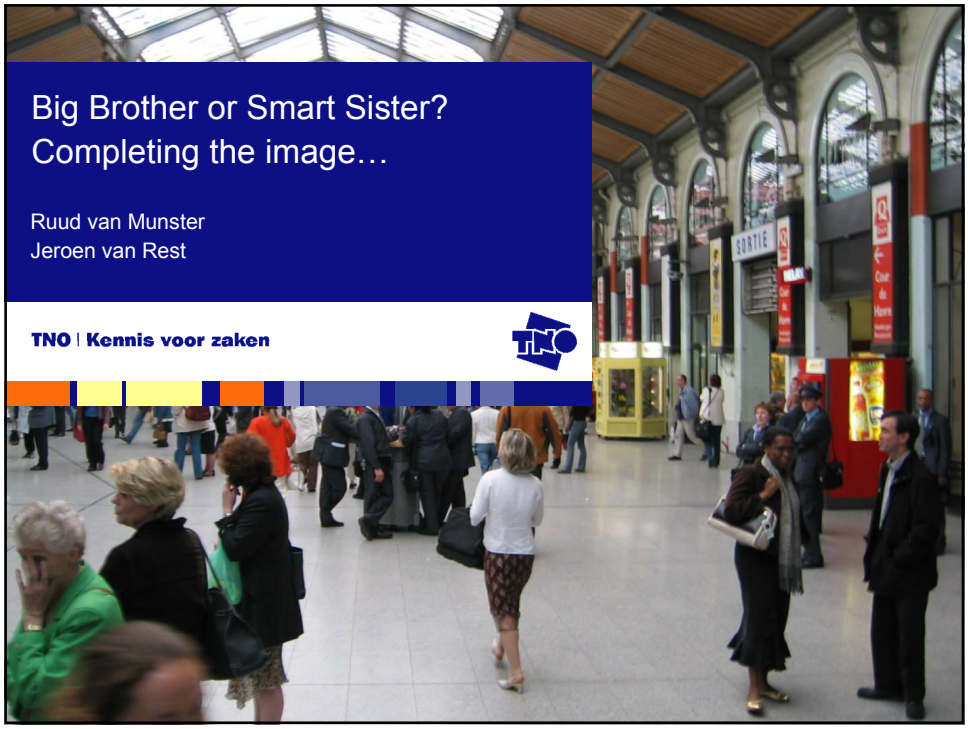


Big Brother or Smart Sister? Completing the image…

Ruud van Munster
Jeroen van Rest

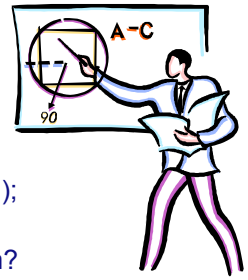
TNO | Kennis voor zaken

Imagine….

"Some people see things as they are and ask why...
Others dream things that never were and ask why not?"
George Bernard Shaw

© Carlos Tarrats's

This presentation in short



What?
- From “looking” to “seeing” (innovative observation);
- Video observation, the ultimate solution?
- Trends and issues: How to help camera’s perform?

How?
- In short: “Need for automatic observation”;
- Beyond camera’s: “Could you listen please?”
- Concepts: “Knowledge based observation”;
- Camera’s as part of a team;
- Thoughts about the near future: trends in observation;
- Questions to this forum.

Context: the high costs of security

The challenge
- Safeguarding is labour intensive and expensive by nature
- Attention for arbitrariness by human observers caused by implicit decisions;
- Everybody gets attention, while only a small group needs attention;
- How to improve security while respecting privacy?

Potential strategy
- (Partly) automatic systems as a filter;
- Decision support for the observers;
- Making decisions explicit and transparent.

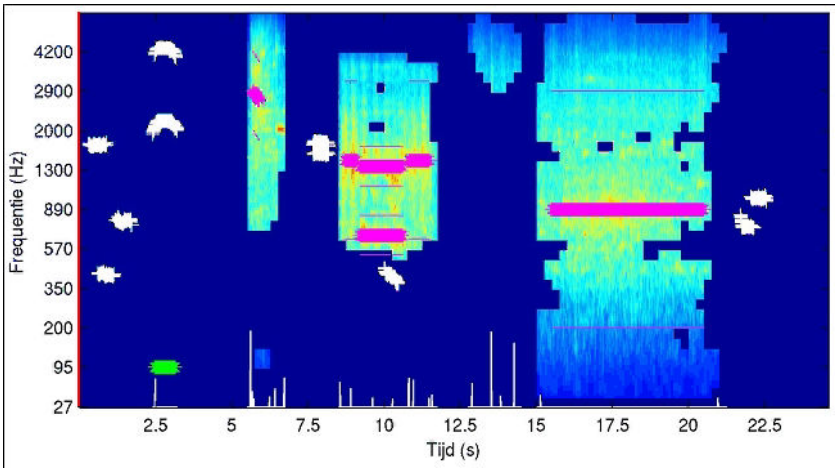
Strategy: Just camera's… ?

- People look, listen, smell, feel, think;
- And have their intuition;
- How about camera's?

- Camera's are stupid, unless…
- They can listen, sniff, think…

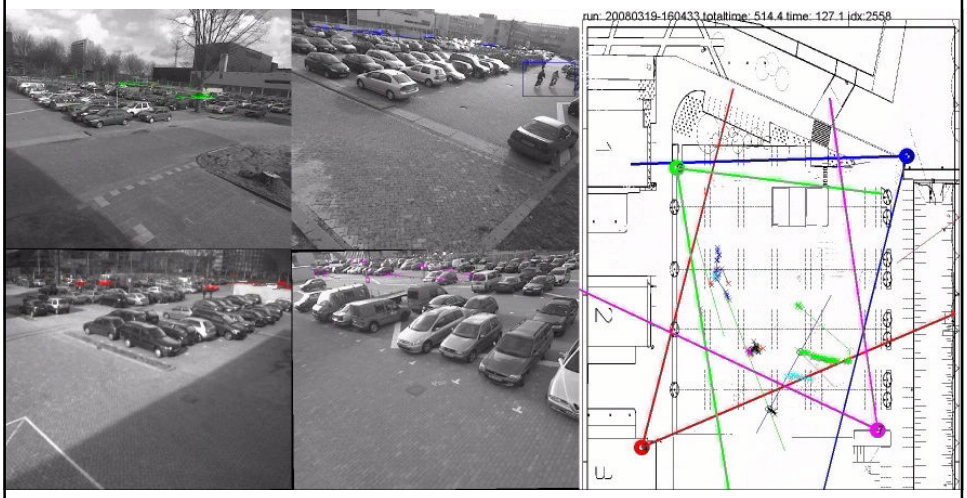
- We need new concepts:
  - Intelligent;
  - Integral;
  - User friendly;
  - Reliable;
  - Transparent and with respect for privacy.

Innovation 1: A listening camera



Interpreting the information in sound supports camera observation!

Innovation 2: Camera's as a team



Innovation 3: A new approach for airports

Bottlenecks in current security process:

- Unfriendly;
- Ineffective;
- Labour intensive ► uncontrolled costs;
- Accumulation of rules.

Alternative:

- Concept of integral observation;
  - ➢Transition from "rule-based" to "risk-based";
  - ➢Friendly, effective en efficient passenger check.

Passenger profiling through monitoring

- Concept to recognize special patterns in behaviour and/or possession of objects and materials;
  - Based upon integral observation with multiple sensors;
  - With a minimum of interaction;
  - But with a maximal result.
- Supporting a “risk-based” approach for security at airports:
  - Reducing the ad-hoc effects of a rule-based approach;
  - Reducing the intensive examinations from 99% to 2%;
  - But with 99,9 % effectiveness.

Basics of the concept

- People and objects are observed “on the fly” without actively visiting observation stations.
- Everybody travelling in the accommodation is tracked with high precision;
- During stay people are observed by a variety of (remote) sensors;
- Observations are added to a token linked to the person;
- If multiple observations indicate a deviation in behaviour or possession, the persons’ risk level is incremented;
- Persons with an increased risk level are candidate for closer examination.

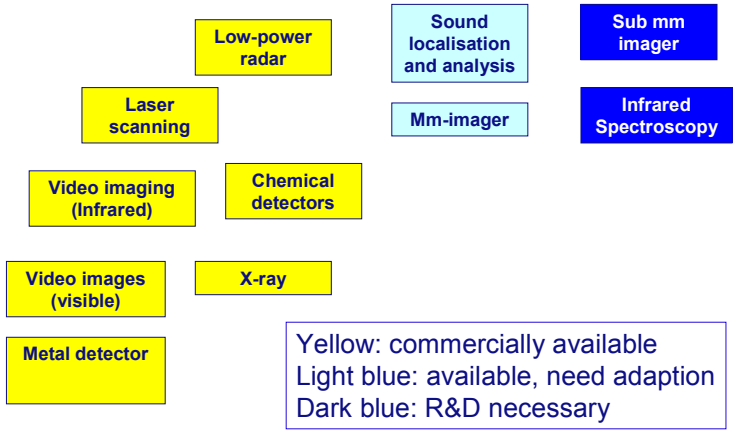
Examples of foreseen observations

Remote body features indicating arousal:
- Temperature;
- Heart beat frequency;
- Perspiration.

Object detection:
- Metal detector;
- Infrared and visible light video;
- Low energy X-ray;
- Low power radar, (sub) millimetre imaging.

Behaviour:
- Motion analysis;
- Trajectory analysis (logical ⇔ not logical);
- Speech analysis;
- Interpersonal contact.

Examples of sensor technology



Impact of this concept

Mainstream

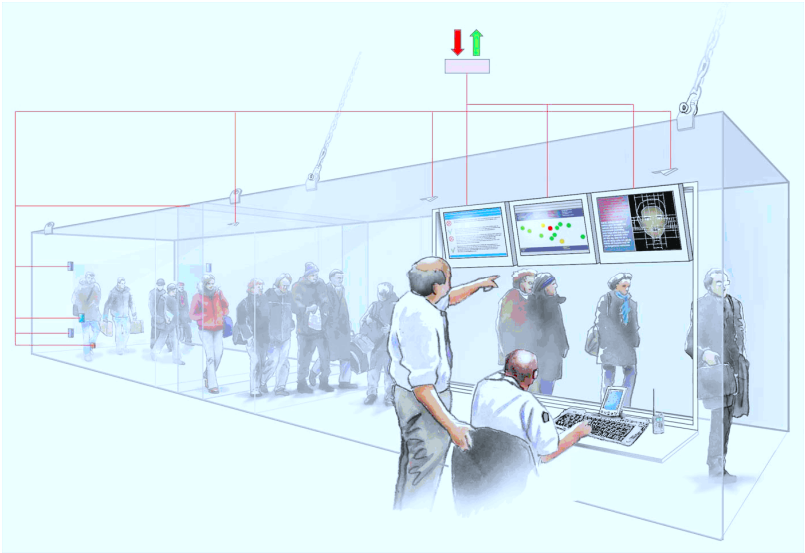
- Building a more complete passenger profile, needed for introduction of a “risk-based” approach;
- Resulting in:
  - An alternative for the current 100 % checking approach;
  - More objectivity when selecting people for intensive inspection.
- Faster passage at the border, thus less irritations and more time to spend at the airport (shopping, wining)
- Long term: better use of the available space.

At the same time

- Tool for research and education to make selection rules explicit;
- Better options to link luggage to the owners.

Artists impression of the concept Free after Minority Report

Movie!



Carefulness and privacy

On one hand:
- Increasing number of observations;
- Observations are more intensive;
- Risk of "Big Brother"!

At the other hand:
- Intelligent sensors are more objective than human observation;
- Hindrance is limited to the target group (1 à 2 %);
- Other people will have a minimum of inconvenience.

- But:
- Keep it transparent;
- Pay attention to auditing of use;
- Apply certification against unwanted use ("function creep").

Conclusions

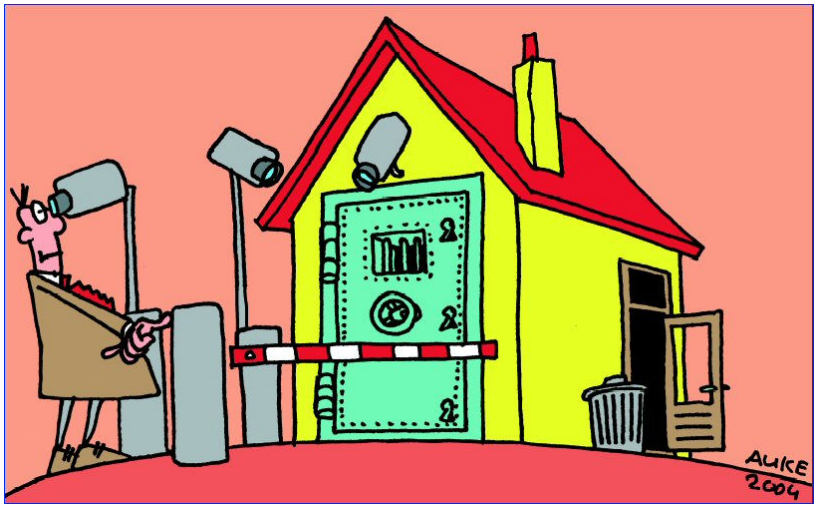
- Camera's are powerful but have their limitations;
- Innovative trends are:
  - Apply camera's as a team using observation models;
  - Integrate different sensors;
  - Camera's are a good platform for integration of sensor data;
  - Robust tracking & tracing is crucial for this approach.
- Image processing and pattern recognition are the motor;
- Attention is needed for privacy issues;
- Transparency, auditing en certification are important to safeguard privacy.

Question to the forum

What is your opinion about the following:

"Taking a more complete 'image' of a person is not necessarily more privacy invasive than taking an incomplete 'image'.
The chance to become suspect may be lower, because a complete image is a better option to preclude false accusations"

Thank you for your attention!



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