HOCHSCHULE MITTWEIDA
UNIVERSITY OF APPLIED SCIENCES

“Artificial Intelligence” and crime
- deep fake -

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FoSIL

Fraunhofer SIT

IARIA

What is a video?

***video* , I see‘ --- *videre* , see‘**

What is a video?

Video is an electronic medium for the **recording**, copying, playback, broadcasting, and display of moving visual media.

content

Transportation of emotions statement's

Transportation of facts

What is the impact of AI on the perception of videos for the law /legal system?

Counterfeiting of evidence

Deep Learning and reality

Witness 1

Deep Learning and reality

Witness 2

Deep Learning and reality

A new quality of deception

FAKE

Deep Learning

Social Engineering

Truth / lie

What is the influence of artificial intelligence for legal relations?

«deep learning» and «fake»

Deepfake is an AI-based technology used to produce or alter video content so that it presents something that didn't, in fact, occur. The word, which applies to both the technologies and the videos created with it, is a portmanteau of ***deep learning*** **and** ***fake***.

Deepfake

Tinder - dodger

+

=

fraud

Dangers of deepfakes

- Identity Stealing
- Computer fraud
- blackmail

Tinder - dodger

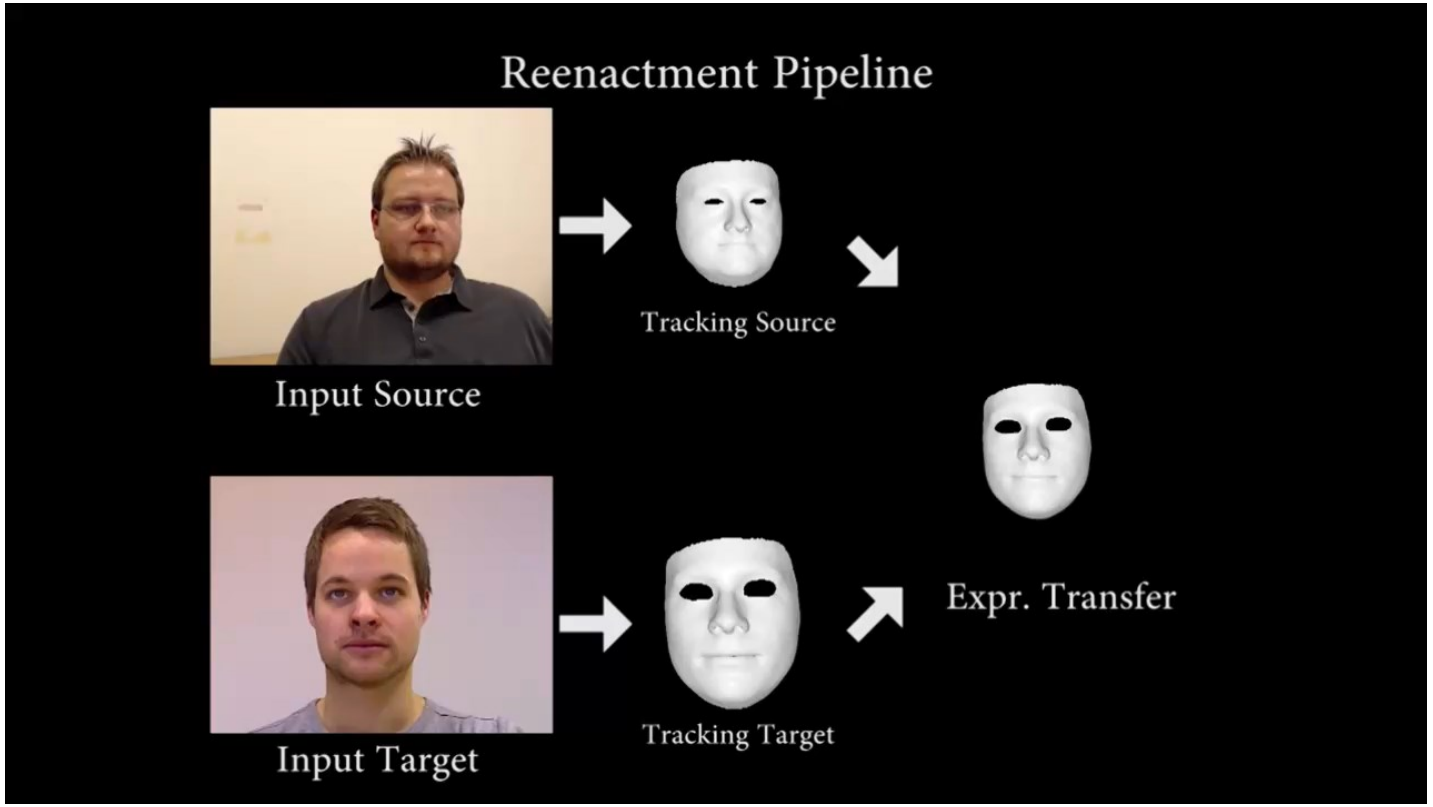
Changed videos and pictures …

- voice or image manipulation in the process of Authentication
- Counterfeiting of evidence (in criminal proceedings) § 268 StGB (manipulate the initial situation, activities …)
- Body movements can be manipulated

Deepfakes -Face2Face

- Real-time rebuilding of faces
- **Works with standard webcam**
- Objective: Movements in the face of the target video should be replaced by persons of another
- Manipulation … As realistic as possible

Deepfakes -- Face2Face



Deep Fake-videos

A new quality of deception

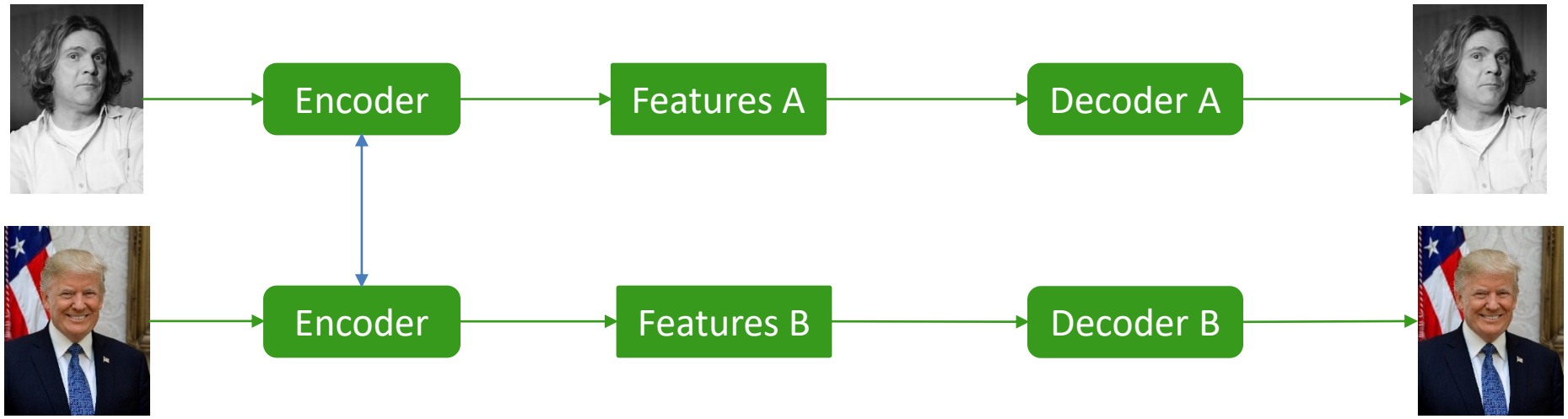
Deepfake – basis idea

Morphing

- Computer-generated special effect for sound and image recordings
- Combined image warping with interpolation
- Calculation of intermediate transitions between single images or sounds
- Complex process consists of
    1. Warping
    2. Tweening (intermediate pictures)
    3. Cross-dissolving

Creating deepfakes

- Concept: Autoencoder (neural network that is trained on compression and decompression of video-frams)
- Consists of 1 input (encoder) and 2 outputs (decoder)
  - Encoder analyzes and encrypts images Using Deep Learning Network CNN (Convolutional Neural Network)
  - Decoders generate different output for face A and face B
  - Add face B to A at the end (or vice versa)



Deepfakes with FakeApp

FakeApp AI-Framework TensorFlow from Google

Creation of emotions in politics

How artificial intelligence can be the statement analysis / credibility assessment of media in legal relations?

Deepfake with GitHub – Code

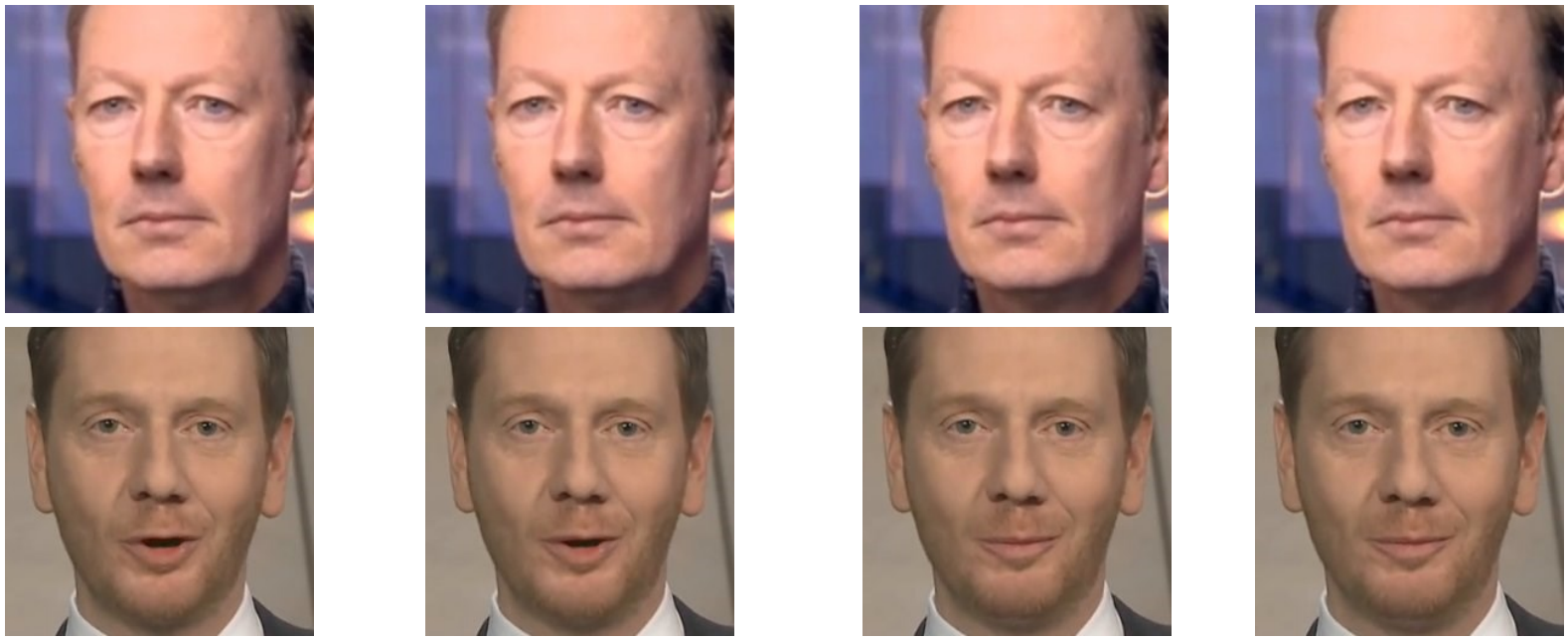
1. sources

Deepfake with GitHub – Code

2. **AI splits videos into individual frames**

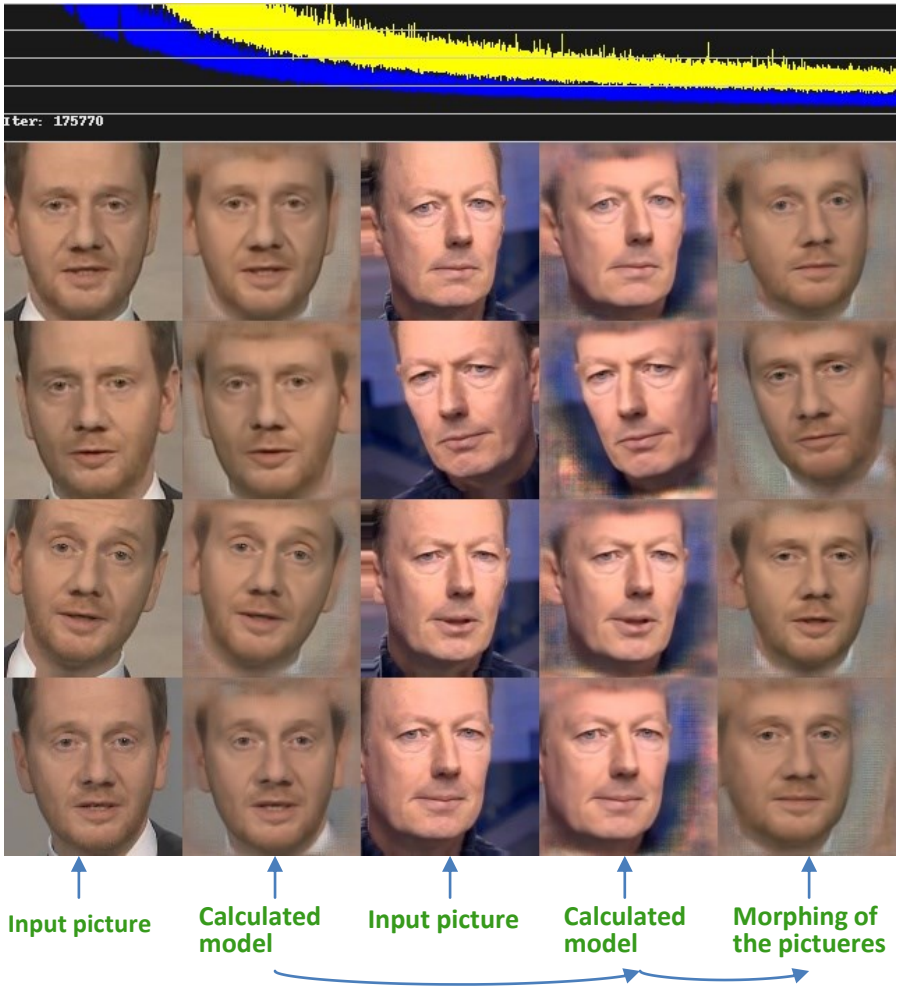
Deepfake with GitHub – Code

3. AI detects faces in frames



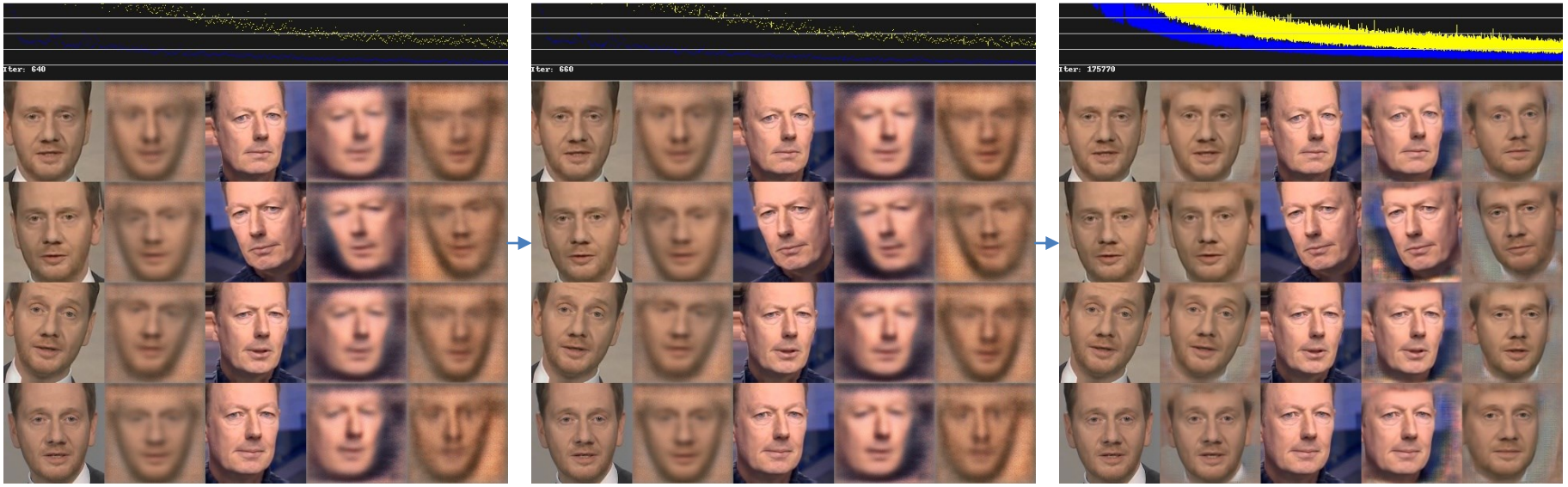
Black edge – shadows

Deepfake with GitHub – Code



Deepfake with GitHub – Code

4. Training process - face Matches



Begin of the trainings phase

End of the trainings phase

Erstellen von Deepfakes mit GitHub – Code

5. Transfer of faces

Abnormalities

- Shadowing → shaded margin on right half of face
- source material is due, in which you rarely see Michael Kretschmer from this page → can be corrected with further and / or better source material

- recognizable flicker of brightness in the face → Customize the parameters in the authoring software

A new phenomena?

Danger of Deep Fakes – “Postident” procedure

Can we use CNN:

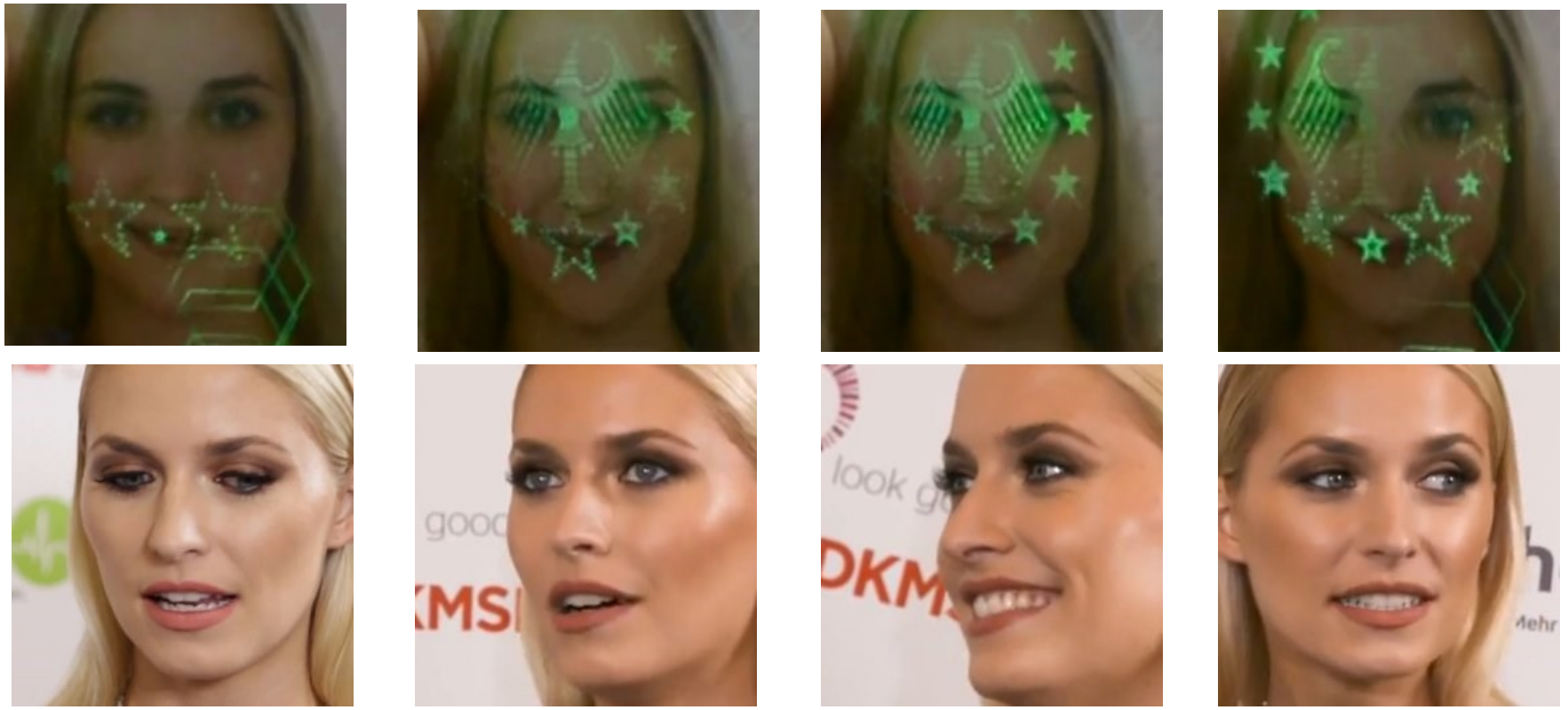
- change the image in document/ID card
- Information
- Quality for “online-fraud”

“Postident” procedure per video chat

Video identification …

Manipulation of the “PostIdent” – procedure

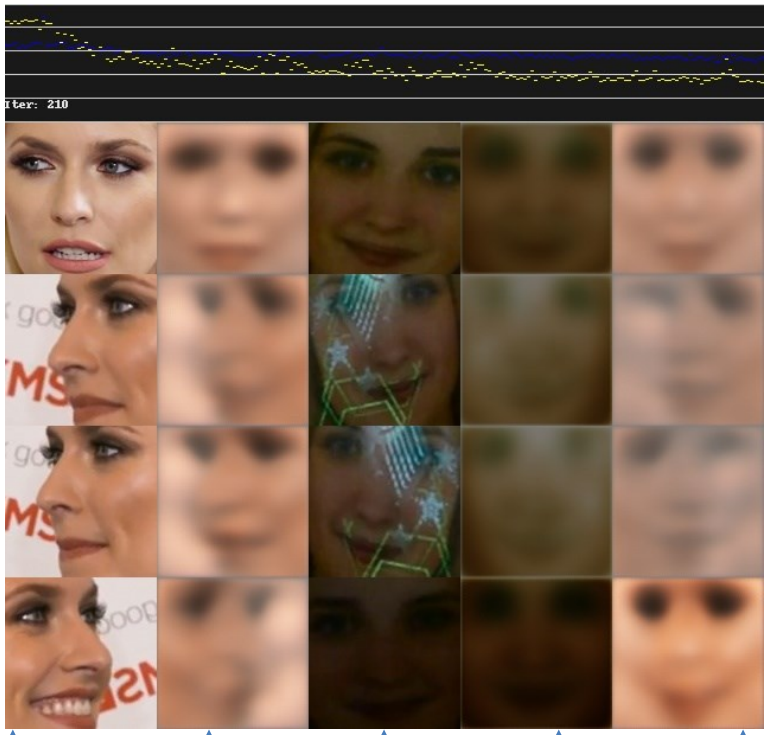
Manipulation of the “PostIdent” – procedure



faces detection in frames

Manipulation of the “PostIdent” – procedure

Begin of the trainings phase



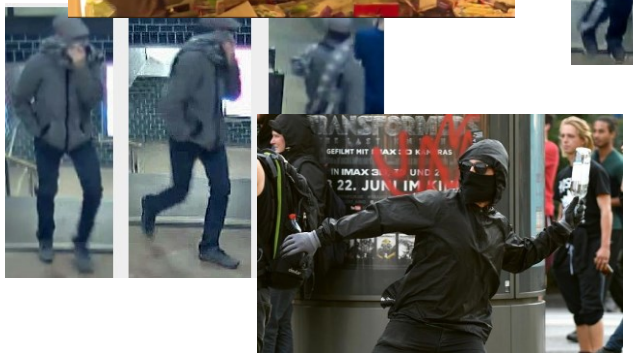
End of the trainings phase

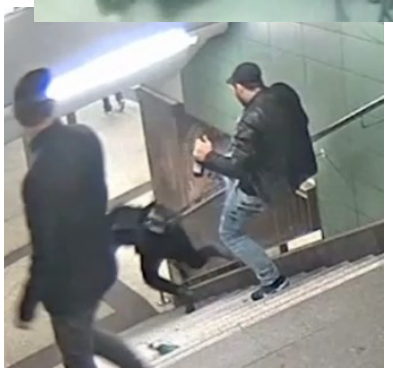
BUNDESREPUBLIK DEUTSCHLAND
FEDERAL REPUBLIC OF GERMANY / RÉPUBLIQUE FÉDÉRALE D'ALLEMAGNE
LCGRPXY40
PERSONALAUSWEIS
IDENTITY CARD / CARTE D'IDENTITÉ
WOITHE
JENNIFER
06.04.1998 DEUTSCH
CHEMNITZ
14.02.2022
377970

Danger and blessings

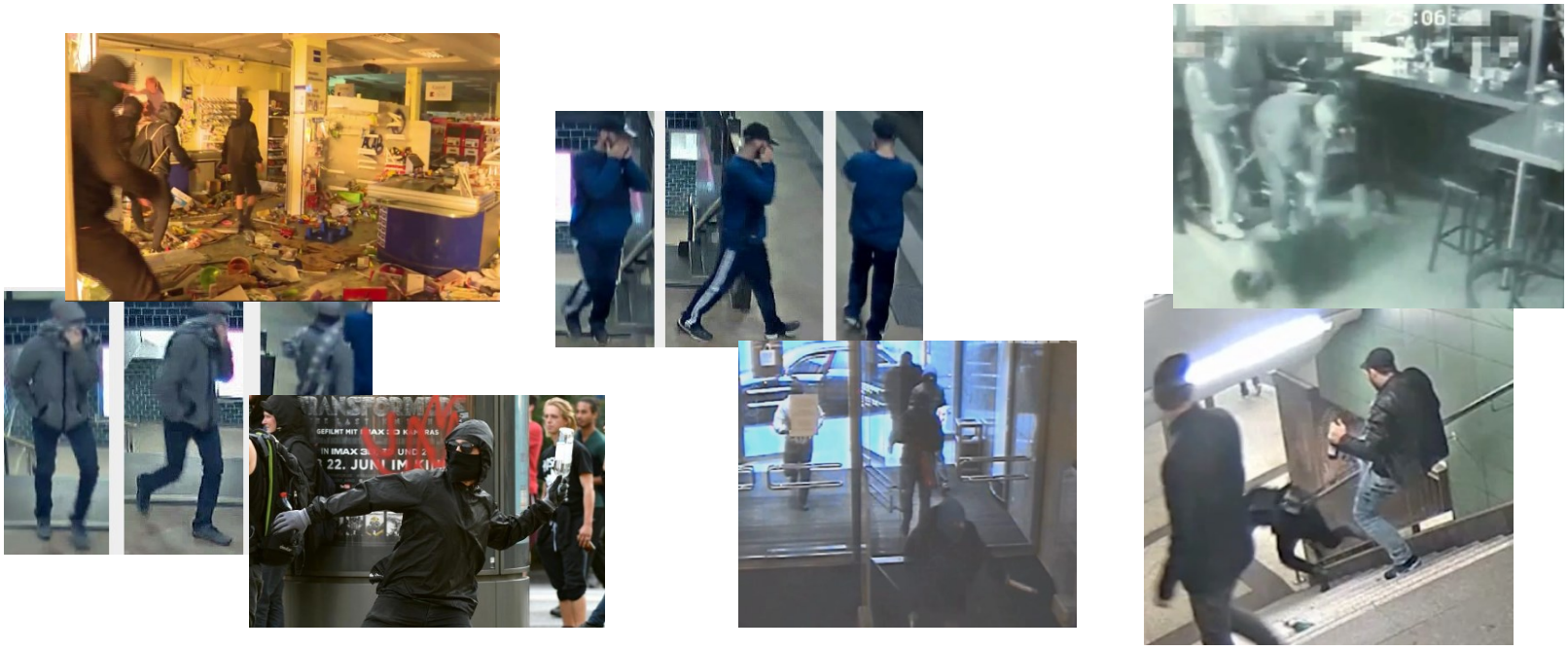
A lot of public videos
possibilities for the documentation of crime.

But
cover-up





- detection and observation
- offender and Victim (or not)
- what is the story of crime
- Can we detect persons and activities …

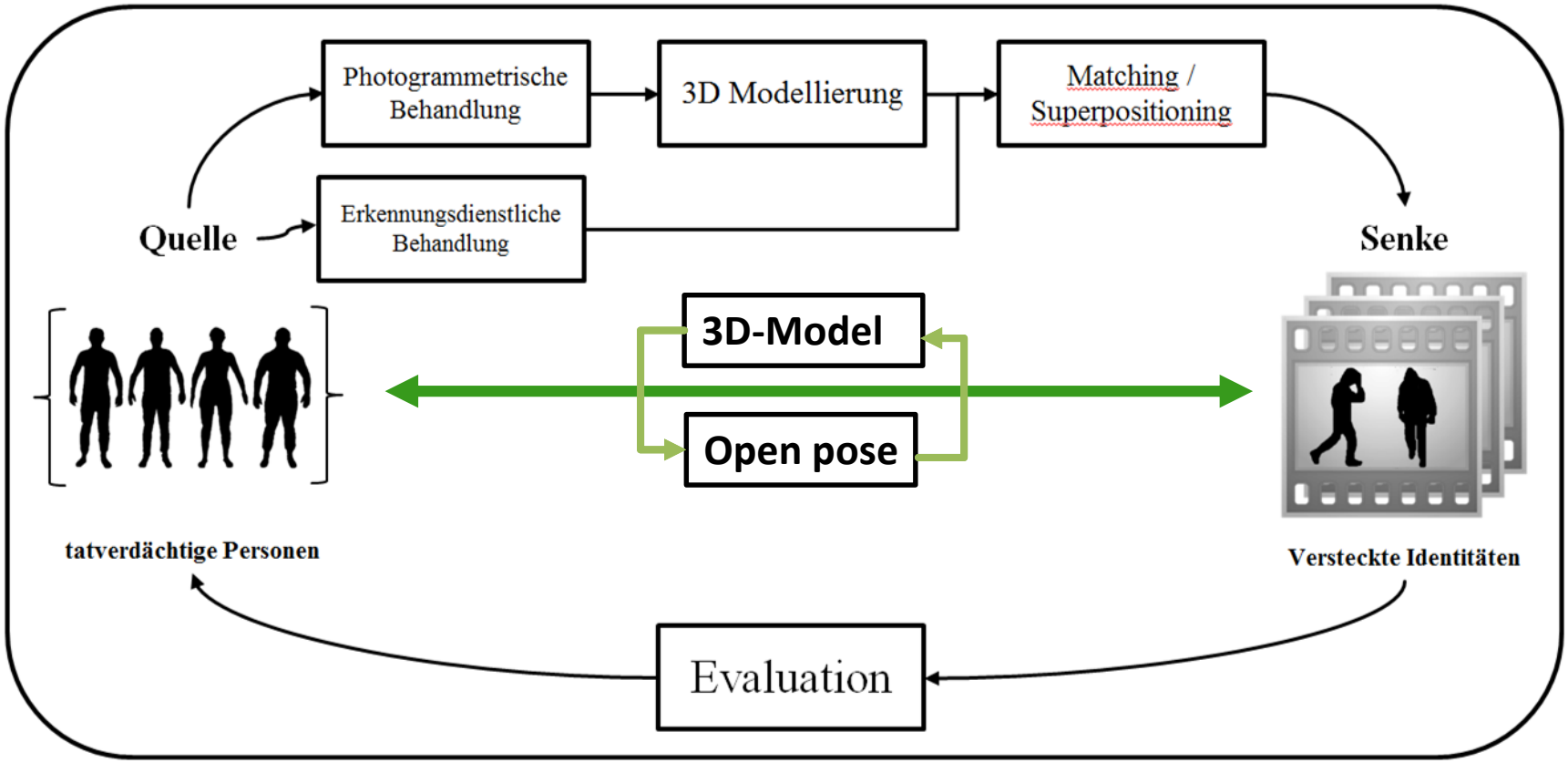


Identification of obfuscated persons in (public) videos

Identification (face recognition)

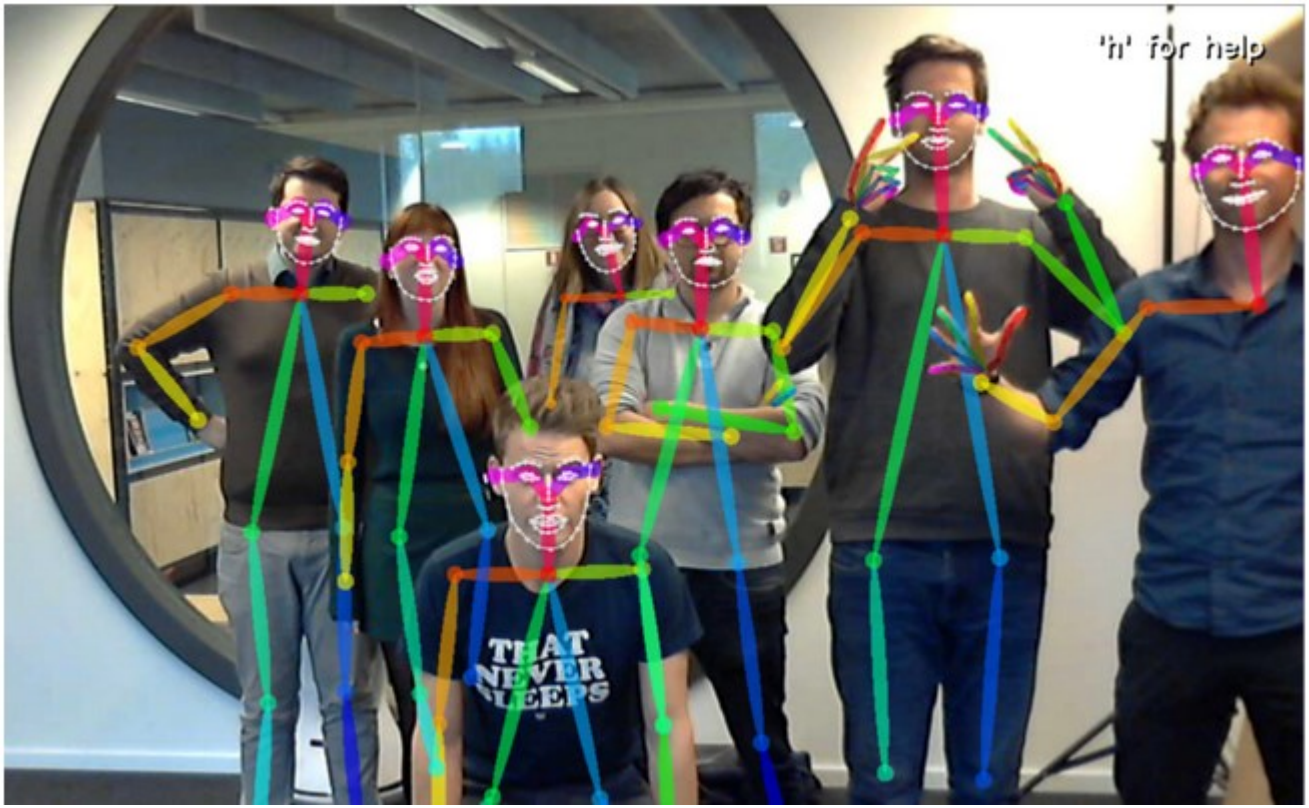
1:n
assignment

or other biometric feature
Gait analysis … anatomy … foot print or shoes print



Artificial skellet – rig

Open pose and gait analysis

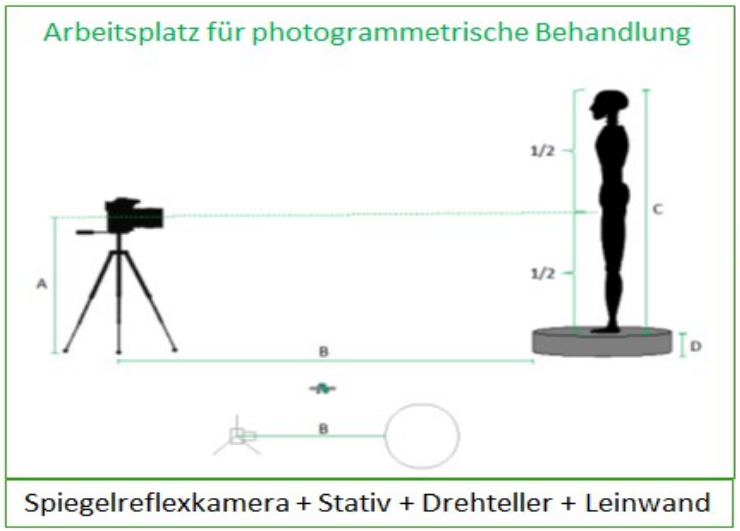


OpenPose represents the **first real-time multi-person system to jointly detect human body, hand, facial, and foot keypoints (in total 135 keypoints) on single images**.

Multi-Person Pose Estimation (Python/C++)

Workflow

turntable



Spiegelreflexkamera + Stativ + Drehteller + Leinwand

Punktwolke

3D-Modelling

3D-Modell

Distinguishing feature of persons in the sense of biometrics

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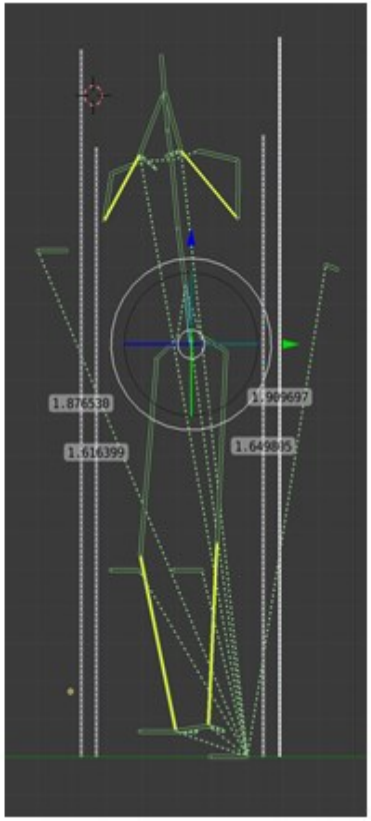

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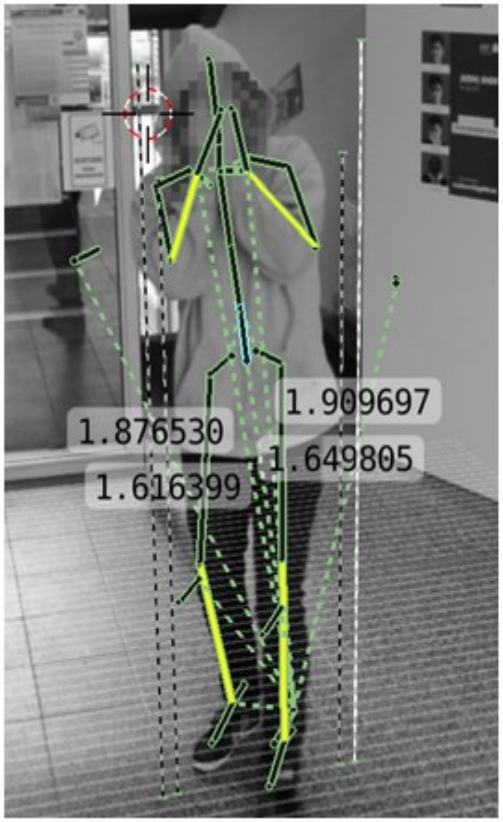
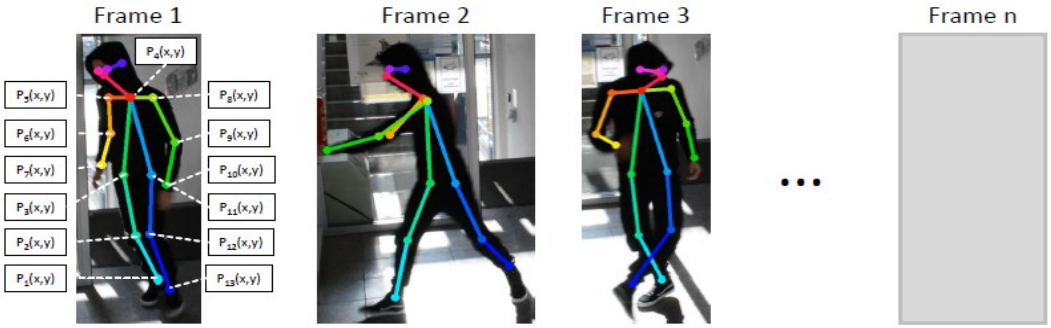
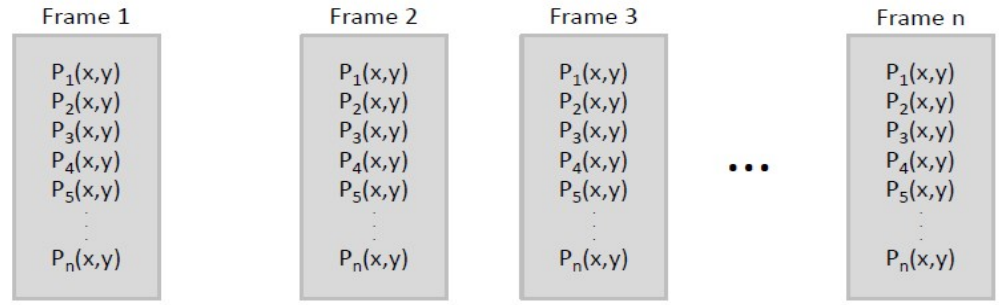
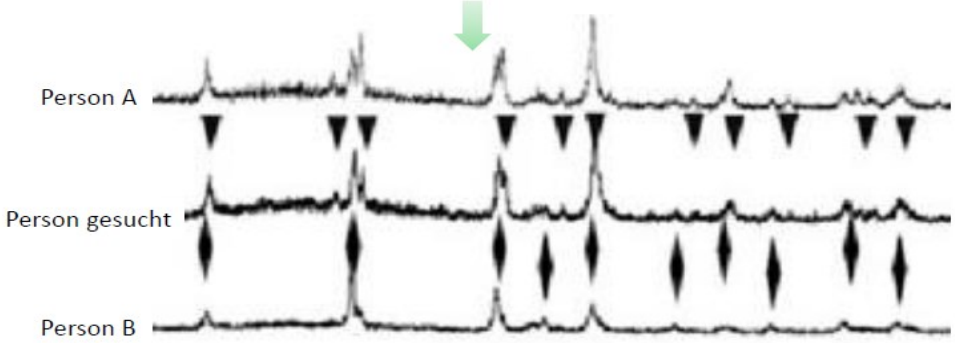


Numerical description of gait pattern





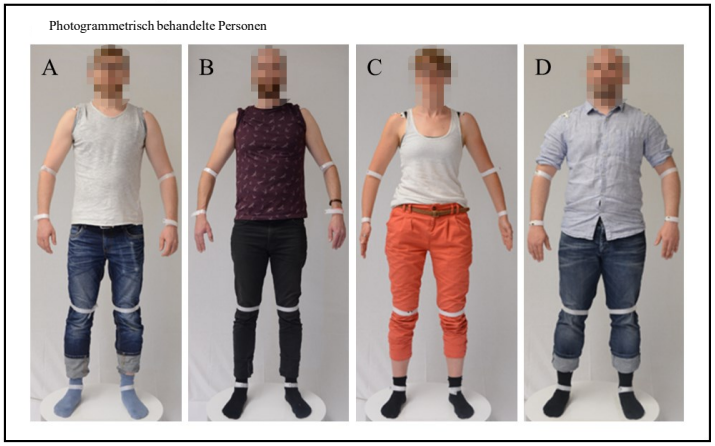


Gait analysis

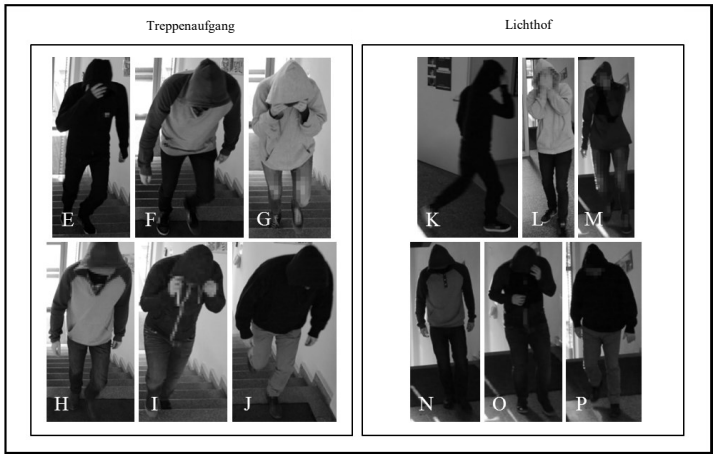
- movement patterns
- Feature vector
- pattern search

Evaluation

Informationsquelle



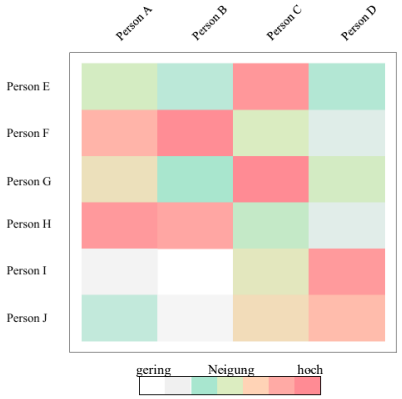
Informationssenke



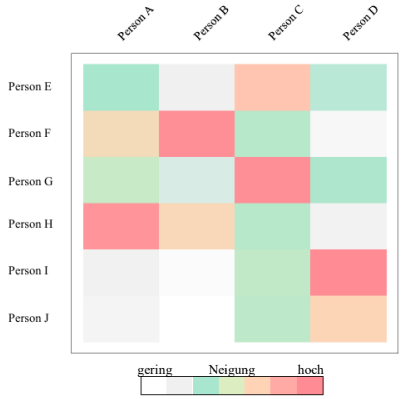
source and sink of information

Results staircase

2 Messungen/Person

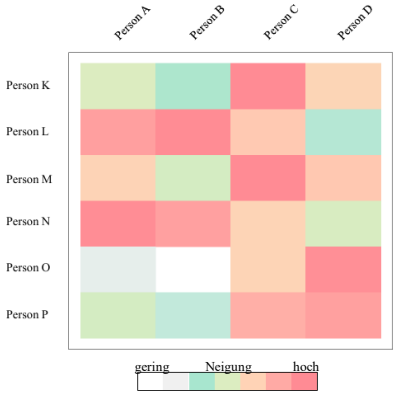


4 Messungen/Person

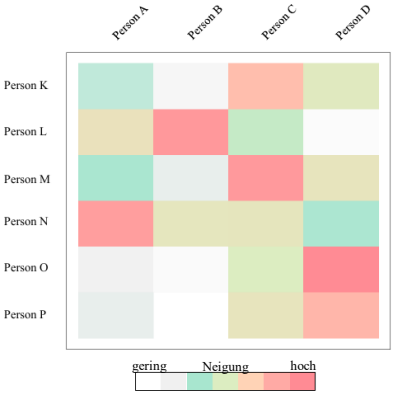


Results atrium

2 Messungen/Person



4 Messungen/Person



Person A = Person H & Person N
Person B = Person F & Person L
Person C = Person G & Person M
Person D = Person D & Person O

Thanks !

FEEL FREE TO ASK QUESTIONS

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