

BMVA symposium on "Security and surveillance: performance evaluation"



Visor

Video Surveillance Online Repository

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Aims of the Visor Project

- Gather and make freely available a repository of **surveillance video footages**
- Together with the videos, the repository contains **metadata annotation**, both manually annotated as ground-truth and automatically obtained by video surveillance systems
- Create an **open forum** to exchange, compare and discuss problems and results on many video surveillance and retrieval projects.



VISOR is within the VIDIVIDEO project



Interactive semantic
video search
with a large thesaurus
of machine-learned
audio-visual concepts

PARTICIPANTS:

- Intelligent Systems Lab (*Amsterdam*)
- Informatics and Telematics Institute (*Greece*)
- Institute for Systems and Computer Engineering (*Portugal*)
- Centre for Vision, Speech and Signal Processing (*University of Surrey UK*)
- Media Integration and Communication Centre (*Università degli Studi di Firenze*)
- Computer Vision Center (*Barcelona*)
- Sound & Vision, the Dutch national audio and video archive (*The Netherlands*)
- FDR, Fondazione Rinascimento Digitale (*Firenze*)



Visor
Video Surveillance
Online Repository

*Università di Modena e
Reggio Emilia*



Video Surveillance Online Repository

Visor contains a set of **videos** grouped into **categories**

The screenshot shows the website's header with the 'Visor' logo and the title 'Video Surveillance Online Repository @ ImageLab'. A navigation menu includes links for Home, Concept List, Videos, Search, Forum, Downloads, Staff, Upload, Profile, Admin, Links, and Credits. Below the menu, a 'Welcome admin' message and a 'Logout' button are visible. The main content area features a 'Video Categories' section with a grid of six video thumbnails and their corresponding category labels: 'Outdoor Unimore D...', 'Indoor Domotic Un...', 'Other', 'Shadows', 'Videos for Smoke ...', and 'Outdoor - other'. At the bottom, there is a footer with contact information and a copyright notice.


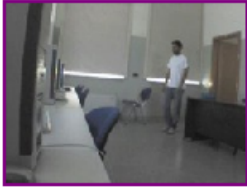
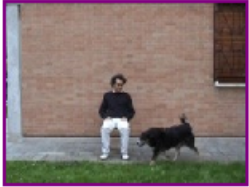



Video Surveillance
Online Repository @ ImageLab

Home | Concept List | Videos | Search | Forum | Downloads | Staff | Upload | Profile | Admin | Links | Credits

Welcome admin

Show List - Show all videos - Show all clips

Video Categories

		
Outdoor Unimore D...	Indoor Domotic Un...	Other
		
Shadows	Videos for Smoke ...	Outdoor - other

For problems or suggestions: contact ImageLab group - Webmaster: Roberto Vezzani - ©2007 - Counter: 1946



Video Surveillance Online Repository

Visor contains a set of **videos** grouped into **categories**

Video Surveillance
Online Repository @ ImageLab

Home | Concept List | Videos | Search | Forum | Downloads | Staff | Upload | Profile | Admin | Links | Credits

Welcome admin [Logout](#)

[Show List](#) - [Show all videos](#) - [Show all clips](#)

Video Categories



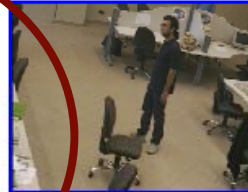
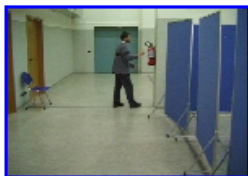





- 6 videos for shadow detection
- 14 videos for smoke detection
- 20 videos for consistent labeling problems on a set of partially overlapped cameras
- 10 videos of fall detection
- And much more...



Video Surveillance Online Repository

Visor contains a set of **videos** grouped into **categories**

Indoor Domotic Unimore D.I.I. setup (Page 1/2)

		
Domotica_federica	Domotica_030930_1	LabInfoFixed_NoCompr
		
video5parte1	video5parte2	video5parte3
		
domotica_031007_1...	domotica_031007_1...	domotica_031007_0...

For each video....



Video details

- Screenshot
- Video information (title, description, size, compression, etc...)
- Metadata (Author, location, date, keywords, etc...)
- Copyright statement
- Flash compressed version
 - (java flash player)

IntelligentRoom	
	<input type="button" value="Show ScreenShot"/> <input type="button" value="Show Preview"/> <input type="button" value="Show Clips"/>
Video Information	
File Name:	intelligentroom_raw.avi
Title:	IntelligentRoom
Description:	IntelligentRoom
Video Details:	Width: 320 Height: 240 Frame Rate: 10 Frame Count: 300 Compression: Uncompressed
Author:	Prati Andrea
Uploaded by:	Vezzani Roberto
Creation date:	02/05/2001
Copyright statement:	This videos belong to the Shadows test bed created by UCSD and Unimore
Download	
Download:	 Original File (AVI)
Download counter:	4



Video details


























- Screenshot
- Video information (title, description, size, compression, etc...)
- Metadata (Author, location, date, keywords, etc...)
- Copyright statement
- Flash compressed version
 - (java flash player)
- Camera information
- Keywords
- Related files
- **Annotations!**

Download	
Download:	Original File ()
Download counter:	7
Camera Information	
Camera Description	
Type	Static Camera
Constrained Motion	no
Infra Red capabilities	no
Omnidirectional camera	no
Other Information	
Forum Topic:	
Keywords:	Outdoor; Unimore; pedonal zone
Other Related Files:	Laboratory_paw.avic_3.jpg()
Annotations	
Empty Annotation (video information only) Author: Visor System <i>(Automatic Annotation)</i>	Download
E:\Viper\Domotica_030930_1.xgtf Author: Amoruso Vincenzo <i>(Ground Truth)</i>	Play Video&Annotation Download entire file Download with Field-selection
Operations	
<input type="button" value="Download All"/>	
<input type="button" value="Upload Annotation"/>	<input type="button" value="Upload Related Files"/> <input type="button" value="Edit"/>



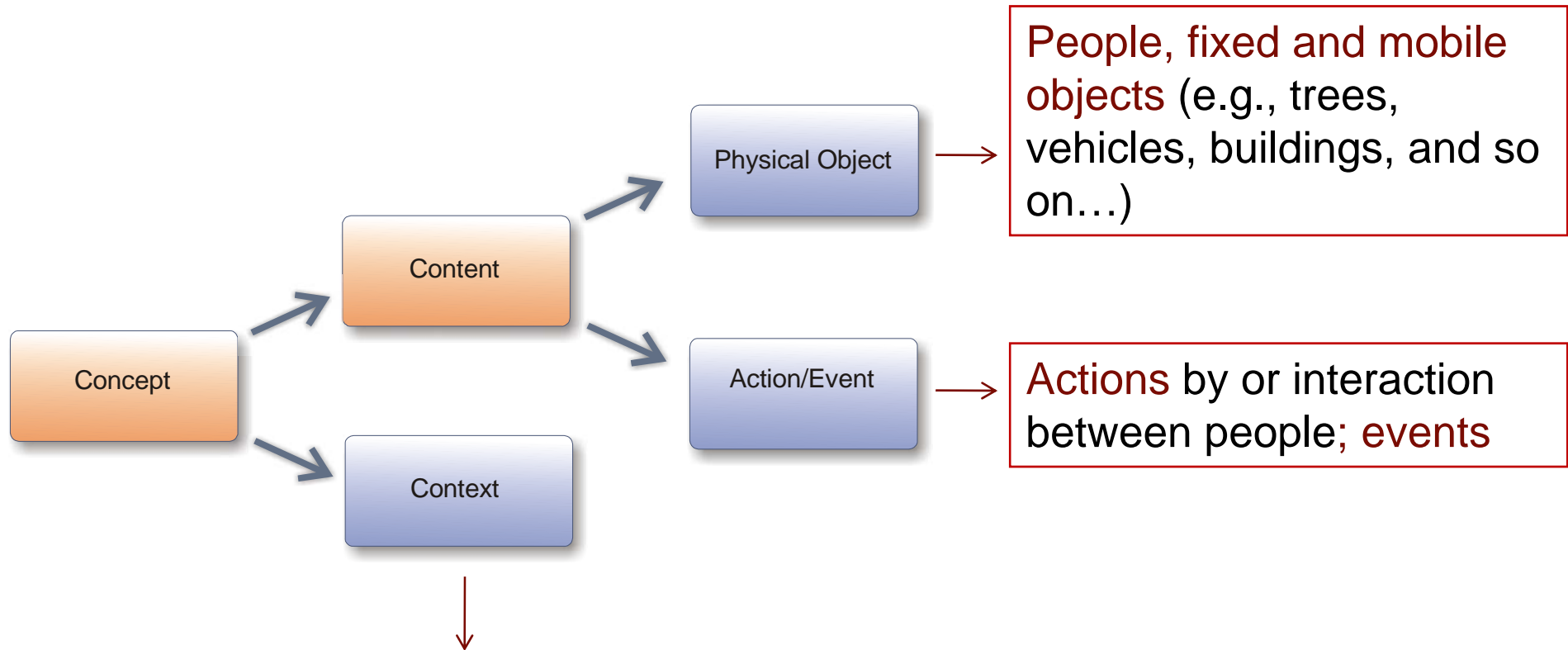
Temporal / semantic clip segmentation

- Each video can be segmented into clips
- Clip level web interface
- Clips of a video:

Clip List (Page 16/17)				
				
06_fumogeno3.avi clip_1642:1875	06_fumogeno3.avi clip_1876:2109	06_fumogeno3.avi clip_2110:2300	07_fumogeno4.avi clip_0:101	07_fumogeno4.avi clip_202:404
				
07_fumogeno4.avi clip_405:606	07_fumogeno4.avi clip_607:809	07_fumogeno4.avi clip_810:1011	07_fumogeno4.avi clip_1012:1213	07_fumogeno4.avi clip_1214:1416
				
07_fumogeno4.avi clip_1417:1618	07_fumogeno4.avi clip_1619:1821	07_fumogeno4.avi clip_1822:1850	08_fumogeno5.avi clip_0:214	08_fumogeno5.avi clip_215:429
				
08_fumogeno5.avi clip_430:644	08_fumogeno5.avi clip_645:859	08_fumogeno5.avi clip_860:1075	08_fumogeno5.avi clip_1076:1290	08_fumogeno5.avi clip_1291:1505
				



Annotation content



Metadata (e.g.: author of the video, camera information, calibration data, location, date and time, and so on...)



Set of surveillance classes and concepts

Class	Category
<i>Person</i>	<i>PhysicalObject</i>
<i>BodyPart</i>	<i>PhysicalObject</i>
<i>GroupOfPeople</i>	<i>PhysicalObject</i>
<i>FixedObject</i>	<i>PhysicalObject</i>
<i>MobileObject</i>	<i>PhysicalObject</i>
<i>ActionByAPerson</i>	<i>Action/Event</i>
<i>ActionByPeople</i>	<i>Action/Event</i>
<i>ObjectEvent</i>	<i>Action/Event</i>
<i>GenericEvent</i>	<i>Action/Event</i>
<i>Video</i>	<i>Context</i>
<i>Clip</i>	<i>Context</i>
<i>Location</i>	<i>Context</i>

List of "IS-A" concepts
(static concepts)
e.g.: *male, girl, civilian, soldier*

LSCOM and MediaMill
concepts are included

List of "HAS-A" concepts
(dynamic concepts)
e.g.: *position, contour, name,
color, appearance*



Annotation Format – Viper

```
<?xml version="1.0" encoding="UTF-8" ?>
- <viper xmlns="http://lamp.cfar.umd.edu/viper#" xmlns:data="http://lamp.cfar.umd.edu/viperdata#">
  - <config>
    - <descriptor name="Information" type="FILE">
      - <attribute dynamic="false" name="SOURCE" type="http://lamp.cfar.umd.edu/viperdata#lvalue">
        - <data:lvalue-possibles>
          <data:lvalue-enum value="SEQUENCE" />
          <data:lvalue-enum value="FRAMES" />
        </data:lvalue-possibles>
      </attribute>
      <attribute dynamic="false" name="NUMFRAMES" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="false" name="FRAMERATE" type="http://lamp.cfar.umd.edu/viperdata#fvalue" />
      <attribute dynamic="false" name="H-FRAME-SIZE" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="false" name="V-FRAME-SIZE" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
    </descriptor>
    - <descriptor name="physical_object" type="OBJECT">
      <attribute dynamic="false" name="nature" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="true" name="status" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="false" name="type" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="false" name="subtype" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="true" name="info2D" type="http://lamp.cfar.umd.edu/viperdata#bbox" />
      <attribute dynamic="true" name="info3D" type="info3d" />
      <attribute dynamic="true" name="connected_with" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="true" name="links" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="true" name="speed" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="true" name="occluded" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
    </descriptor>
    - <descriptor name="event" type="OBJECT">
      <attribute dynamic="false" name="name" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="true" name="status" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
      <attribute dynamic="false" name="physical_object" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
      <attribute dynamic="false" name="contextual_object" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
    </descriptor>
  </config>
  - <data>
    - <sourcefile filename="file:/C:/zhou_work/ra_qmul/sequences/ANECHOIC-1/2%20person%20running%20speaking/full%20data%20
      + <file id="0" name="Information">
      + <object framespan="108:341 369:374 383:577 598:803 854:992" id="0" name="physical_object">
      - <object framespan="1:1 121:442 489:609 639:669 681:819 859:886 918:1106" id="1" name="physical_object">
        <attribute name="nature" />
        <attribute name="status" />
        <attribute name="type" />
        <attribute name="subtype" />
      + <attribute name="info2D">
        <attribute name="info3D" />
        <attribute name="connected_with" />
        <attribute name="links" />
        <attribute name="speed" />
        <attribute name="occluded" />
      </object>
    </sourcefile>
  </data>
</viper>
```

- XML based
- Config* and *data* are separated
- Widely diffused
- Easy to use
- Clear
- Documentation
- Compact
- Extensible
- Annotation Tool (VIPER-GT)



Annotation Format – Viper

- XML based
- Config* and *data* are separated

```

<?xml version="1.0" encoding="UTF-8" ?>
- <viper xmlns="http://lamp.cfar.umd.edu/viper#" xmlns:data="http://lamp.cfar.umd.edu/viperdata#">
- <config>
- <descriptor name="Information" type="FILE">
- <attribute dynamic="false" name="SOURCE" type="http://lamp.cfar.umd.edu/viperdata#lvalue">
- <data:lvalue-possibles>
- <data:lvalue-enum value="SEQUENCE" />
- <data:lvalue-enum value="FRAMES" />
- </data:lvalue-possibles>
- </attribute>
- <attribute dynamic="false" name="NUMFRAMES" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />
- <attribute dynamic="false" name="FRAMERATE" type="http://lamp.cfar.umd.edu/viperdata#fvalue" />
- <attribute dynamic="false" name="H-FRAME-SIZE" type="http://lamp.cfar.umd.edu/viperdata#dvalue" />

```

```

<attribute dynamic="false" name="contextual_object" type="http://lamp.cfar.umd.edu/viperdata#svalue" />
</descriptor>
</config>
<data>
<sourcefile filename="file:/C:/zhou_work/ra_qmul/sequences/ANECHOIC-1/2%20person%20running%20speaking/
+ <file id="0" name="Information">
+ <object framespan="108:341 369:374 383:577 598:803 854:992" id="0" name="physical_object">
- <object framespan="1:1 121:442 489:609 639:669 681:819 859:886 918:1106" id="1" name="physical_object">
- <attribute name="nature" />
- <attribute name="status" />
- <attribute name="type" />
- <attribute name="subtype" />
+ <attribute name="info2D">
- <attribute name="info3D" />
- <attribute name="connected_with" />

```

```

- <attribute name="type" />
- <attribute name="subtype" />
+ <attribute name="info2D">
- <attribute name="info3D" />
- <attribute name="connected_with" />
- <attribute name="links" />
- <attribute name="speed" />
- <attribute name="occluded" />

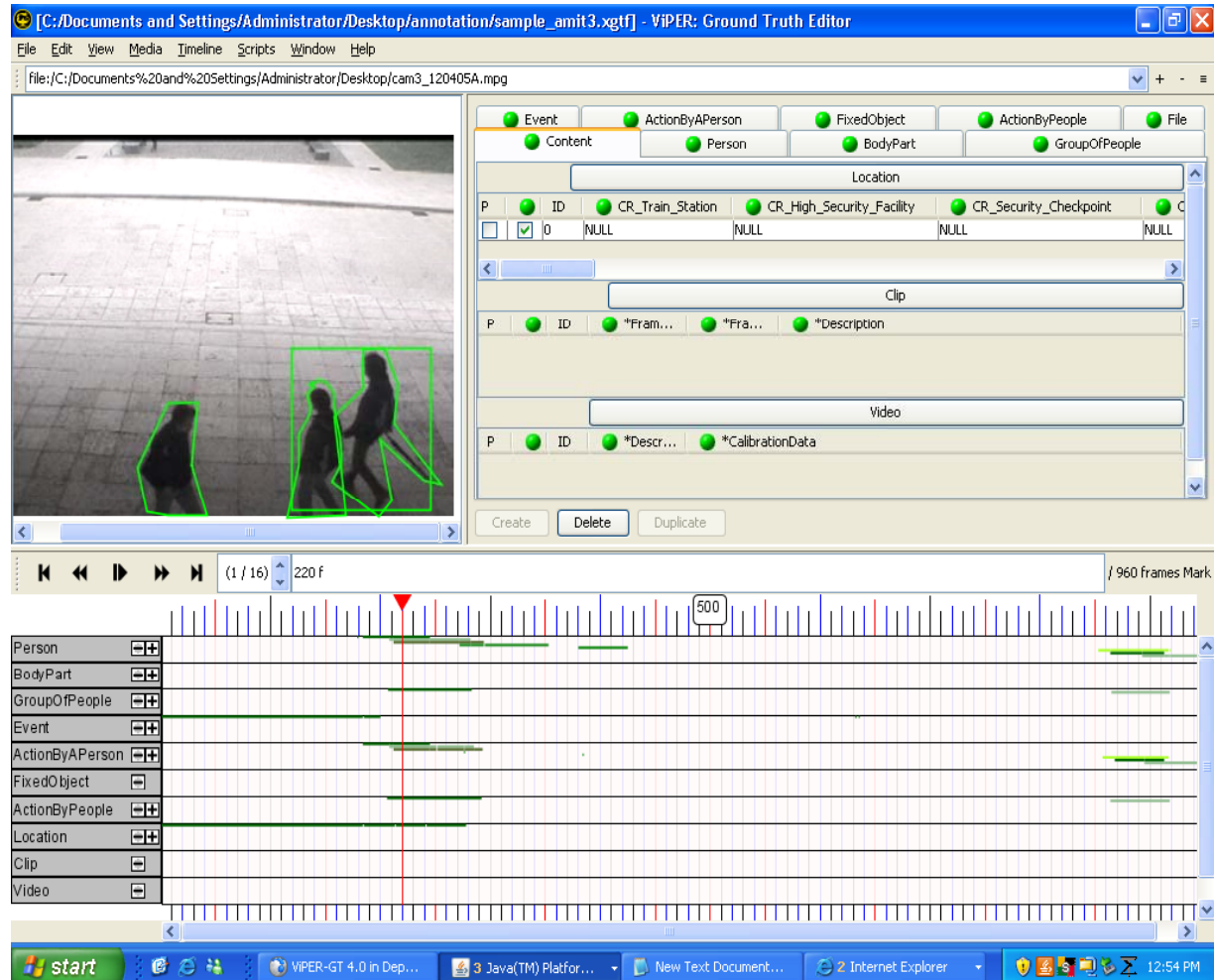
```

- Annotation TOOL (VIPER-GT)



Viper-GT – a free annotation tool

- A free online tool to generate annotation data for videos
- Written in java (high portability)
- Visor provides the configuration file for VIPER-GT
- Visor can import annotation data generated with Viper-GT



Annotation

- Two different types:
 - **Ground truth** annotation (manually generated)
 - **Automatic** annotation (i.e., system outputs)
- Used for:
 - Video **search** within the repository
 - Ground truth annotation data for training or **evaluation** purposes
 - Automatic annotation for **comparisons** and challenges
- *To this aim we want to introduce performance metrics and automatic evaluation modules (like ETISEO)*



Concept-based video retrieval

Search by concept

(Demo: try with Female_Person)

Show all the videos with **Adult**

Show only videos with **Adult**

- Bicycle
- Building
- Bus
- Car
- CarAccident
- CarRunsRedLight
- CarStarts
- CarStops
- Chair
- Civilian_Person
- Crowd
- CrowdDispersal
- CrowdFormation
- Cycling
- Exiting_Car
- Face
- Female
- Female_Person
- Furniture
- Grass
- Group
- Handshaking
- Highway
- Indoor
- Male
- Male_Person
- Motorbike
- Office
- Outdoor

For problems or suggestions: contact [frazzani](#) - ©2007



Search by Concept: Adult

Video	Screenshot	Author	Annotation2
cam1_120405A1 <i>cam1_120405A1</i> Details	 Download the media file	v_amoruso	1. E:\Viper\cam1_120405A1.xgtf <i>(Amoruso Vincenzo)</i> Download Annotation
cam1_120405B <i>cam1_120405B</i> Details	 Download the media file	v_amoruso	1. E:\Viper\cam1_120405B.xgtf <i>(Amoruso Vincenzo)</i> Download Annotation
cam2_120405B <i>cam2_120405B</i> Details	 Download the media file	v_amoruso	1. E:\Viper\cam2_120405B.xgtf <i>(Amoruso Vincenzo)</i> Download Annotation
cam3_120405A1 <i>cam3_120405A1</i> Details	 Download the media file	robervez	1. E:\Viper\cam3_120405A1.xgtf <i>(Amoruso Vincenzo)</i> Download Annotation



Privacy issues

- Restricted access granted only to registered users
- User registration requires moderator grant
- Video processing in order to make it privacy compliant
- “Research only” videos
- Responsibility of the uploader of the video content (like Youtube)

- *Collaboration with the Law faculty of Modena*
- *CRIS (Inter department security research center – Modena - Italy)*



Privacy issues



User group and Forum

- User group of researchers working on video surveillance topics
- Custom **Forum Topics on**
 - Generic video surveillance issues
 - The VISOR system (e.g., call for videos, comments, suggestions, etc...)
 - One topic for each video in order to share comments and votes



Home | Profile | Active Topics | Members | Search | FAQ

Forum	Topics	Posts	Last Post	Moderator(s)
VideoSurveillance				
Software and Tools Any software or tools for VideoSurveillance	0	0		
The future of the Videosurveillance The future of the Videosurveillance	1	3	07/27/2007 19:25:00 by: robervez	
videosurveillance systems This forum is conceived as a review about videosurveillance systems	0	0		
Visor Videos				
Visor Configuration Schema Errors, comments, suggestions about the Visor configuration schema	0	0		
Visor Video and Annotation Forums One Topic for each video	0	1	07/18/2007 15:16:27 by: admin	
Statistics				
2 of 4 Members have made 4 posts in 5 forums, with the last post on 07/27/2007 19:25:00 by: robervez.				
There is currently 1 topic.				
Please welcome our newest member: v_amoruso.				
Contains new posts since last visit. No new posts since the last visit.				
Visor © Visor 				



We invite you to

- Contribute to the growing and population of both the **video repository** and the **annotation** set
- Join to the community using the **forum**
- Sending us **comments** and **suggestions**...

<http://imabelab.ing.unimore.it/visor>



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Thank you for your attention!!



Visor

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<http://imabelab.ing.unimore.it/visor>



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System Features - Storage

- Video
 - Different video formats are supported
 - Set of tags/keywords
 - Metadata (*authors, creation date, ...*)
 - Camera information
 - *Camera type and model, Infrared, static/moving camera, calibration information*
- Annotations
 - Stored in the same DB
 - Two categories: automatic generated and manual ground-truth
 - Completely customizable structure



cam3_120405A1	
	<ul style="list-style-type: none">• Show Screenshot• Show Preview• Show Summary
Video Information	
File Name:	Visor_0000071.mpg
Description:	cam3_120405A1
Author:	
Creation date:	
Download	
Download:	 Original File ()  AVI
Camera Information	
Camera Description	
Type	Static camera
Constrained Motion	no
Infra Red capabilities	no
Omnidirectional camera	no
Annotations	
E:\Viper\cam3_120405A1.xgtf (Ground Truth)	Author: Amoruso Vincenzo  Entire File  Fields Selection
Other Information	
Forum Topic:	
Keywords:	Outdoor; Unimore; pedonal zone;
Uploaded by:	robervez
Upload date:	07/09/2007 16.21.33



System Features - Management

- Video

- Video preview (flash)
- Single Screenshot
- Summary (Set of keyframes)
- Protection based on User level
- Query by keyword, concept, or metadata

- Annotation

- Import/export in Viper format (*MPEG7 and custom formats are in progress*)
- Partial annotation selection is allowed
- *Merge of different annotations (in progress)*

Selective Annotation	
Choose Descriptors	<input checked="" type="checkbox"/> Person <input checked="" type="checkbox"/> ActionByAPerson <input checked="" type="checkbox"/> Location <input checked="" type="checkbox"/> Clip <input checked="" type="checkbox"/> Video <input checked="" type="checkbox"/> MobileObject
Dynamic Attributes	<input checked="" type="checkbox"/> ActionByAPerson - IDPerson <input checked="" type="checkbox"/> Clip - Description <input checked="" type="checkbox"/> Clip - FrameEnd <input checked="" type="checkbox"/> Clip - FrameStart <input checked="" type="checkbox"/> Person - IDPerson <input checked="" type="checkbox"/> Video - Description
Static Concepts	<input checked="" type="checkbox"/> Include static concept
Frame range	<input checked="" type="checkbox"/> Use frame range - Download annotation for frames from <input type="text" value="1"/> to <input type="text" value="0"/>

Download Reset

For problems or suggestions contact [email] group - Webmaster: Roberto Vezzani - ©2007



End

