



Video Killed the Text Star: OSINT Approach



ONDEV₂

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@cesarjz





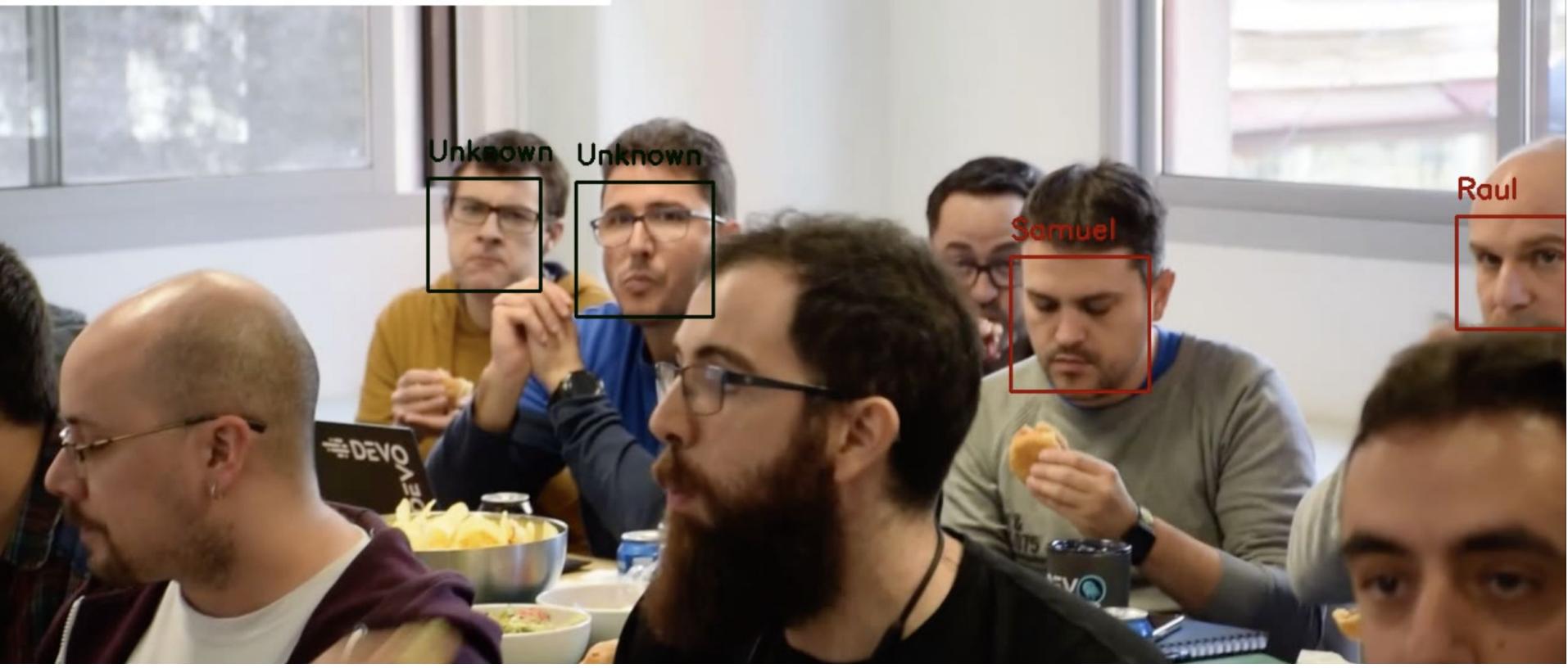
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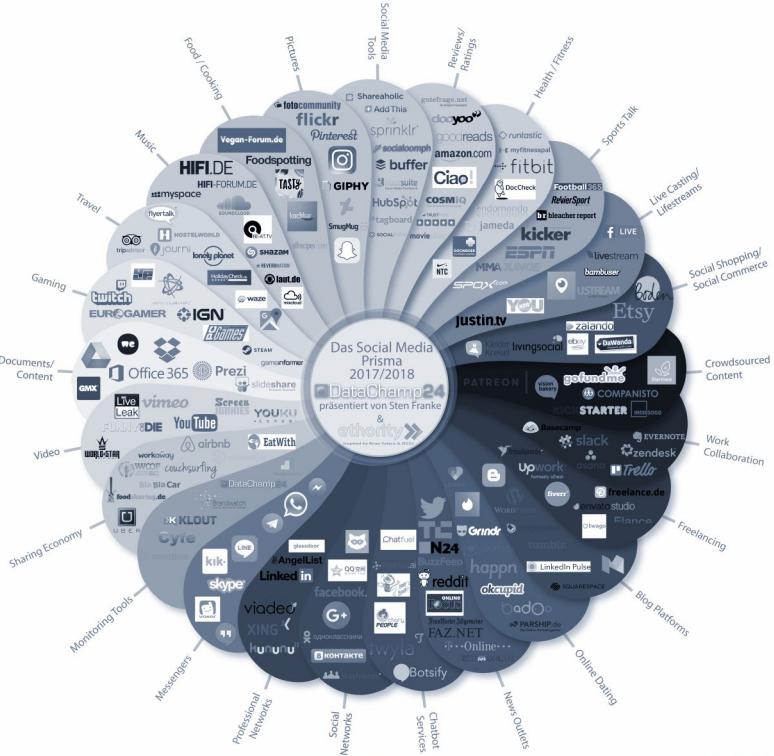




1. OSINT
2. Video analysis
3. Faces Recognition
 - a. Where are the faces?
 - b. Faces encoding
 - c. Identify persons
4. Video Demo
5. Architecture
6. Code
7. Identify unknowns
8. Defense



OSINT



It's a good day to have a SOCIAL day!
Wir laden dich herzlich dazu ein, das Social Media Prisma in deinen Social Networks, Blogs, eMails, Präsentationen, Newsletter und allen anderen Medien zu teilen.
Bitte verlink die DeinSocialDay-Seite: <http://bitly.us/deinSocialDay> oder nimm es mit! Weiter, Denk, Stein Fränen & abholen!





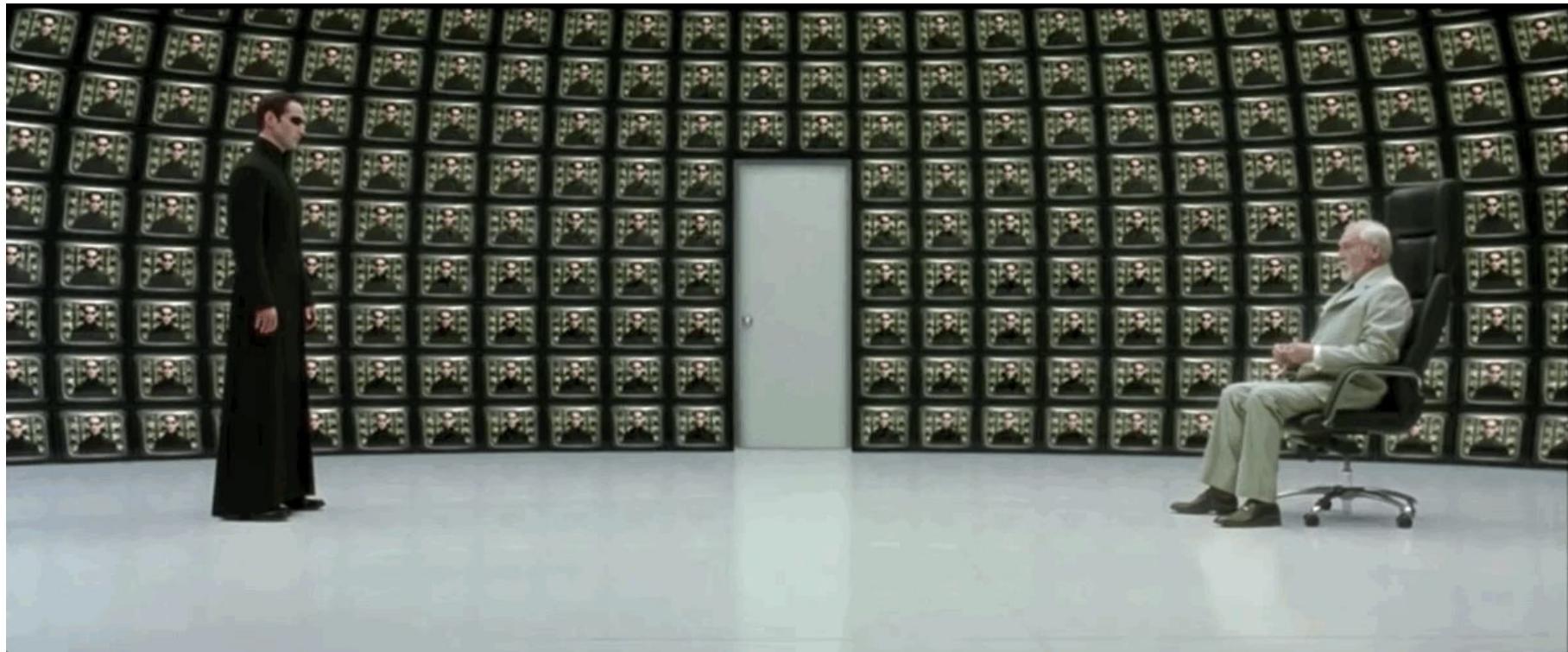
Open-source intelligence is the data collected from publicly available sources to be used in an intelligence context.

The development of behavior forecasts or recommended courses of action to the leadership of an organisation, based on wide ranges of available overt and covert information.

Use Cases

- National Security
- Counterterrorism
- Cyber Tracking of terrorists
- Search missing persons
- Identify persons in sexual violence crimes
- Identity theft
- Monitor competitors activities
- Gather information about a specific target (Hacking)
- Marketing ROI (Sports, YouTube, ...)

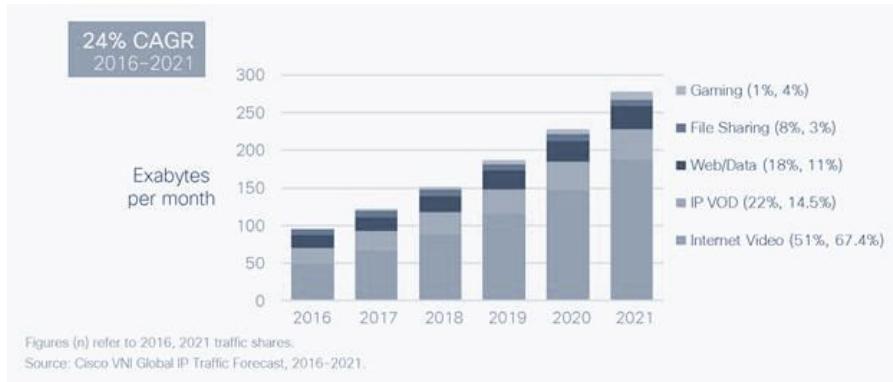
Video Analysis





By 2021, 80% of the World's Internet
Traffic Will Be Video

Video Traffic



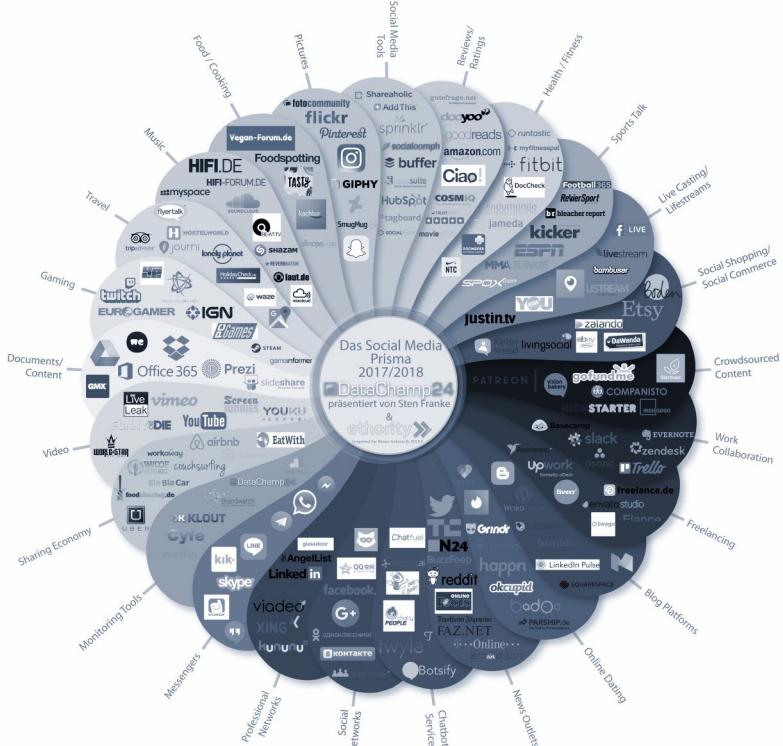
2018. Video Surveillance Traffic ~0.18 (2%)

Exabytes per month

180.000 Terabytes

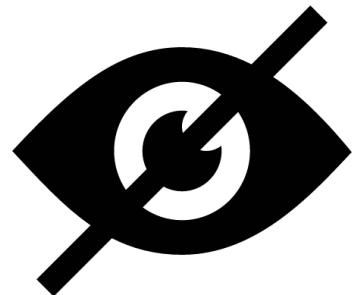
180.000.000.000.000.000 bytes

Video Traffic



It's a good day to have a SOC/L day.
Wir laden dich herzlich dazu ein, das Social Media Prisma in deinen Social Networks, Blogs, E-Mails, Präsentationen, Newsletter und allen anderen Medien zu teilen.
Bitte verlinke die Download-Seite: <http://ethority.de/social-media-prisma>. Vielen Dank, Sten Franke & ethority





Sensitive Content

Next content contains sensitive content which some people
may find offensive or disturbing

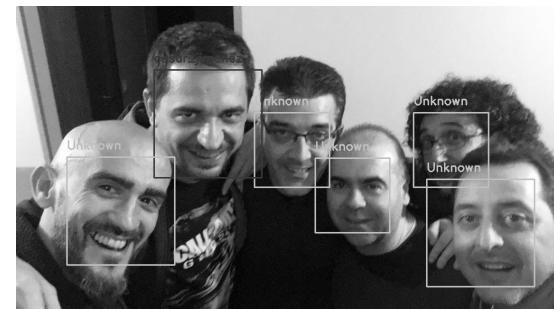


Video Analisis

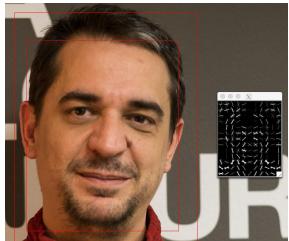


Facial Recognition

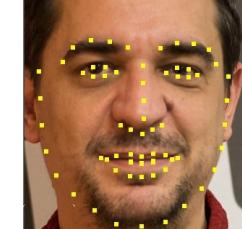
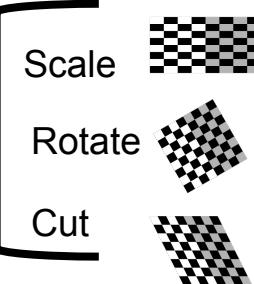
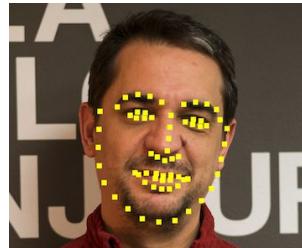
Human face recognition is one of Machine Learning applications which has had more advances in recent years.



HOG or CNN



Landmarks



Compare with faces encoded

```

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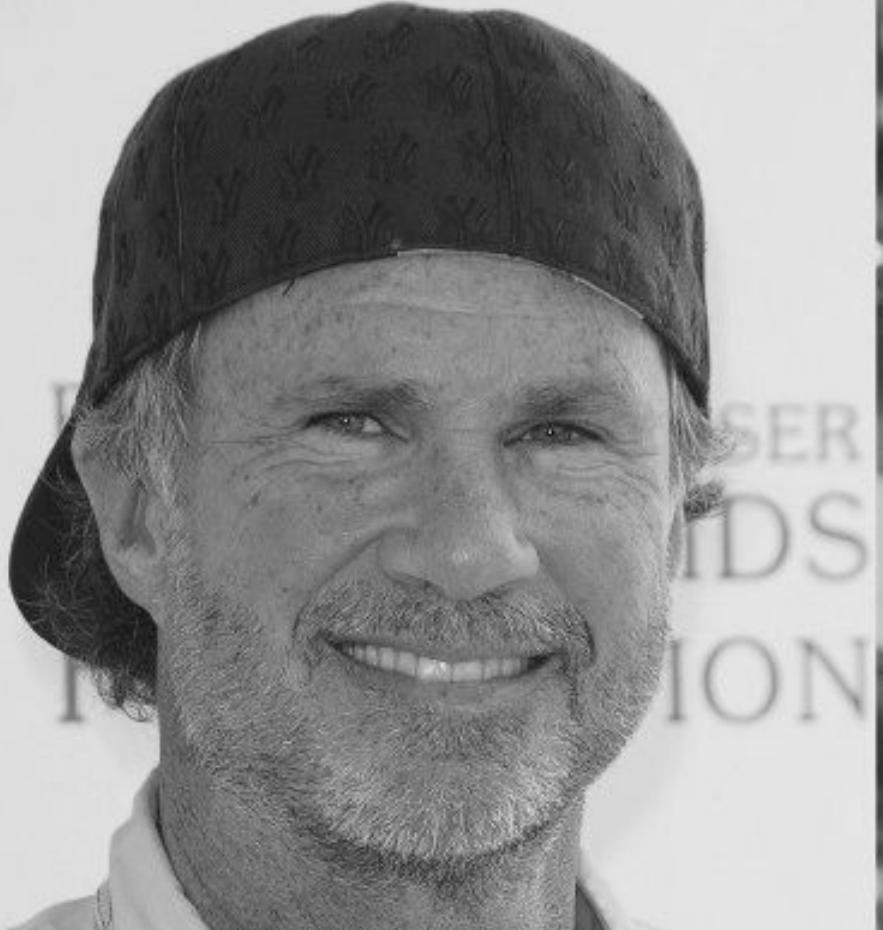
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128 measurements

Where are
the faces?





Will Ferrell? vs Chad Smith?

Difficult for humans too. Chihuahua vs muffins



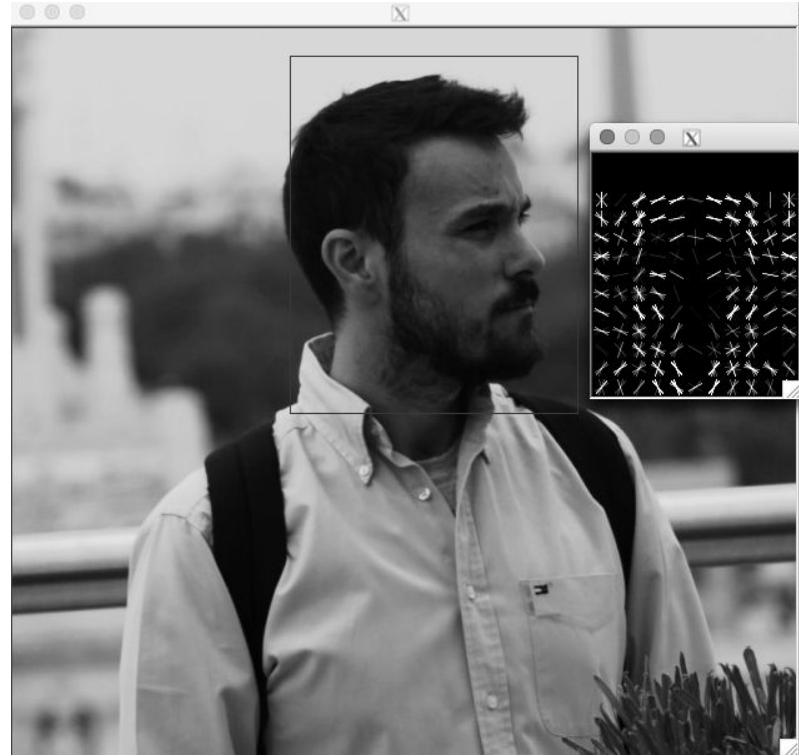


Where are the faces? HOG. Histogram of Oriented Gradients



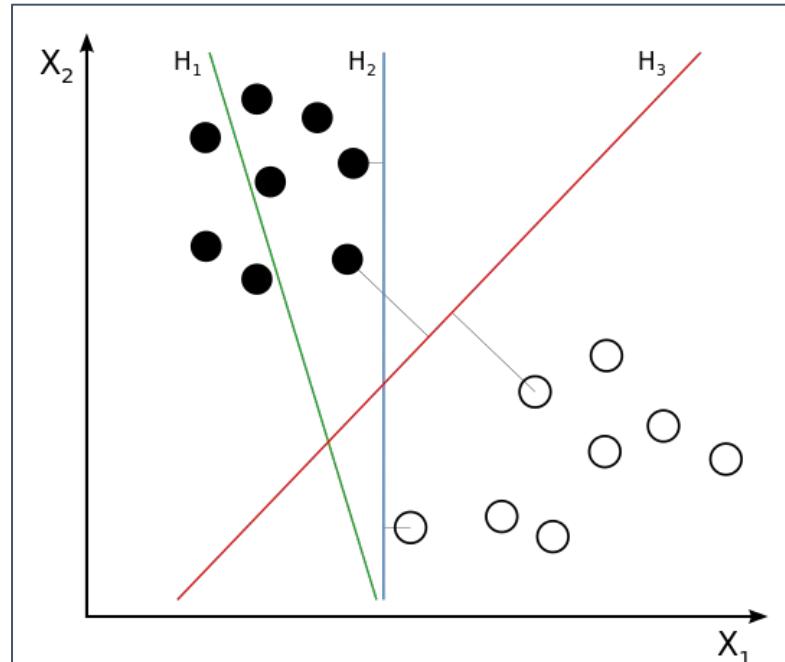
HOG. Histogram of Oriented Gradients

HOG: 2005. Navneet Dalal and Bill Triggs.
Histogram of Oriented Gradients over human
models



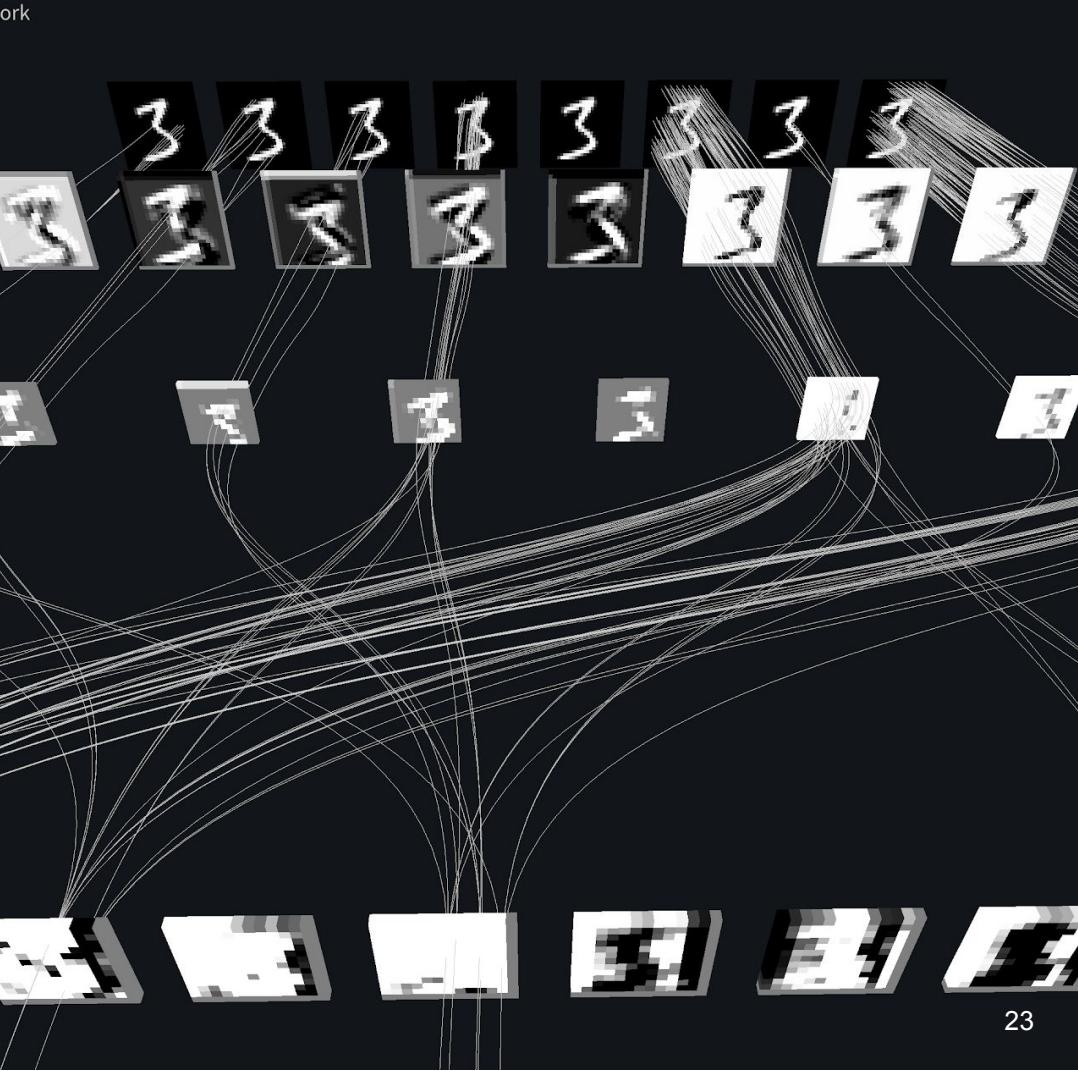
HOG Histogram of Oriented Gradients

Classification.
Support Vector
Machine
algorithm.



By User:ZackWeinberg, based on PNG version by User:Cyc - This file was derived from: Svm separating hyperplanes.png, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=22877598>

Where are
the faces?
CNN.
Convolutional
neural network



CNN Convolutional neural network. Convolutions Kernel



Convolutional Border Kernel detections

255	255	255	0	0	0
255	255	255	0	0	0
255	255	255	0	0	0
255	255	255	0	0	0
255	255	255	0	0	0
255	255	255	0	0	0

X

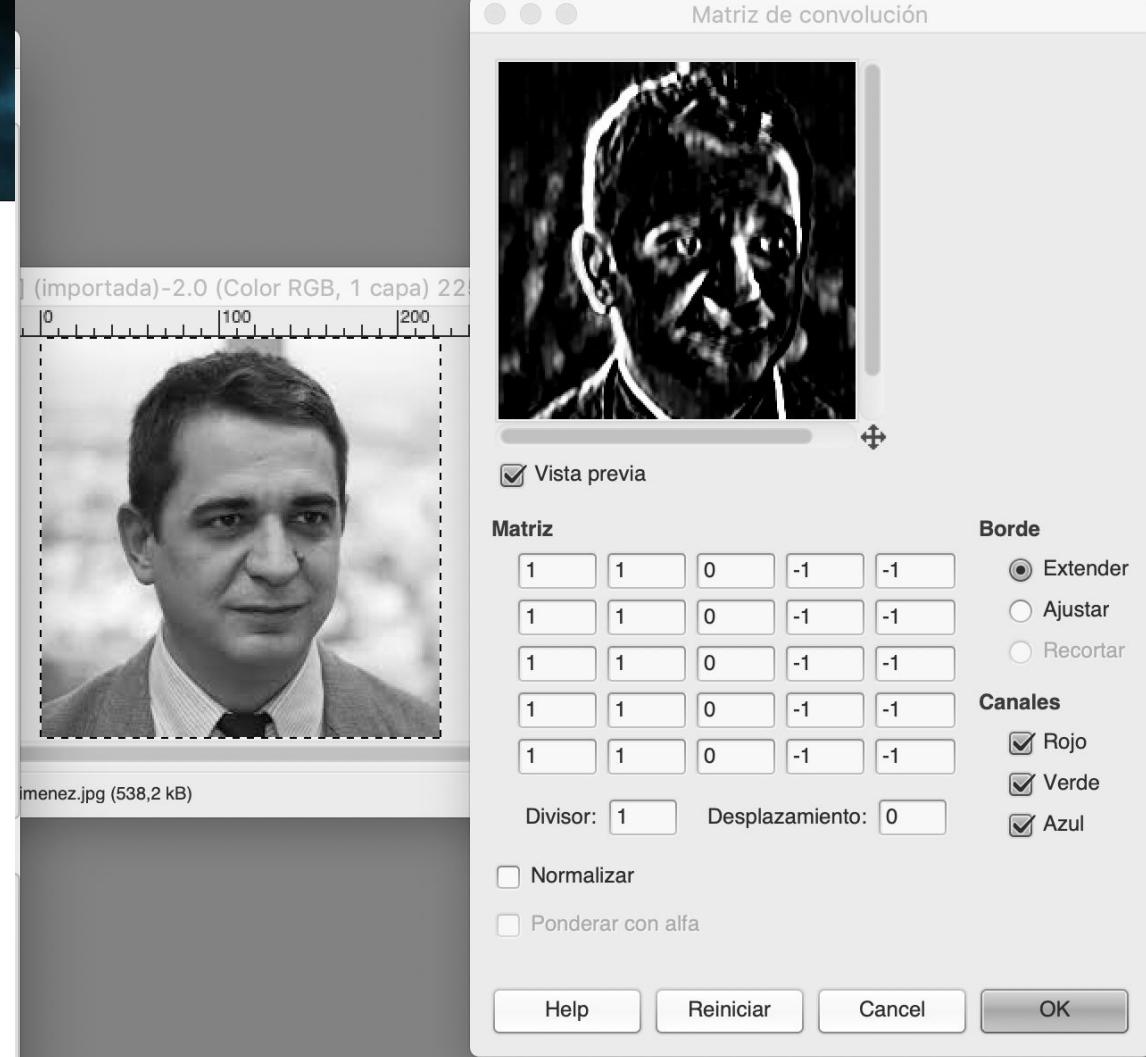
1	0	-1
1	0	-1
1	0	-1

=

0	765	765	0
0	765	765	0
0	765	765	0
0	765	765	0

CNN Convolutional neural network. Filter Kernels

GIMP Example

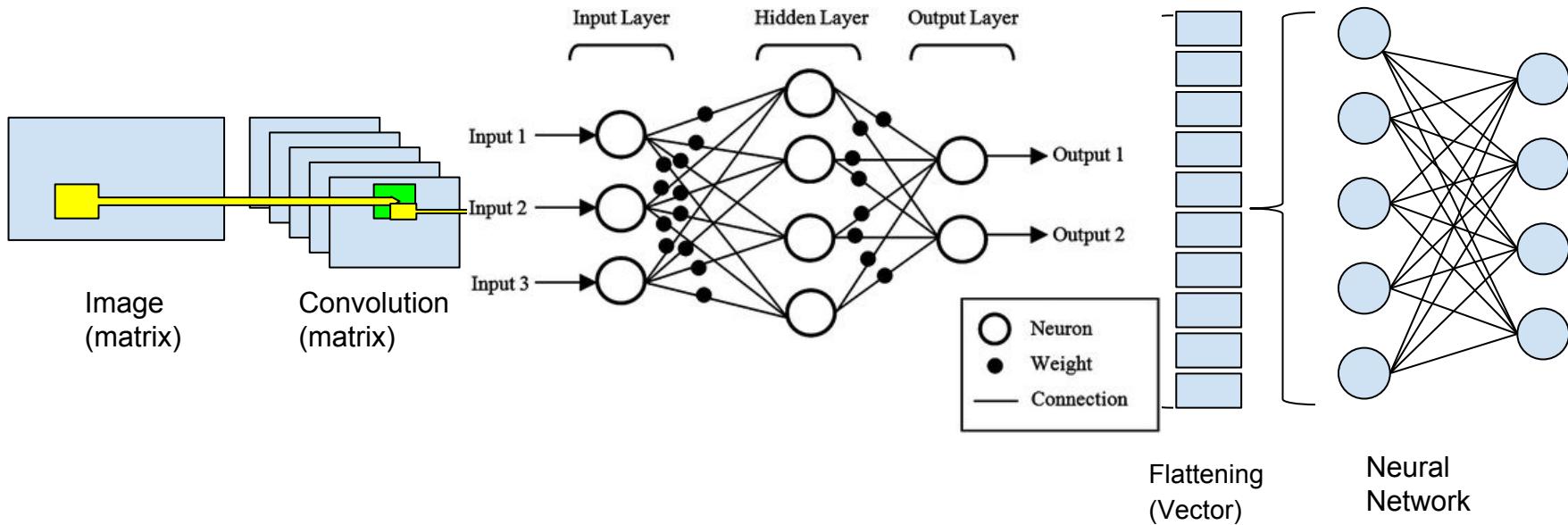


CNN Convolutional neural network. Subsampling Max Pooling

1	3	2	9
7	4	1	5
8	5	2	3
4	2	1	4

7	9
8	

CNN Convolutional neural network





Caution

Don't use CNN in a CNN Video. The recursivity
may cause world implosion

CNN + CNN =

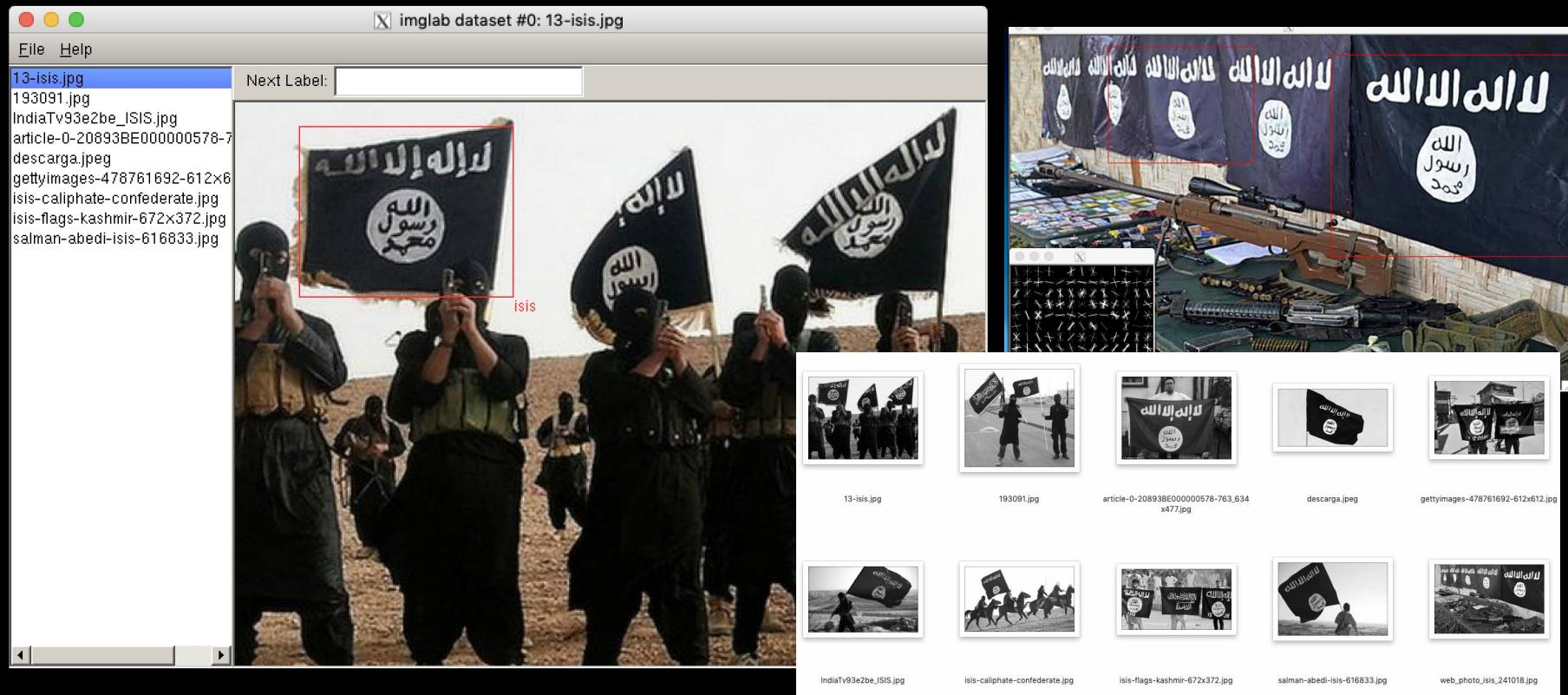




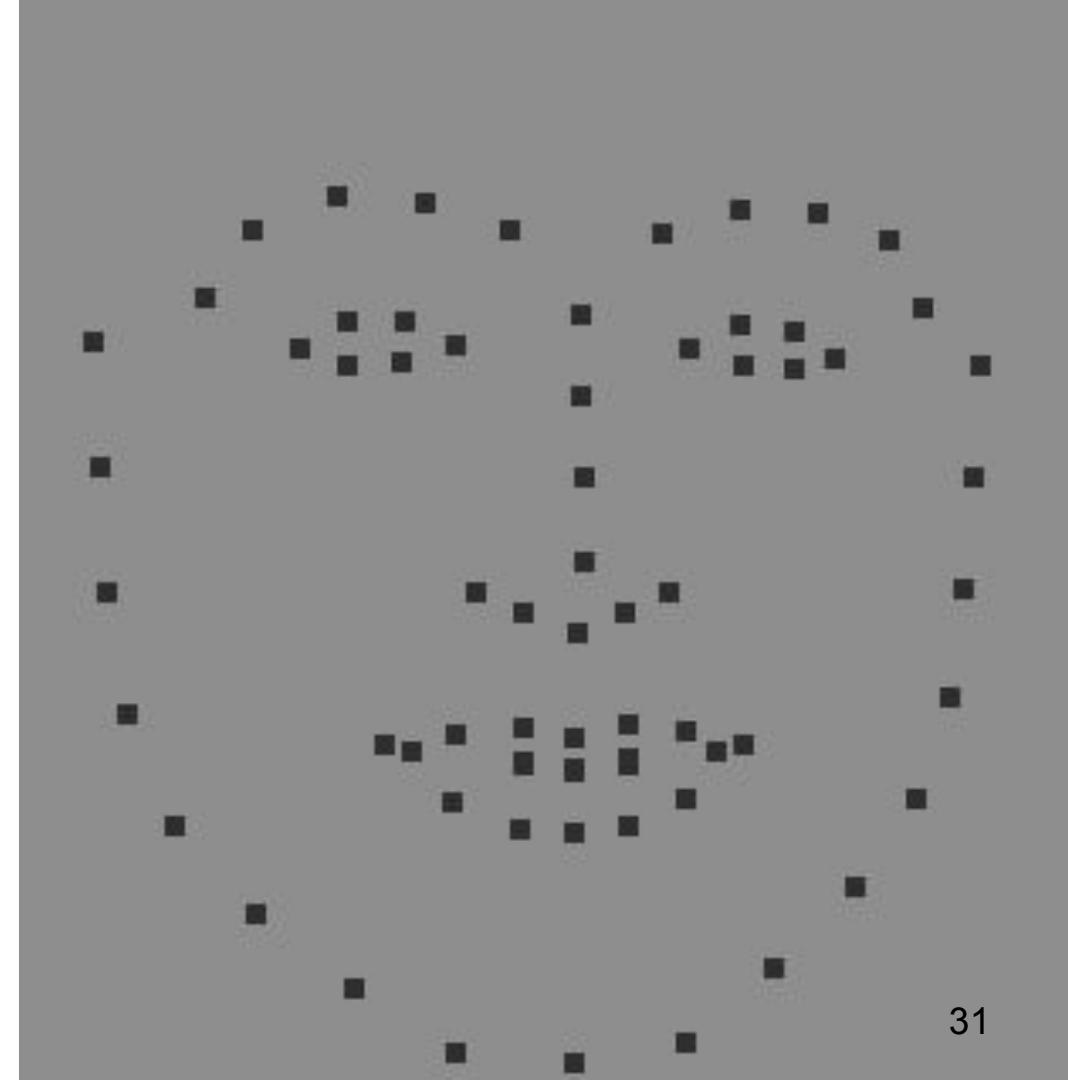
CNN. Best accuracy. (Processing offline)

HOG. Faster (Video in real time)

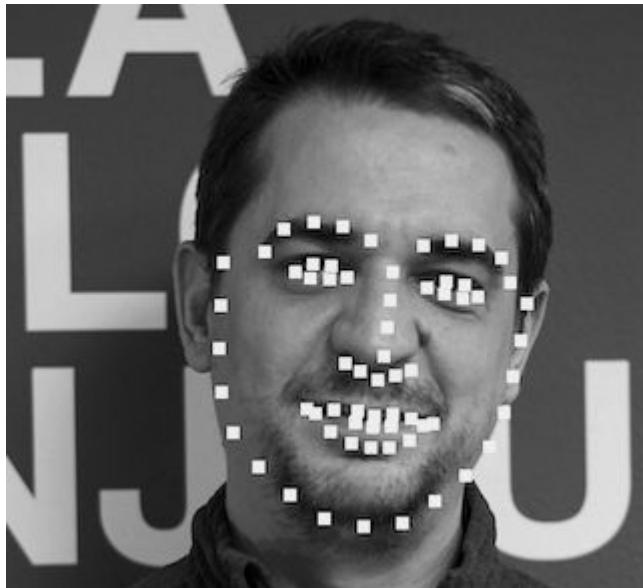
All that glitters is not Gold Faces



Face landmarks



Face landmarks



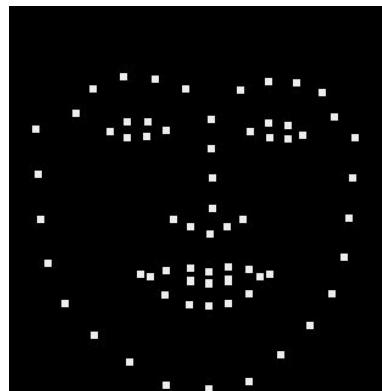
In this examples:

- 17 in chin
- 5 in left eyebrow
- 5 in right eyebrow
- 4 in nose bridge
- 5 in nose tip
- 6 in left eye
- 6 in right eye
- 12 in top lip
- 12 in bottom lip

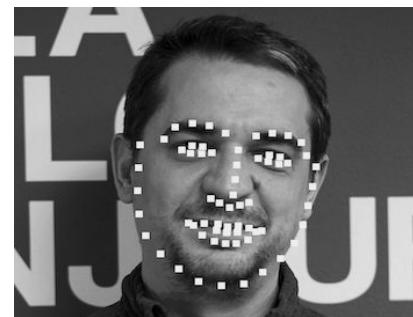
Align all landmarks with affine transformations:
scale, rotate and shear



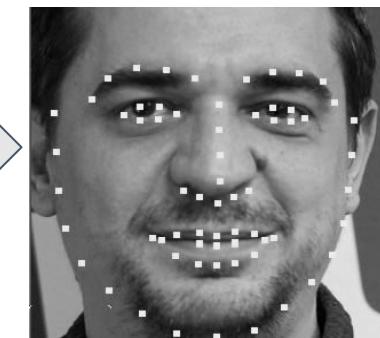
Obtain



Desired



Obtain



Affine
transformation



Faces encoding

Faces encoding

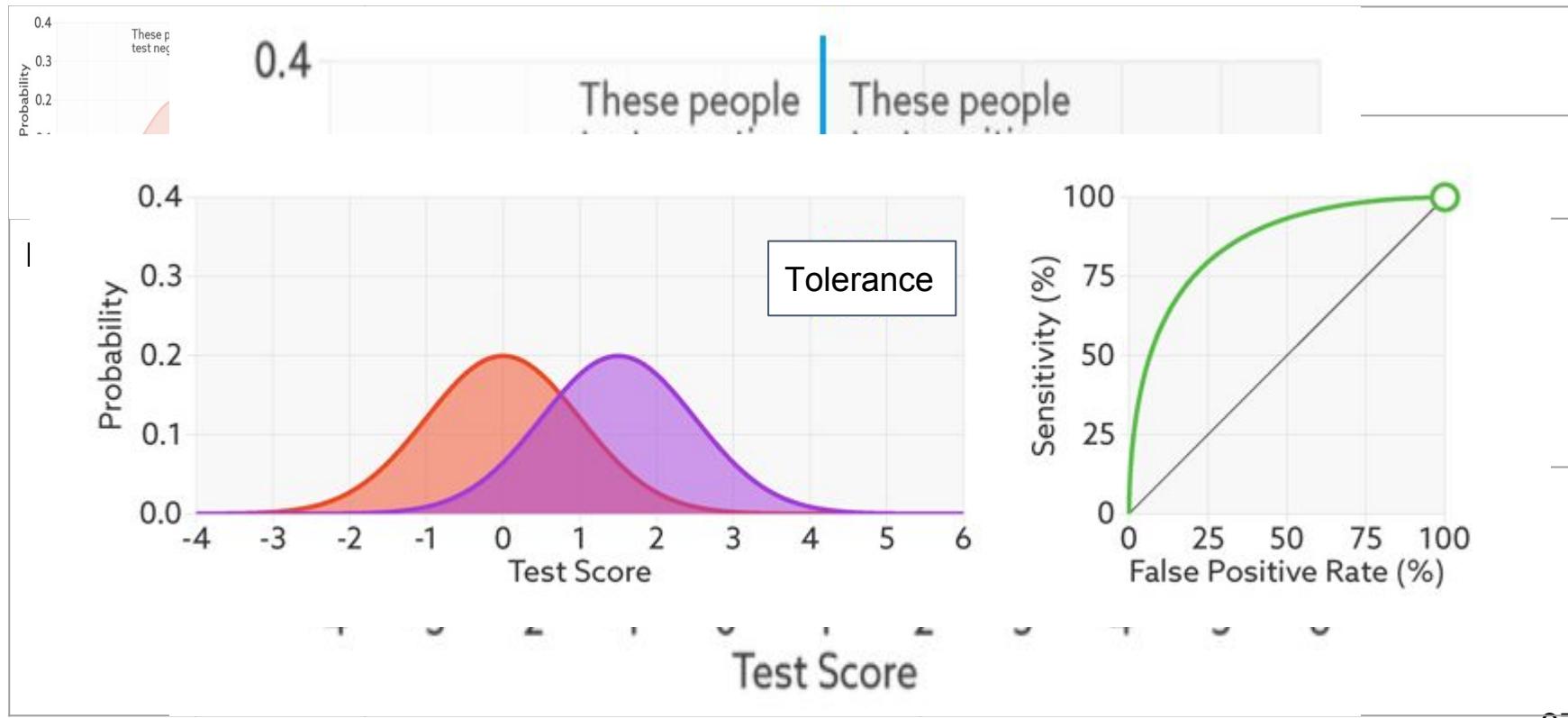
Create in 2015 by
researchers at Google.

128 measurements of each face. Based on triplets.

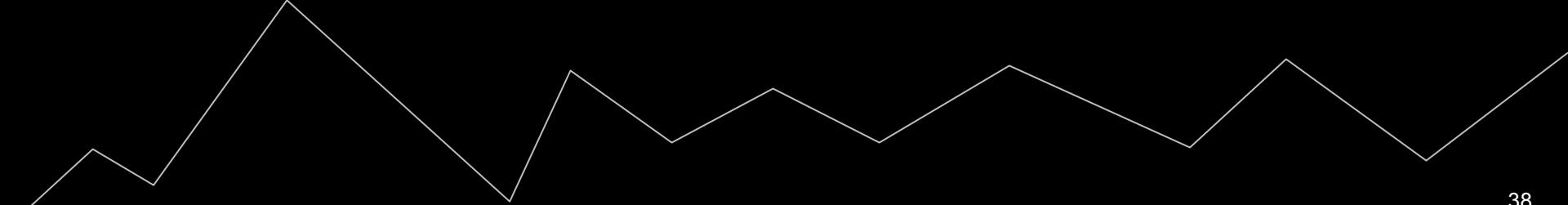
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Face recognition

Determine tolerance. Euclidean distance between vectors



Unknown Unknowns



Unknown



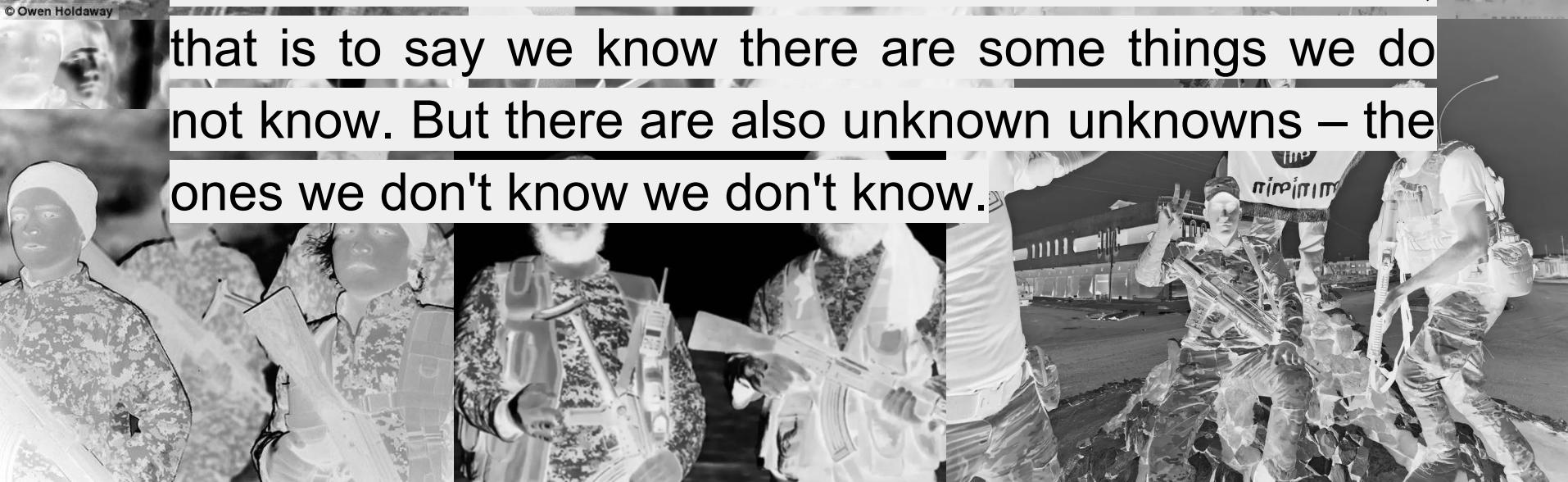
Unknowns

COUNTER EXTREMISM PROJECT

From March 8 to June 8, 2018, the Counter Extremism Project (CEP) conducted a study to better understand how ISIS content is being uploaded to YouTube, how long it is staying online, and how many views these videos receive.



There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know.



Demo



Architecture

Do It Yourself

OpenCV
(Open Source Computer Vision) is a popular computer vision library started by Intel in 1999.
<https://opencv.org/>



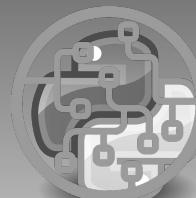
Apache Storm is a free and open source distributed realtime computation system.
<http://storm.apache.org/>

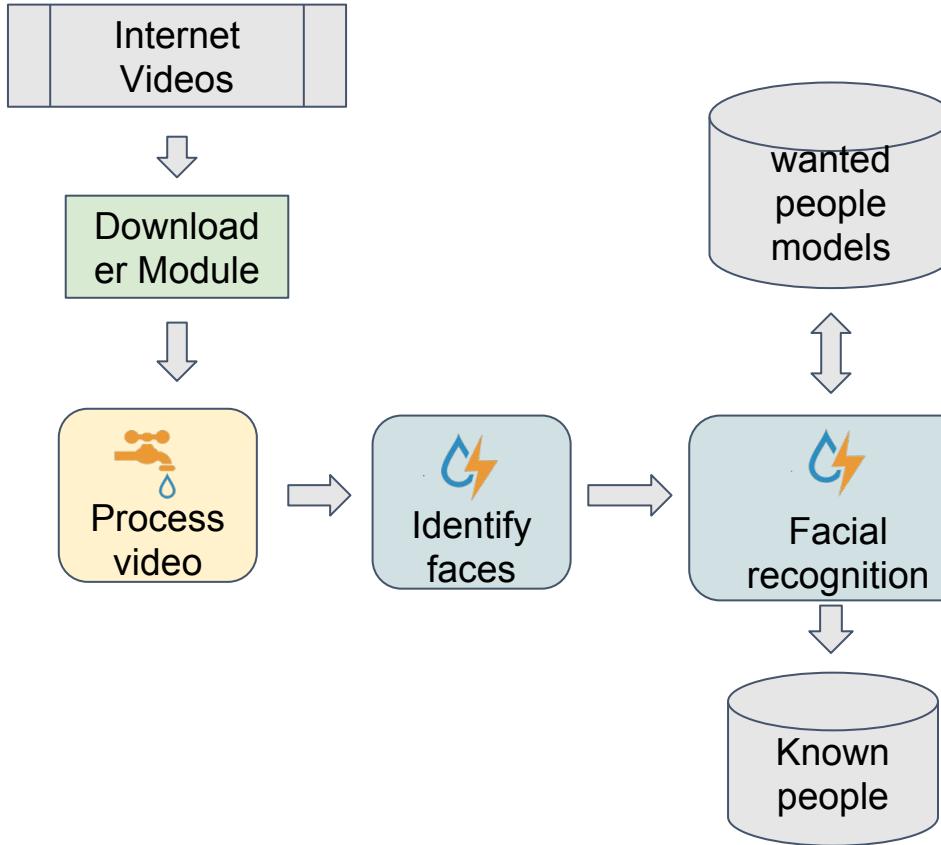


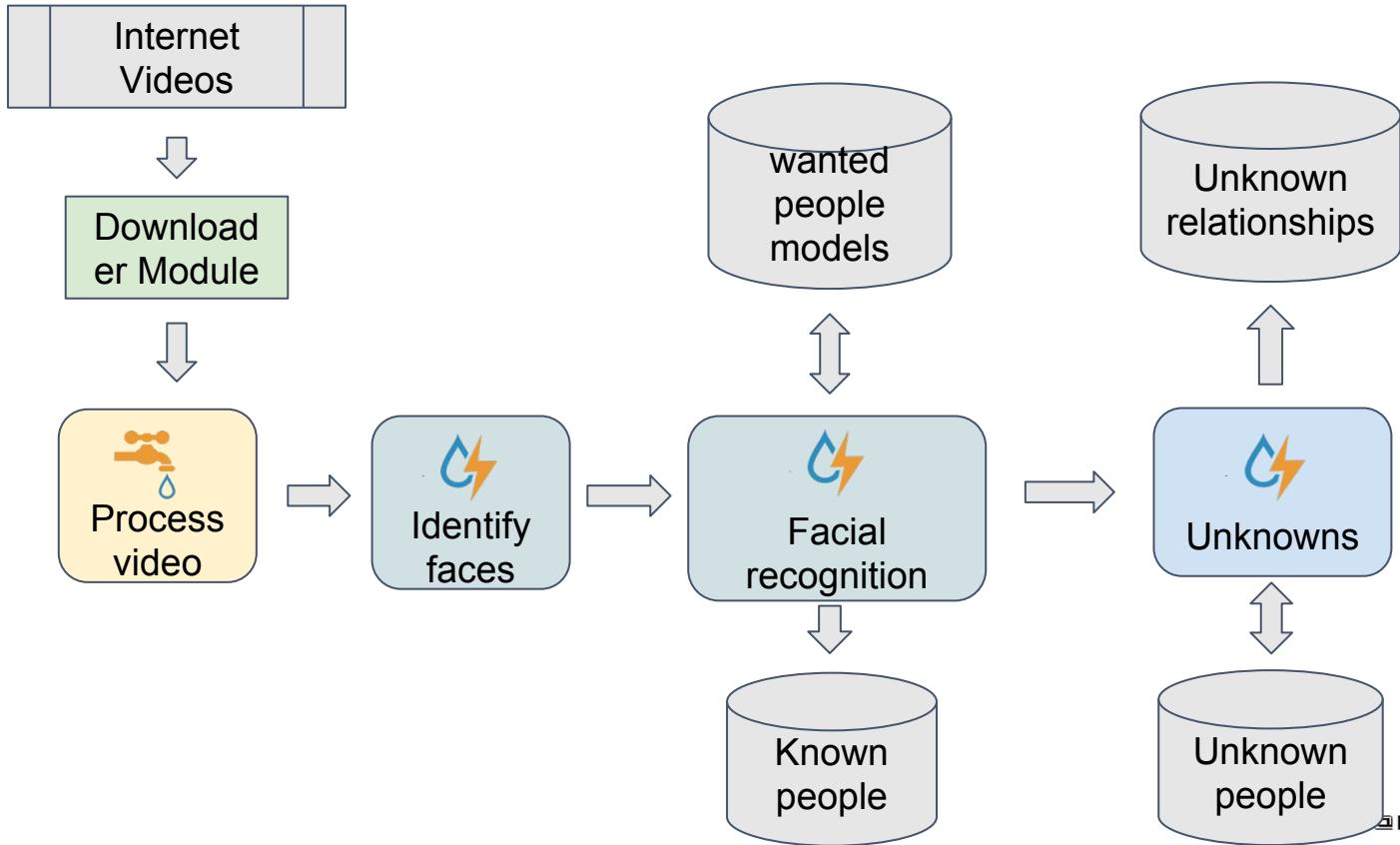
Dlib is a modern C++ toolkit containing machine learning algorithms and tools.
<http://dlib.net/>



Face Recognition.
Recognize and manipulate faces from Python.
https://github.com/eitgey/face_recognition









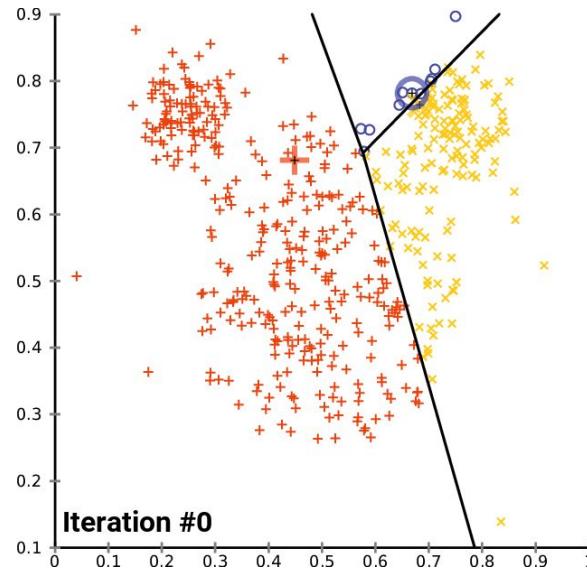
How group Unknowns?

Hash similarity
or Perceptual
Hash
pHash

Don't work properly

Is influenced by
background, brightness,
face position ...

Clustering Model k-Means



Don't work properly

"Need" to know
how many different
persons are in the
dataset

Chinese whispers

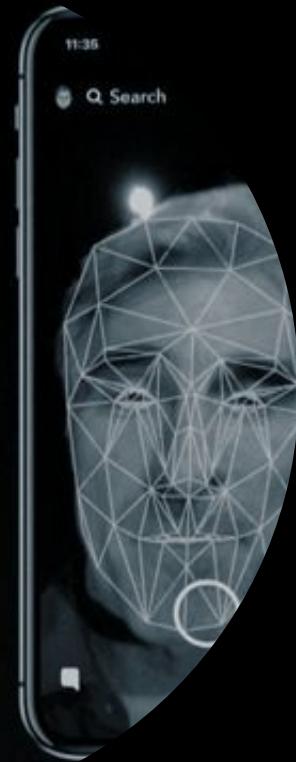


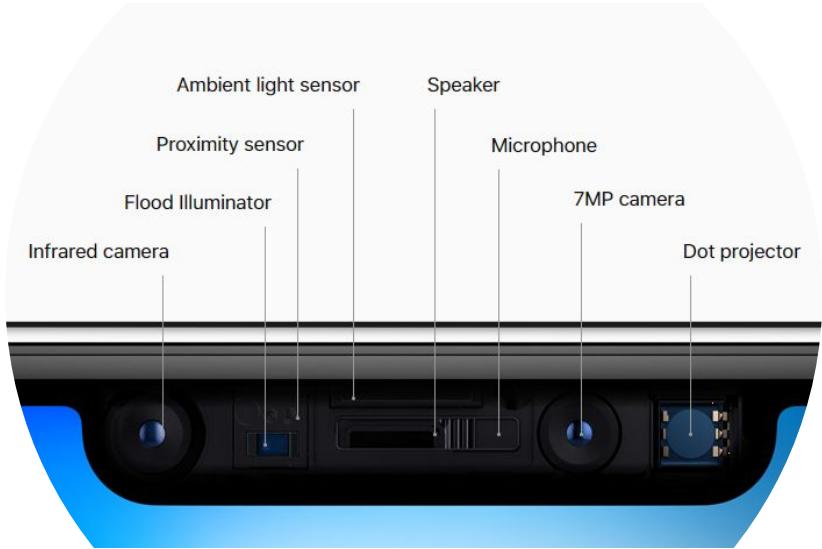
The algorithm works in the following way

- All nodes are assigned to a random class. The number of initial classes equals the number of nodes.
- Then all of the network nodes are selected one by one in a random order. Every node moves to the class which the given node connects with the most links. In the case of equality the cluster is randomly chosen from the equally linked classes.
- Step two repeats itself until a predetermined number of iteration or until the process converges. In the end the emerging classes represent the clusters of the network.

It works pretty well !!

Three-dimensional face recognition





Face ID
TrueDepth camera™



Intel®
RealSense™

Social impact



Smile! The Secretive Business of Facial-Recognition Software in Retail Stores

<http://nymag.com/intelligencer/2018/10/retailers-are-using-facial-recognition-technology-too.html>

Photo-Illustration: Konstantin Sergeyev/Intelligencer; Photo: Joe Raedle/Getty Images



Tesla deploys massive new
Autopilot neural net in v9,
impressive new capabilities,
report says

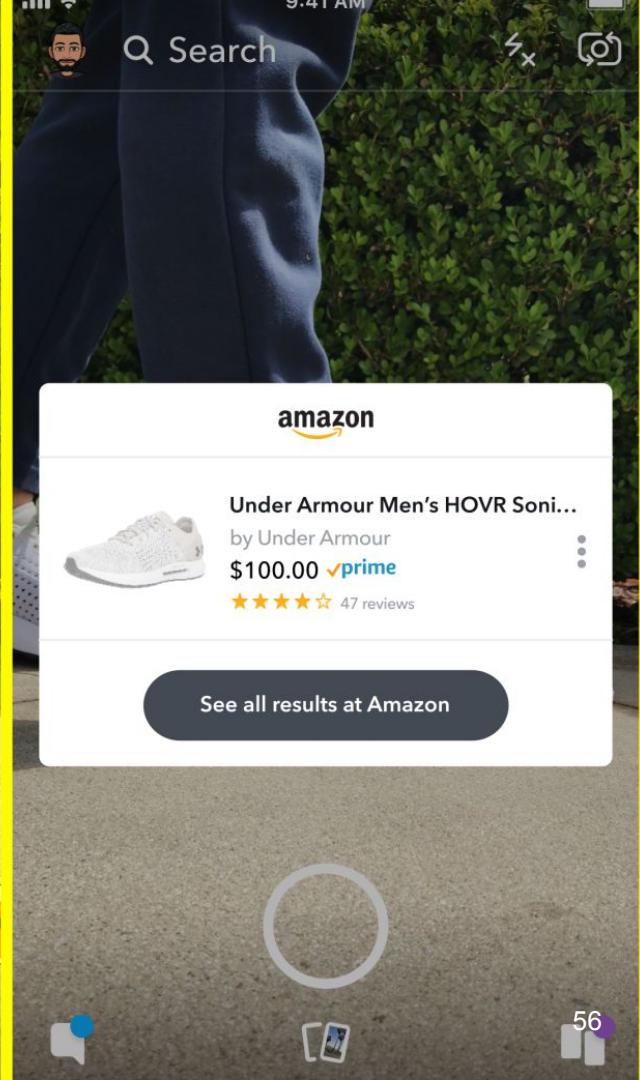
<https://electrek.co/2018/10/15/tesla-new-autopilot-neural-net-v9/>



Q Search

Introducing Visual Search

<https://www.snap.com/en-US/news/post/introducing-visual-search/>



The world's first deep learning enabled video camera for developers

AWS DeepLens helps put deep learning in the hands of developers, literally, with a fully programmable video camera, tutorials, code, and pre-trained models designed to expand deep learning skills.

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Amazon

China's social score program coming to the world. 社会信用体系

“China's social credit system was launched in 2014 and is supposed to be nationwide by 2020. As well as tracking and rating individuals, it also encompasses businesses and government officials.”

<https://www.wired.co.uk/article/china-social-credit>

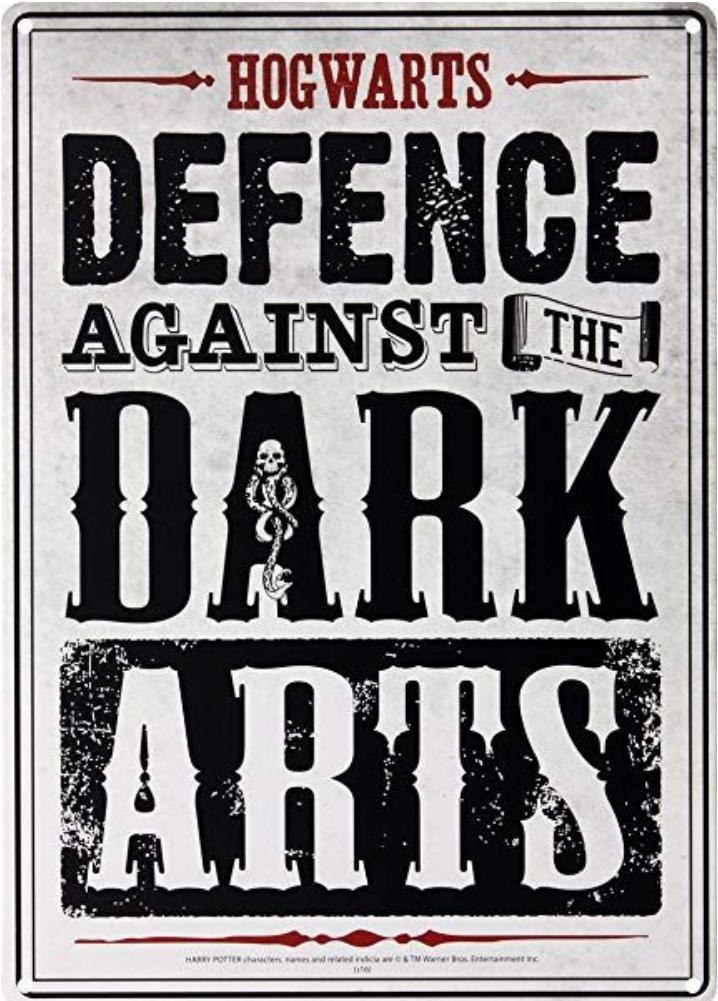
“Some types of punishments include: flight ban, exclusion from private schools, slow internet connection, exclusion from high prestige work, exclusion from hotels, and registration on a public blacklist”.

https://en.wikipedia.org/wiki/Social_Credit_System



Kevin Hong

Defence Against the Dark Arts





Defense.
Anti - facial
recognition
systems

Justice Caps
<http://justicecaps.com/>



Defense.
Anti - facial
recognition
systems

<https://www.kickstarter.com/projects/reflectacles/reflectacles-reflective-eye-wear-and-sunglasses>

Defense. Anti - facial recognition systems

<https://cvdazzle.com/>





Thank you
Questions?