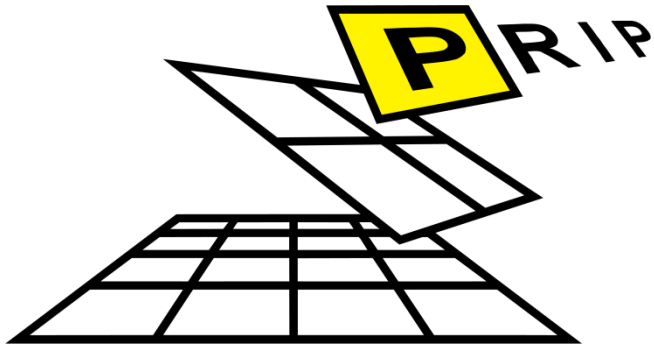


Automated detection of security critical scenarios in bank foyers by image analysis: A review.

Christoph Musik , Stefan Vogtenhuber (IHS Vienna)
Philipp Blauensteiner, Martin Kampel (TU Vienna)

‘A Global Surveillance Society?’
London, City University, 13th April 2010, Session 1 CCTV

Inter- and transdisciplinary research project TripleB ID



Computer science

eQUIHS

employment • qualification • innovation

Sociology

Co-operation partners



Theoretical frame: Technology in the making

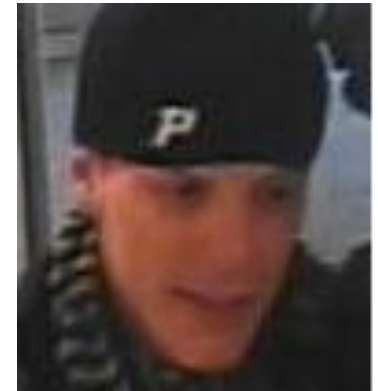
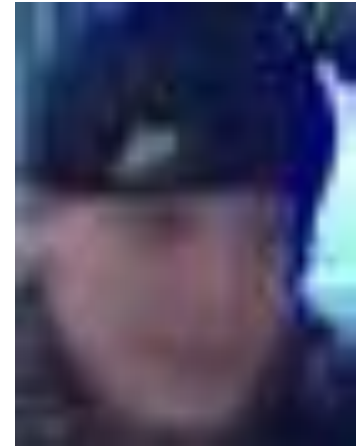
- Science and Technology Studies (STS)
 - Construction of Technology
 - Construction of Knowledge
- Surveillance Studies: Construction of code

Contextualization: The prevention of bank robberies

- Presence of CCTV does not act as a deterrent
- Security experts assumption: Potential robbers exploring a bank branch when preparing the crime can be detected
- Is it possible to translate this assumption to a system for automated event recognition?
- Is it an appropriate means of preventing bank robberies?

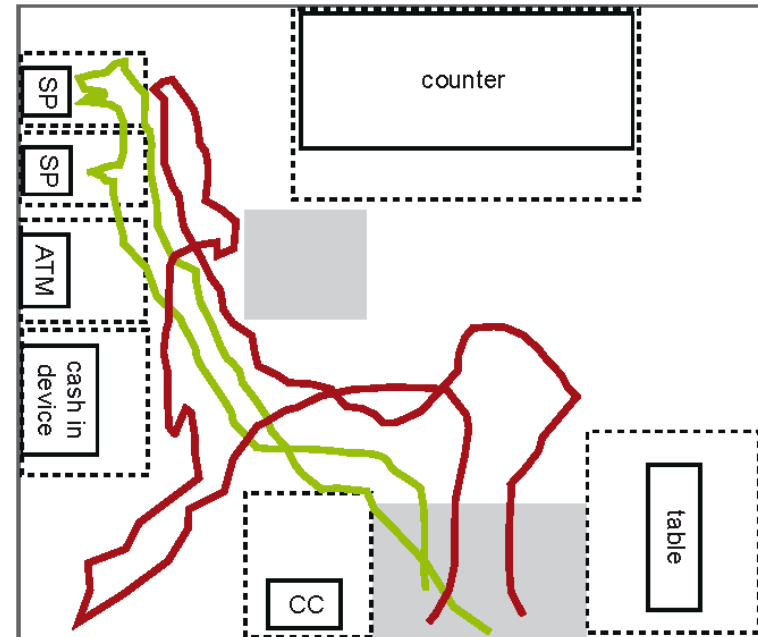
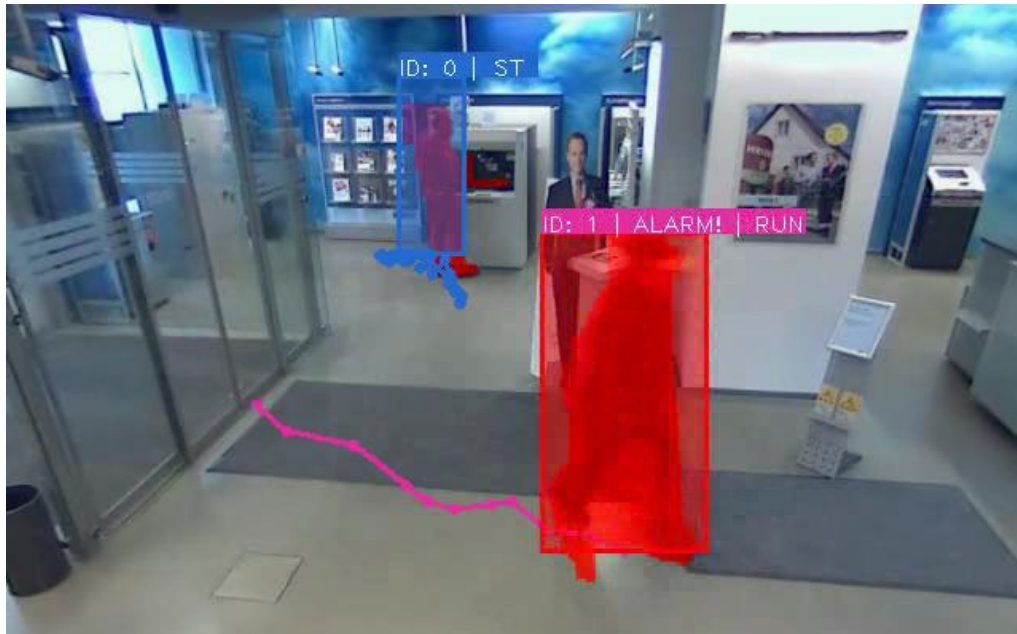
Computer Vision: Recent Developments

- Better sensors
- Improvement of image quality
- But: higher costs
 - Cameras
> 10 x more expensive
 - Storage
500 GB – 1 TB a day (for 8 HD cameras)
 - Hardware (for real time analysis)



Computer Vision: A Typical Surveillance System

- Detect and track objects
- Detect (unusual) events
 - e.g., analyse trajectories
 - Rule based vs automatic detection of unusual events

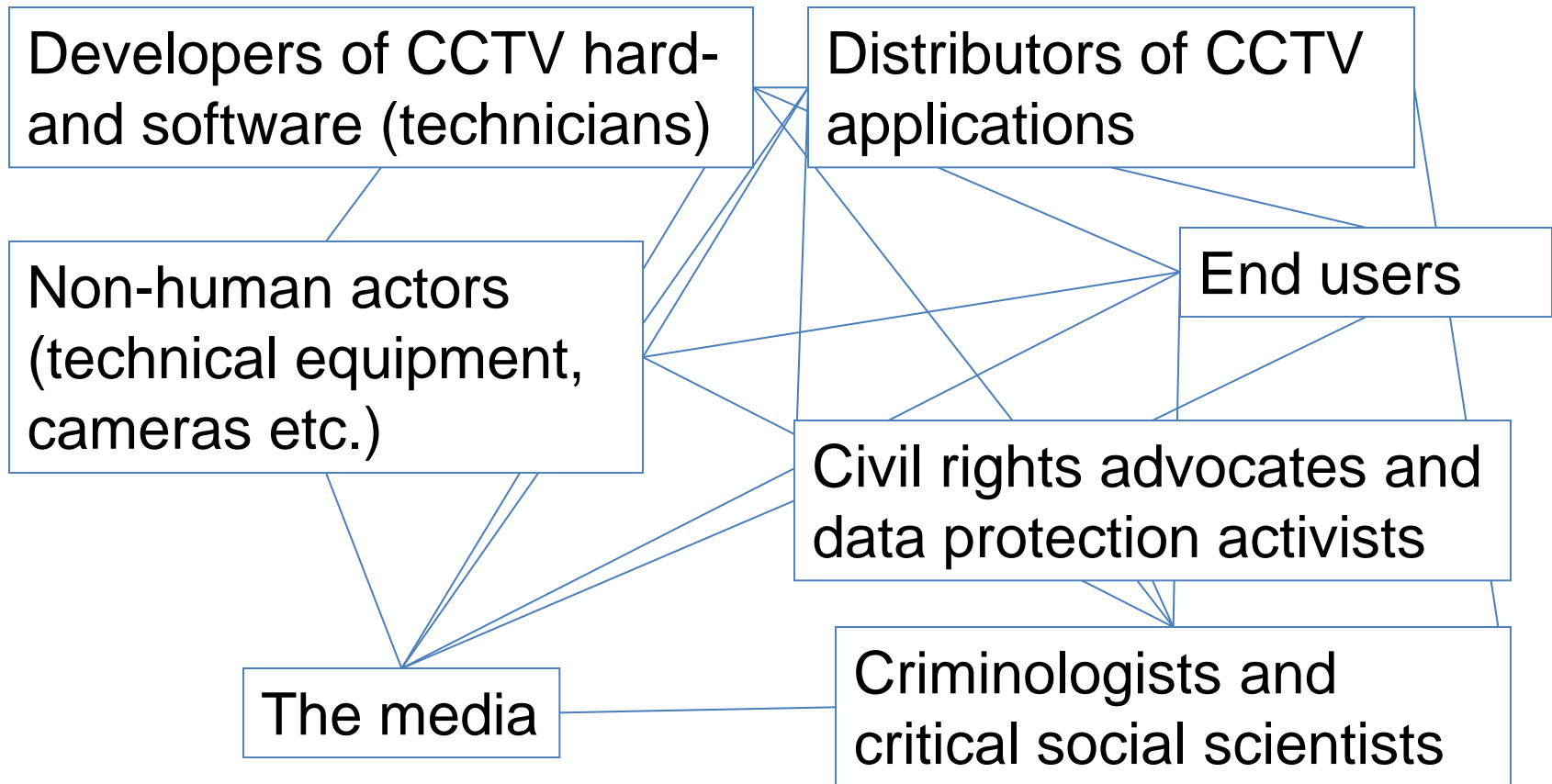


Computer Vision: Limitations of Visual Surveillance

- Occlusions
 - ➔ Multi-camera surveillance
- Crowds
 - ➔ Crowd analysis



Mapping the actor network



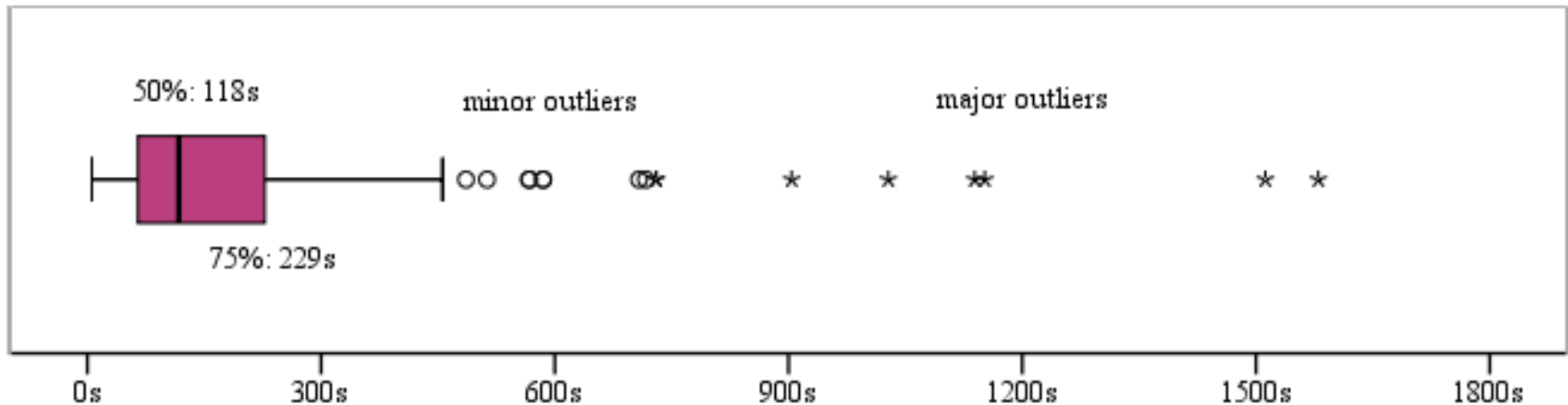
The Construction of Suspectedness

Qualitative interviews with representatives from various interest groups → pre-definition of suspicious behaviour

- staying at the bank foyer without using a machine (e.g. the ATM)
- ...without interacting with a member of staff over an extended period of time
- staying at a machine for an unusual long time

"Normal behaviour of bank customers"

- Non-participant observation + video analysis
- Four observation sessions; n=236 people



Customer's duration of stay in bank foyers in seconds. n=236, median=118s, IQR= 164s

"Normal behaviour": Conclusions

- Normal behaviour is very diverse
- No evidence that those differing from the mean are suspicious
- Information, that many bank robbers behave like ordinary customers

Discussion

- Those diverging from the norm are not suspicious → they have to be protected
- The construction of suspectedness has to be evidence-based rather than on the deviation from statistical normality
- Evidence and knowledge should be generated before engineering a technological system