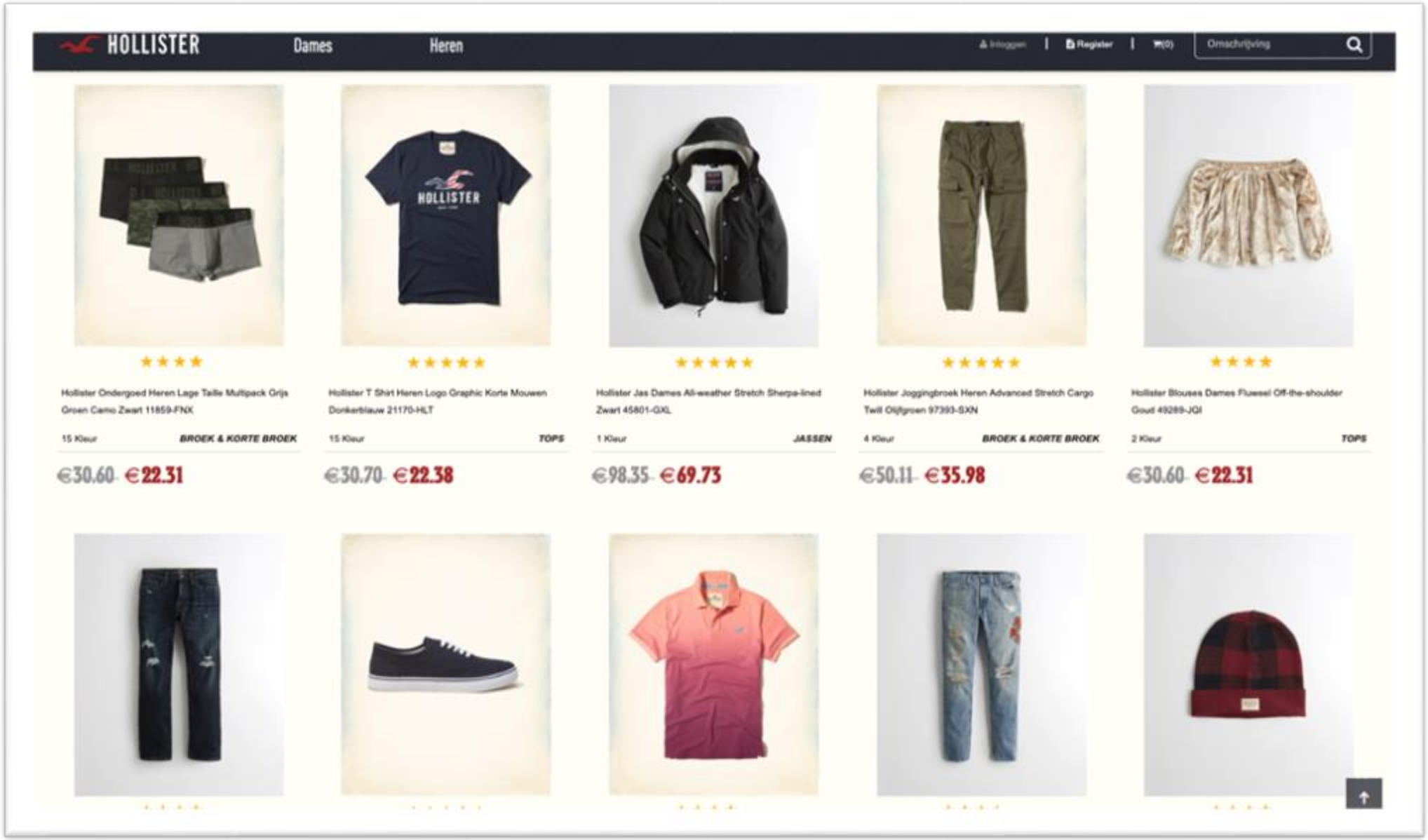
nederlandwebshop.nl



SIDN's interest

- Consumer losses [1-4]
- Trust in Internet may decrease

Perfect vantage point:

- List of *all* .nl-domains;
- Registration data and measurements.

Results so far

- Detected thousands since 2016
- Protected users form being scammed

- 2 detection systems, 2 case studies
  - BrandCounter (2018 Q1-2)
  - FaDe (2019 Q1)

Research questions of paper

Q1: How many counterfeit webshops?
Q2: How to take counterfeit shops offline?

Q3: How do counterfeiters operate?

BrandCounter

Observation:

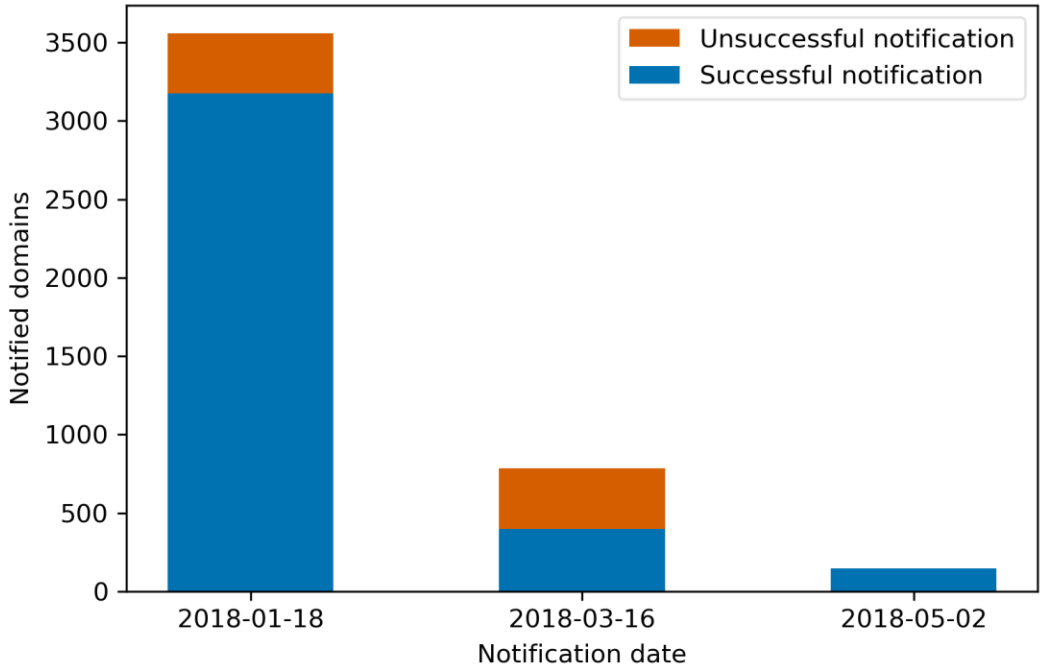
- Long html <title> tags listing brands (Nike, Reebok, Gucci, etc.)
- Helps rank high on search engines (SEO) [5]

Method:

- Create a list with 1100 brands and discount words
- Count suspicious words in the html <title> of .nl-websites
- >5 words (arbitrary), mark as suspicious

BrandCounter notification

- 18,952 suspicious domain names found by counting brands
  - 42.3% registered with *Registrar A*
- We (SIDN) have limited possibilities to take down domains directly
- Sent 4107 notifications to *Registrar A*
  - 3708 took down (90.31%)



Fake Detector (FaDe)

- Have counterfeiters given up?
- Learned to avoid BrandCounter?

Towards FaDe:

- Collaboration with ICS, a credit card issuer
- ICS provided 231 shops involved in scams
- Classification model based on supervised machine learning

Photo by Sigmund on Unsplash

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- Support Vector Machine
- Optimized using grid search

Dataset

- 231 counterfeit
- 229 legitimate

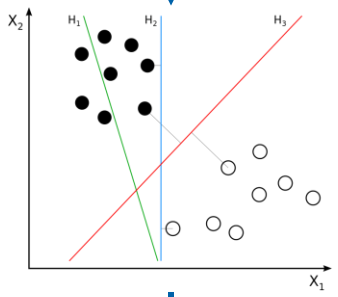
Features

- 6 registration
- 3 infrastructure

Training samples

Testing samples

Train model



Apply model

Samples	Precision	Recall
Train (cross-validation)	0.98	0.97
Test	1.0	1.0

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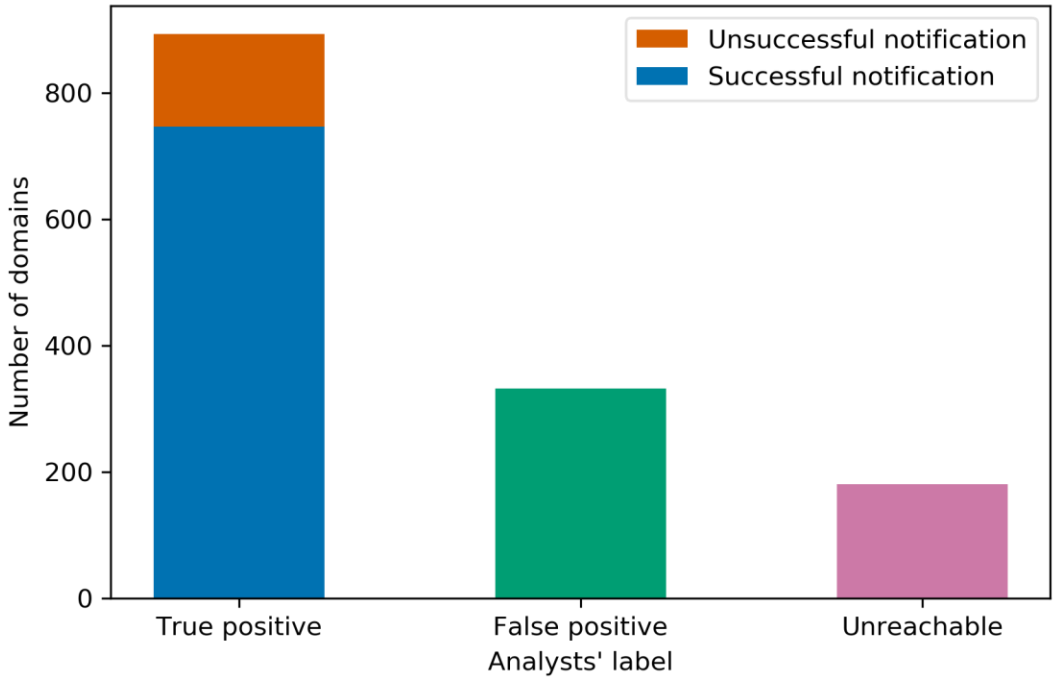
FaDe notification

- Applied model to 30k .nl-domains
  - 1407 classified as suspicous
  - 894 true positives (73%)

- Sent 894 notifications to registrars
  - 747 took down (84%)

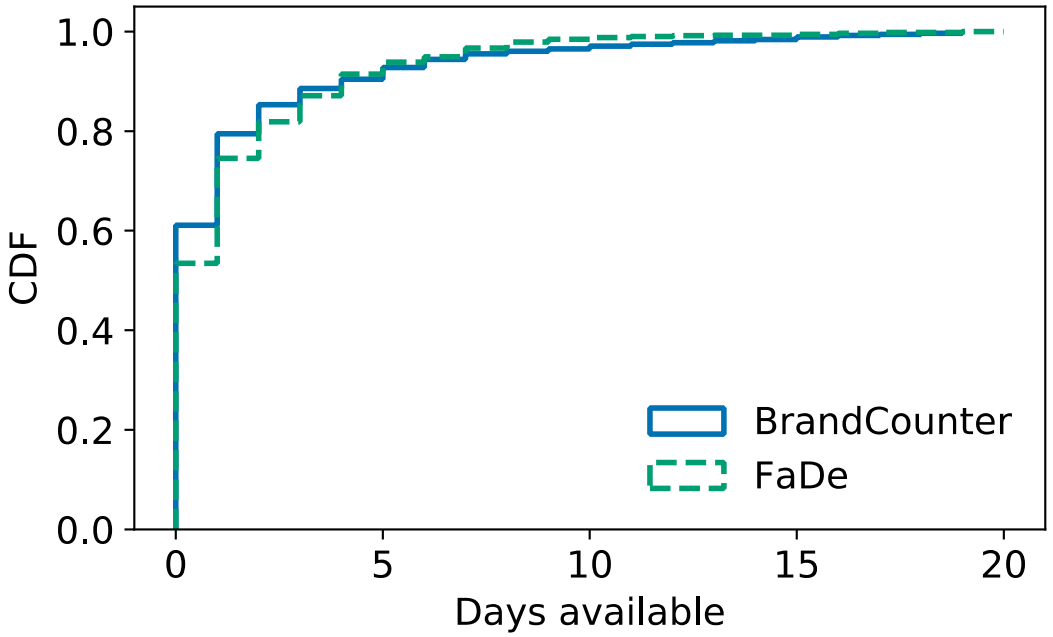


How do counterfeiters operate?

Photo by JESHOOTS.COM on Unsplash

Production farm of shops: automation

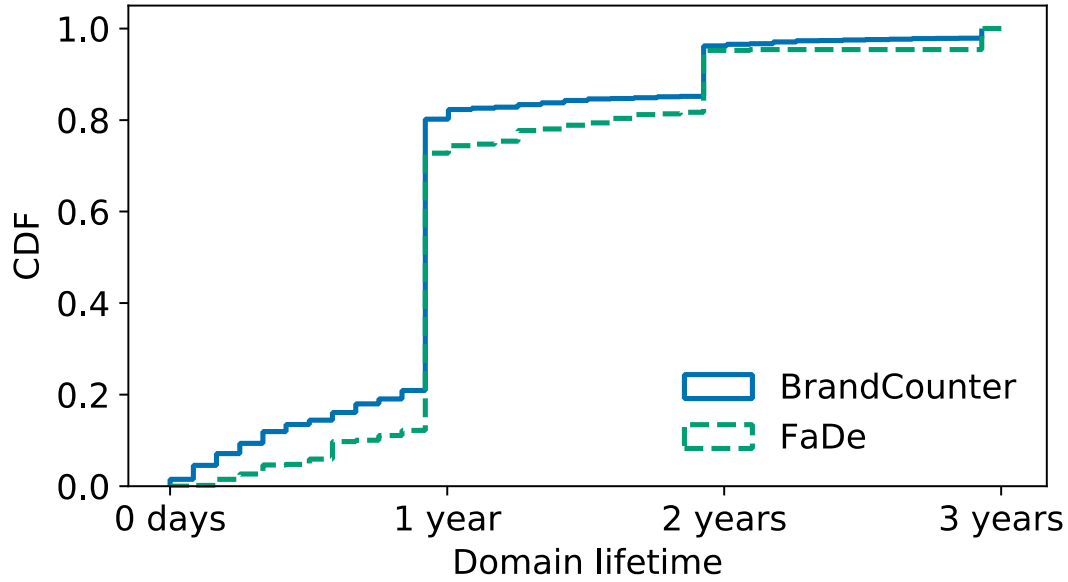
- Mostly cheap registrars that offer APIs
- Similar yet different website templates
- 80% is a re-registered domain
  - Majority re-registered immediately
  - Benefit from “residual reputation” [6]



Days in between domain expiration and re- registration.

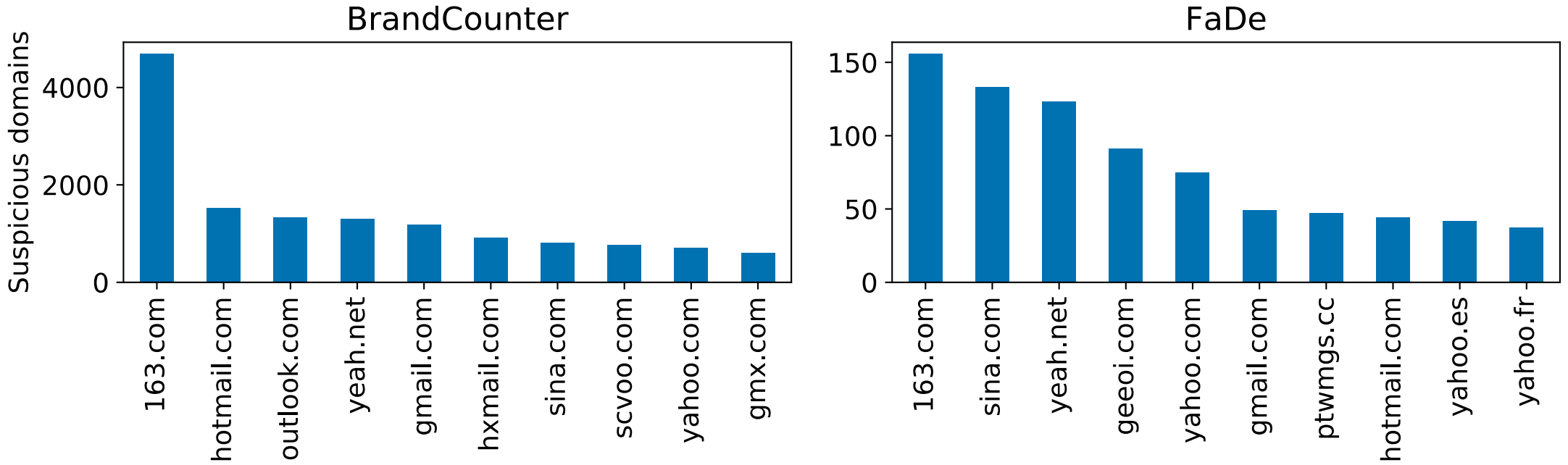
Spreading chances: domains cheap and disposable

- Domain names do not match content
- Spelling mistakes, translation errors
- Domains have short lifetimes

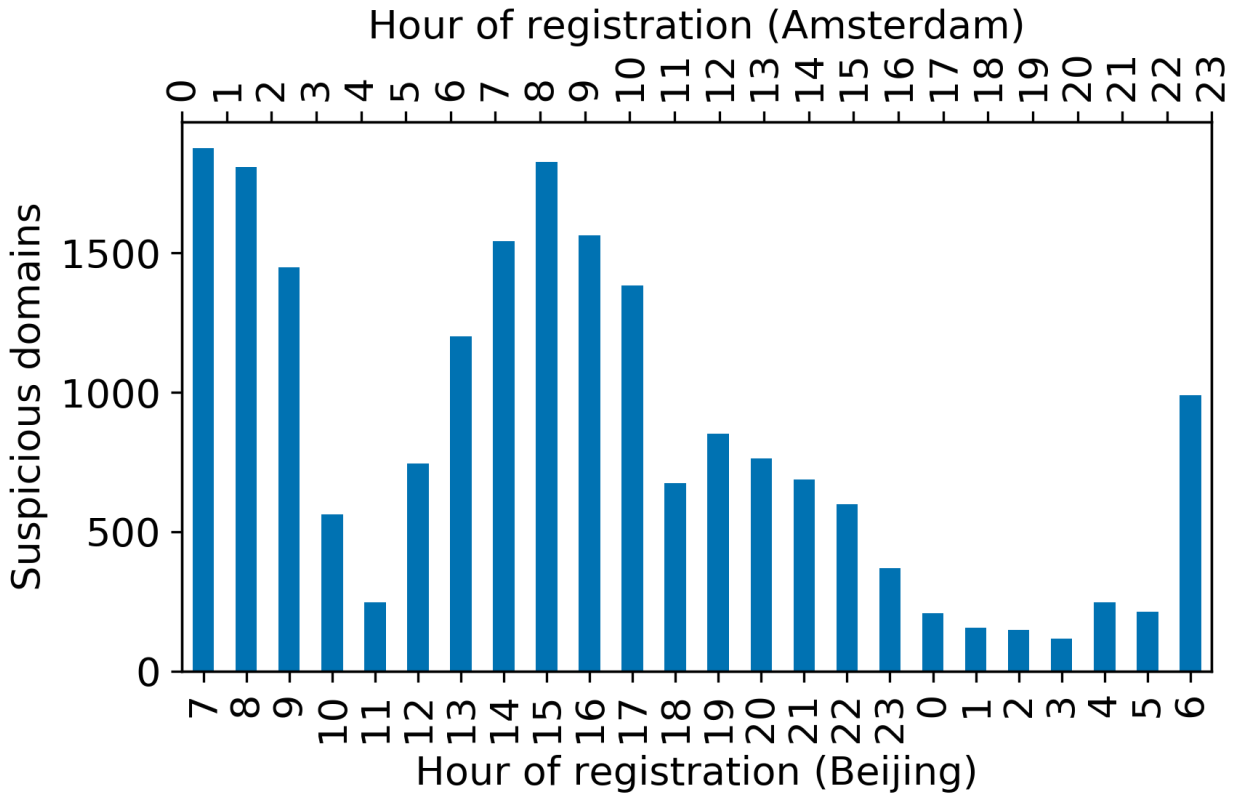


Most domains not renewed after 1 year— the registration period.

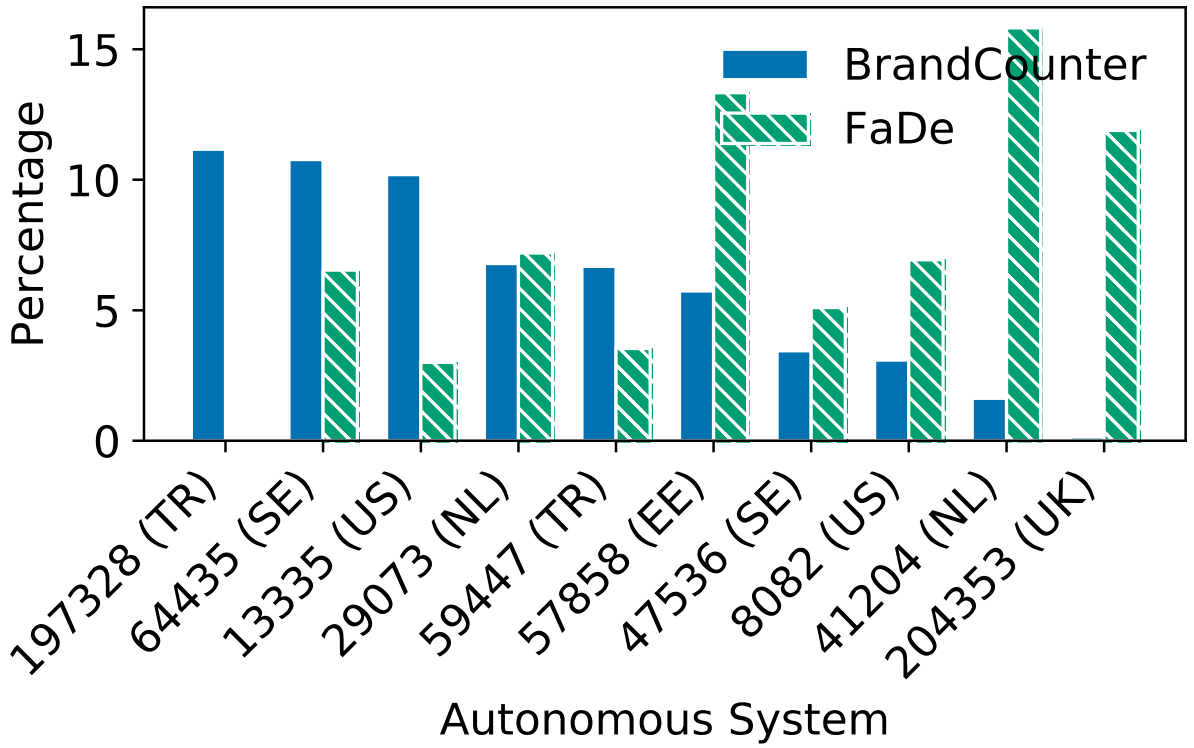
Registrations from China



Registrations from China



Not hosted in China



We helped to take down 4455 counterfeit webshops

Less counterfeit webshops (not peer-reviewed)

- Learned to avoid us again?
- Changed tactics due to proactive detection and quick notifications?

Year	Taken down
2018	~12,000
2019	4,340
2020	481

Number of counterfeit webshops taken down

Less domains ≠ less scams:

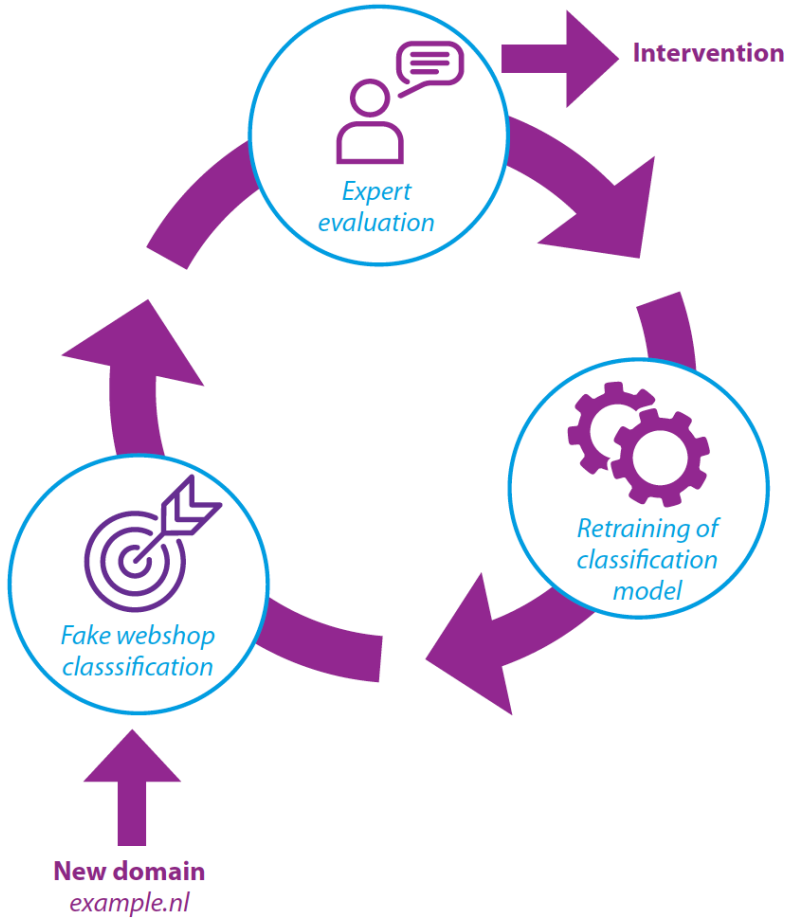
- Share signals with other organizations
- Research on wider disruption

We shared COVID-19 webshops that promoted iDEAL with Currence for broader analysis and wider disruption

https://www.sidnlabs.nl/en/news-and-blogs/machine-learning-method-identifies-brand-logos-on-fake-webshops

Lessons learned

- Registrars and ICS collaboration was key
- Detectors are simple yet effective
  - Registries have perfect vantage point
  - Suggests little pressure
- It's an ever going wack-a-mole game
  - Monitor features and evaluate model regularly
  - We collaborate with others on this topic



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