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i-DASH
INVESTIGATORS DASHBOARD

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The project is co-funded by the European Union, through the Safer Internet plus programme <http://ec.europa.eu/saferinternetplus/>

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I-DASH goals

To develop a *collection of integrated tools* capable of *handling thousands of hours of videos* potentially containing child pornography. The tools will focus on filtering out irrelevant material, recognition of known child pornography, interactive search in the material and establishing links between different videos.

To establish a *standard* to exchange video fingerprints and corresponding data to *facilitate international collaboration* and development of new kinds of technology.

To establish a *European database with video fingerprints* of known child pornography, allowing for efficient filtering of data and facilitating collaboration between national police forces.

The comments from the European Commission "... we think this is a very promising project because the parties involved already proved in the past they can handle high science and make real effective tools used in daily practice by detectives..."

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I-DASH research and development

Organization	Country	Contact	Main Focus
University of Amsterdam (UVA)	Netherlands	Marcel Worring, m.worring@uva.nl	Project coordinator Concept detection Interactive search
Nederlandse organisatie voor Toegepast Natuurwetenschappelijk onderzoek (TNO)	Netherlands	Wessel Kraaij, Wessel.kraaij@tno.nl	Nudity detection System Architecture VideoFingerprinting
Instituto Superior Technico (INESC)	Portugal	Isabel Trancoso, Isabel.Trancoso@inesc-id.pt	Audio analysis
University of Surrey (Surrey)	United Kingdom	Josef Kittler, J.Kittler@surrey.ac.uk	Location matching Object matching Datamining
ZiuZ - visual Intelligence (ZiuZ)	Netherlands	Gerrit Baarda, g.baarda@ziuZ.com	User requirements Dissemination Application Development System Integration

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I-DASH end-users

Organization	Country	Contact
Ministère de la Défense	France	Nicolas Duvinage, nicolas.duvinage@gendarmerie.defense.gouv.fr
Interpol	International	Hamish MC Culloch, h.mcculloch@interpol.int
National Police Agency The Netherlands	The Netherlands	Chris Groeneveld, chris.groeneveld@kpbp.politie.nl
Politiet	Norway	John Ståle Starnes, j.starnes@politiet.no
Child Exploitation and Online Protection Center	England	Paul Griffiths, Paul.Griffiths@ceop.gsi.gov.uk
Rikskriminalpolisen	Sweden	Per-Åke Wecksell, per-ake.wecksell@rpk.police.se

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Project organisation

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    graph TD
      SG["Steeringgroup  
Marcel Worring  
Wessel Kraaij  
Gerrit Baarda  
Isabel Trancoso  
Josef Kittler  
Eduardo Heras (EC)  
1 representative of supporting organisations"]
      UvA["University of Amsterdam  
Marcel Worring"]
      AB["Advisoryboard  
Nicolas Duvinage (France)  
Hamish MC Culloch (Interpol)  
Paul Griffiths (England)  
Per-Åke Wecksell (Sweden)  
John Stale Starnes (Norway)"]
      TNO["TNO  
Wessel Kraaij"]
      ZiuZ["ZiuZ  
Gerrit Baarda"]
      IT["Instituto Superior Technico  
Isabel Trancoso"]
      US["University of Surrey  
Josef Kittler"]
      UA["University of Amsterdam  
Marcel Worring"]

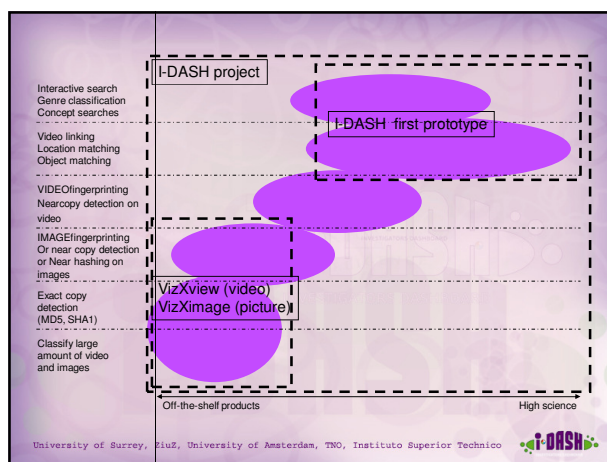
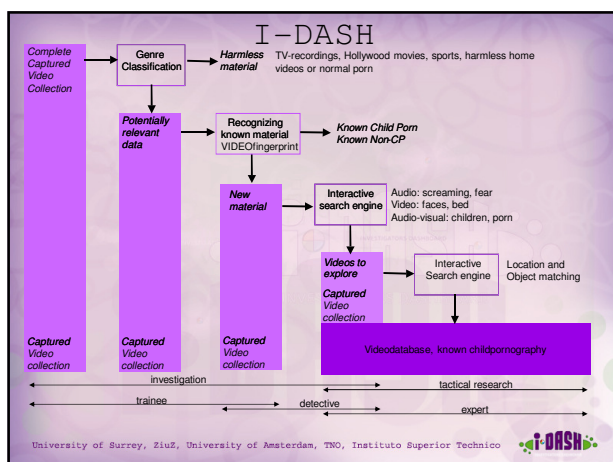
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      SG --- AB
      UvA --- TNO
      UvA --- ZiuZ
      UvA --- IT
      UvA --- US
      UvA --- UA
  
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I-DASH milestones

Date	Milestone
3Q2008	• Installation VizXview and first prototype of I-DASH
4Q2008	• Representative end-user selected for steering committee • First version of user requirements and focus points
1Q2009	• Full design of the system is ready
3Q2009	• Installation of second prototype system and demonstrators (working on own video material) • Conference
1Q2010	• Installation of third prototype system
3Q2010	• End of the project • Final conference

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MD5 hash: 32 characters, hexadecimal

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Robustness of fingerprints

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VIDEO-fingerprinting

- A standard compare (like an MD5 or SHA1) of digital files doesn't work anymore.
- Video Fingerprints are robust against:
 - Resolution change
 - Transcoding (AVI → MPEG)
 - Video noise
 - Only a part of the video is confiscated
 - Color invariants (think of NTSC vs PAL or black-white vs color)

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Results

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Results - robustness



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Results - correct or incorrect



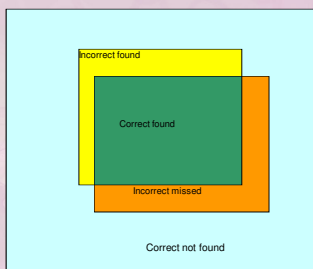
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Ranking matched videos

1. Correct found
 2. Correct found
 3. Incorrect found
 4. Correct found
- threshold
5. Incorrect missed
 6. Correct not found
 7. Correct not found

Seized videos



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Interactive search

Both from technics and business there are three approaches

- Genre classification to support the classifying process. To filter out harmless material with normal home movies, Hollywood movies, sport videos, normal porn, ...
- Concept searches to support the classifying process. To find video's with screamings of children, fear, interviews, faces, porn, nudity, bed or ...
- Location and object matching to support crosslinking and the tactical research

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Interactive search - Genre classification

Automatically detect TV-recordings, Hollywood movies, sports, harmless home videos or normal porn

Based on for example

- average shot length
- number of different camera positions
- movement
- image quality

Remark:

- Technology is based on statistics. The longer the video the better the prediction.
- Do we trigger on a hidden child porn scene of 1 minute in a sportsvideo of one hour?

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Interactive search - Location matching

Photo 2 is taken from a different angle and with a different zoom level

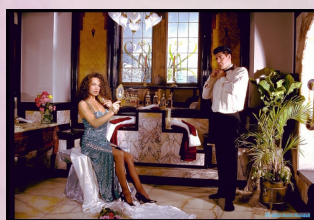


photo 1

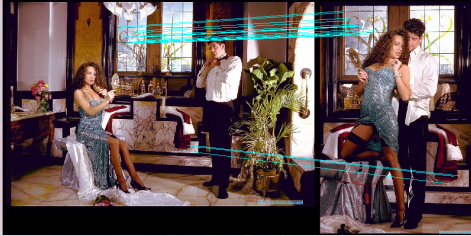


photo 2

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Automatic matching on details in the room



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Interactive search – Object matching in video




Hit list



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Interactive search – Object matching Photo 2 has another background and another pose



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The tattoo is matching



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