

WATSS: a Web Annotation Tool for Surveillance Scenarios

Speaker

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Introduction

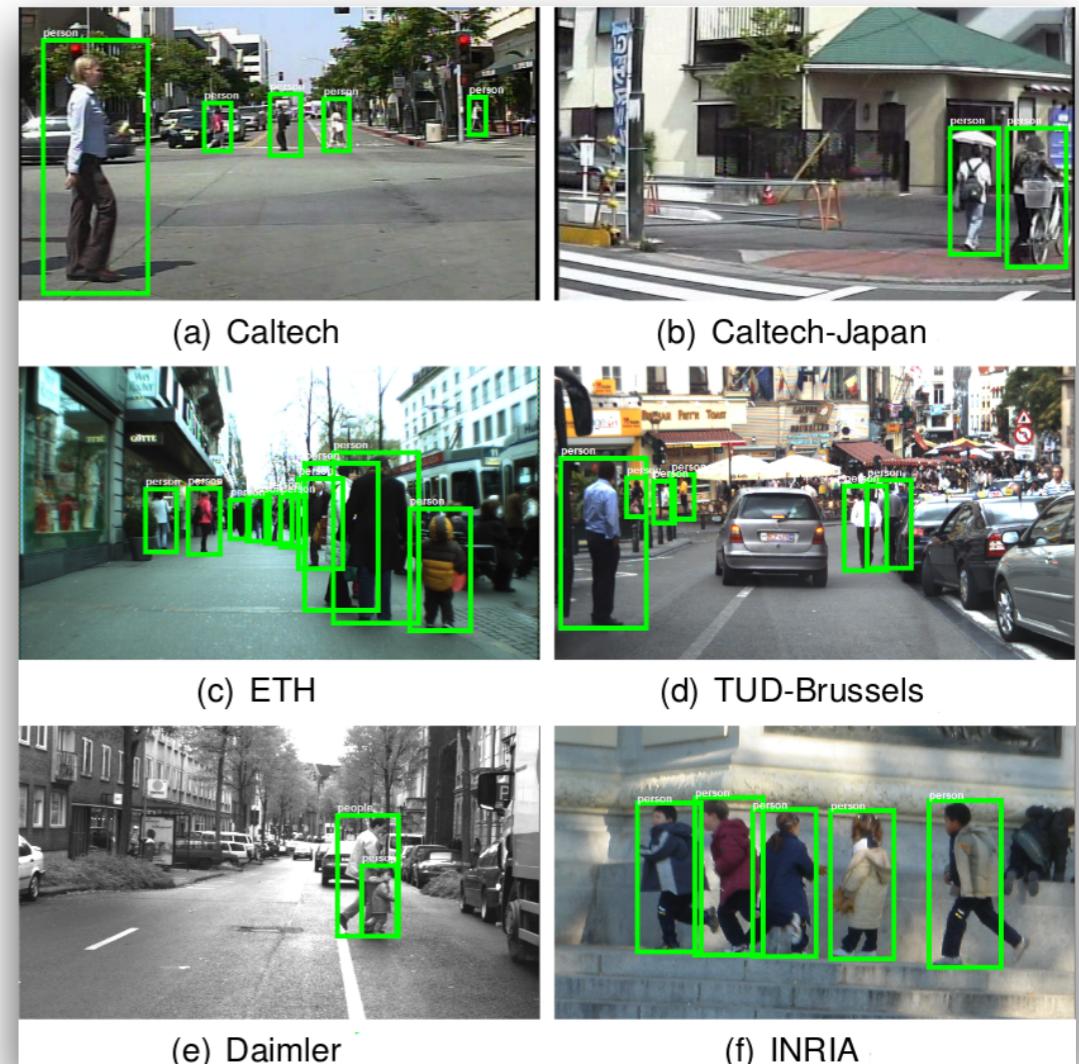
The computer vision and pattern recognition community need challenge and realistic datasets to work on

- such datasets have led to major advancements in different fields:

1. Object Recognition
 2. Pedestrian Detection
 3. Person Re-Identification
 4. Tracking
 5. Group behavior understanding

- various challenges in the public datasets:

1. real scenarios (indoor, outdoor)
 2. partial occlusion, crowd
 3. different light conditions

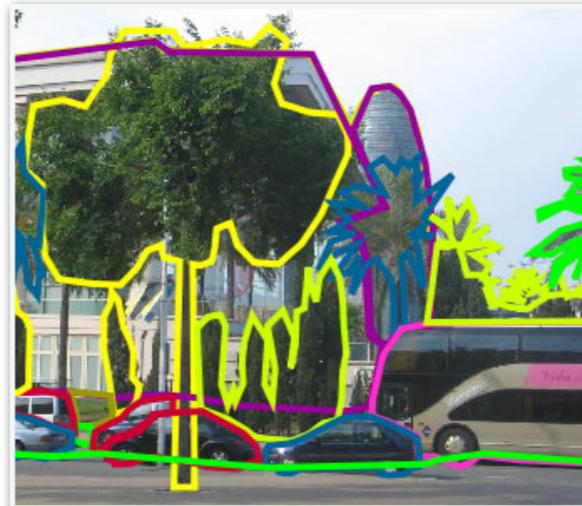


However, dataset annotation is a time consuming and expensive task to perform

Some Annotation tools

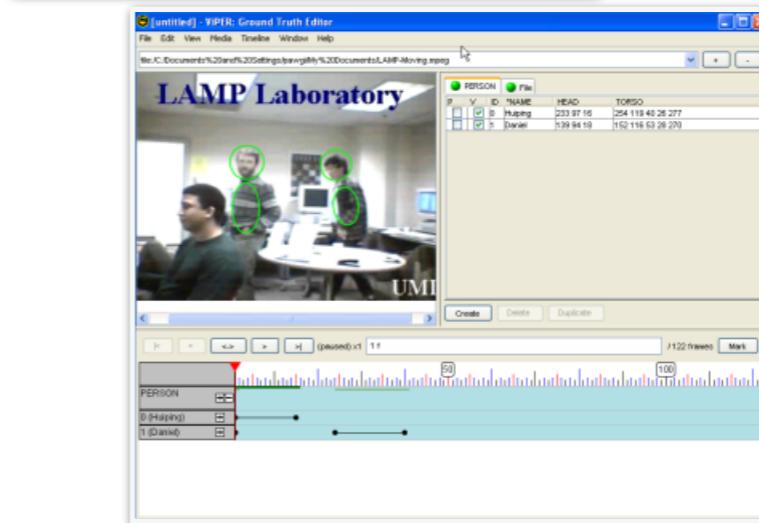
LabelMe [RussellIJCV08]:

- web based tools and mobile applications
- focused on annotating scenes



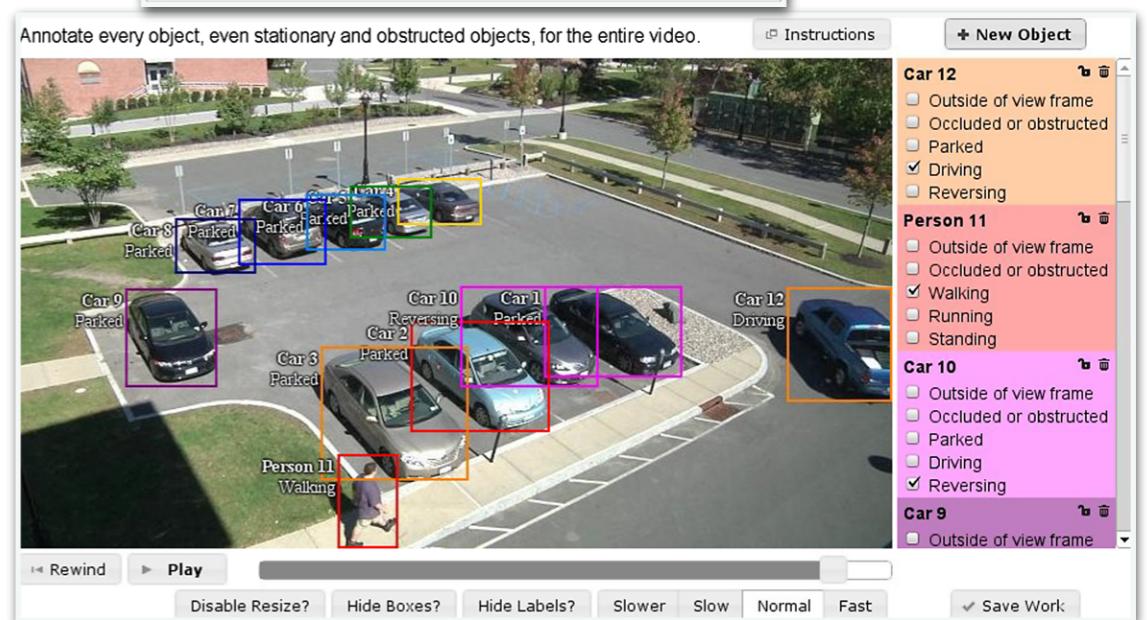
Viper-GT [ViPER-GT03]:

- JAVA graphical user interface
- tool for editing and reviewing video metadata
- metadata stored in the Viper format



VATIC [VondrickIJCV12]:

- online tool
- developed for object detection
- supports annotations like bounding boxes, polygons and ellipses
- allows to specify a finite set of attributes (person, car, walking, etc.)



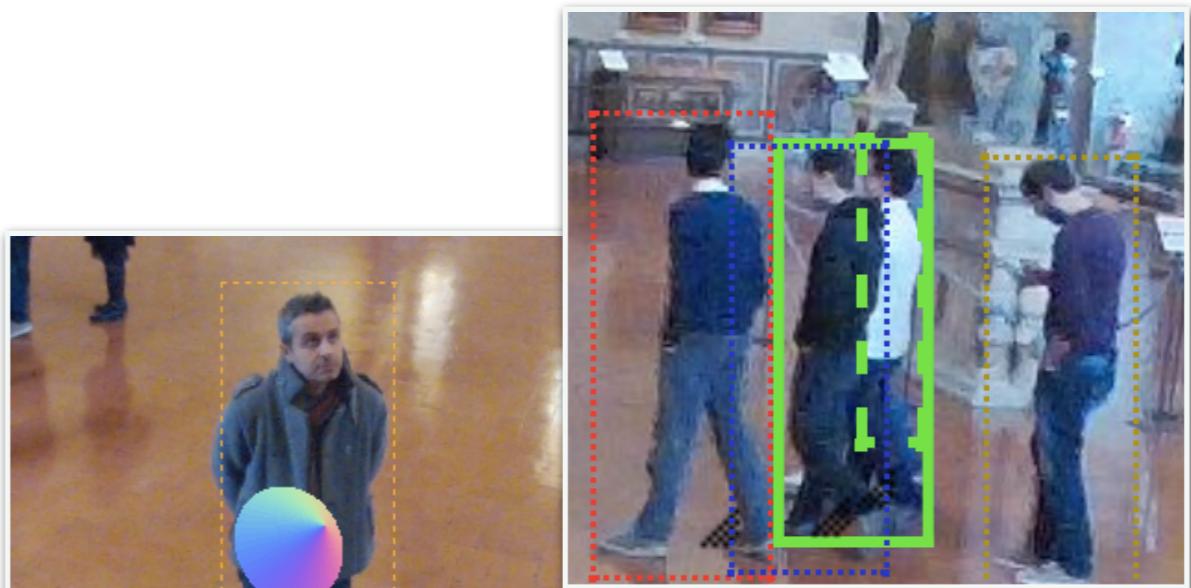
WebAnnotation Tool for Surveillance Scenarios



A web-based annotation tool [**BartoliACMMM15**] developed to annotate datasets for different tasks:

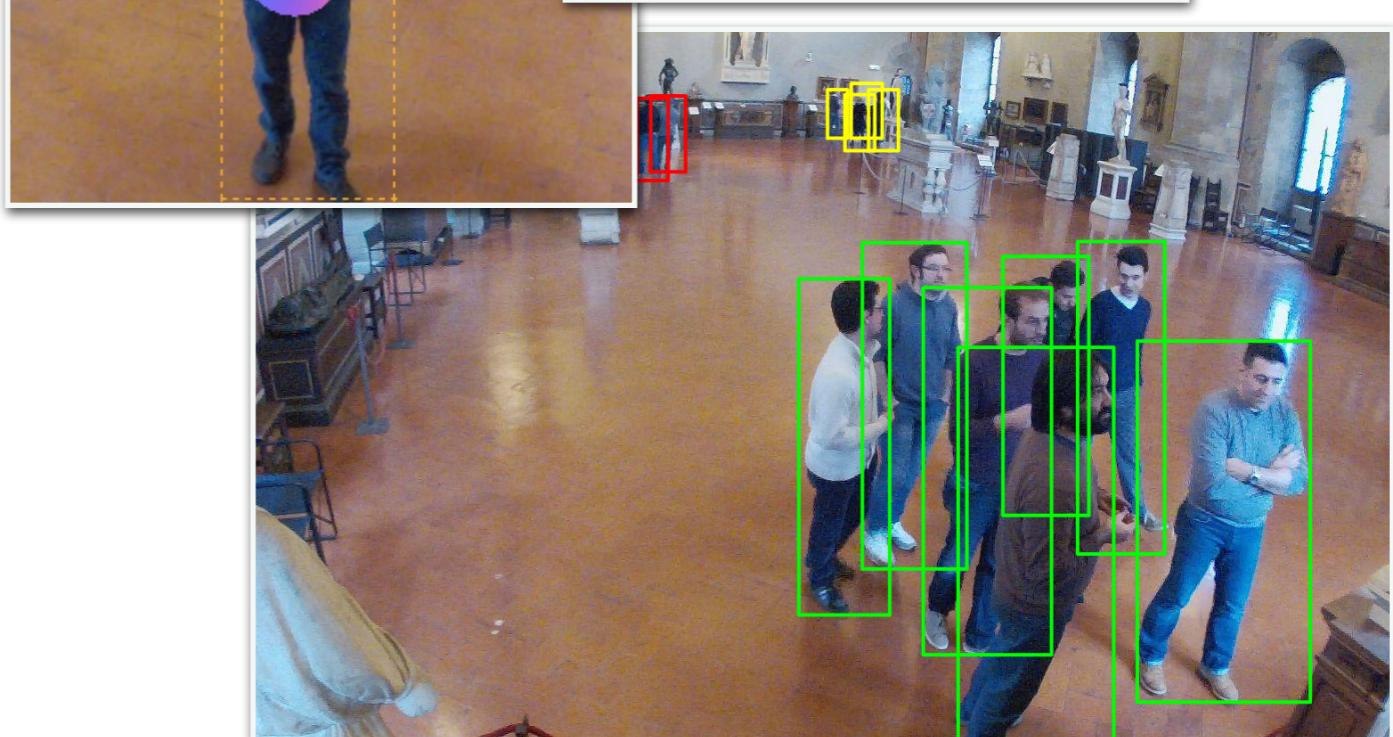
1. object/person detection, re-identification and tracking:

- id person
- full bounding box
- occlusion area



2. coarse gaze estimation

- face orientation
- body orientation
- artwork under observation



3. group behavior understanding

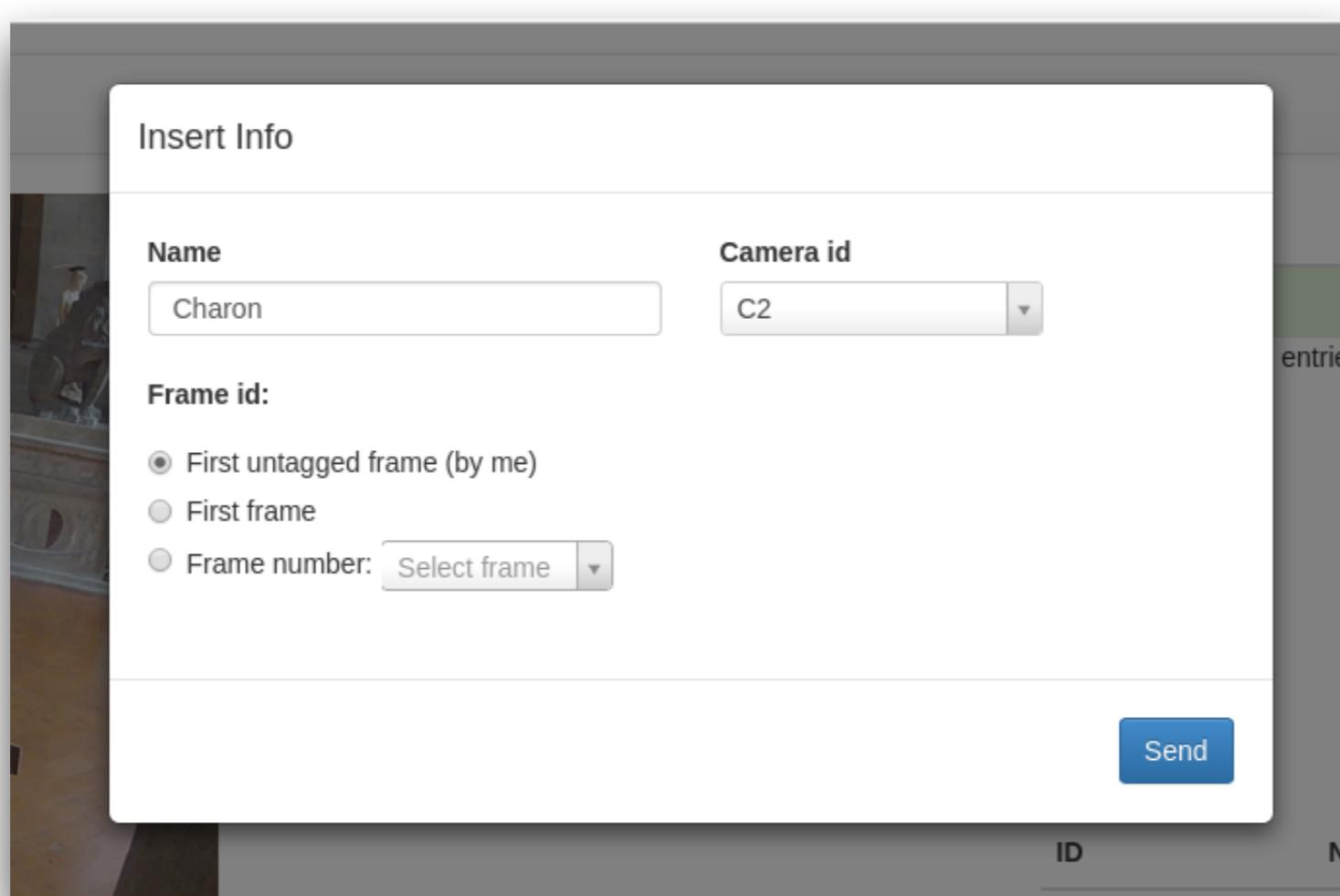
- id group
- group belonging

WebAnnotation Tool for Surveillance Scenarios



Features:

- manage datasets with multiple cameras
- multiple annotators can operate at the same time
- ability to jump to a specific "camera_id - frame" to annotate
- jump to first unannotated frame



Web Annotation Tool for Surveillance Scenarios



- each person has associated:
 - a single identifier on all frames of all cameras
 - an avatar image allows a faster identity retrieve
 - a set of attributes that can be annotated

Insert Person

Brand New Person

Choose a Person Already in the DB

ID: 59	ID: 62	ID: 65	ID: 66	ID: 67	ID: 70	ID: 71	ID: 72	ID: 73	ID: 74	ID: 75

Welcome, lore

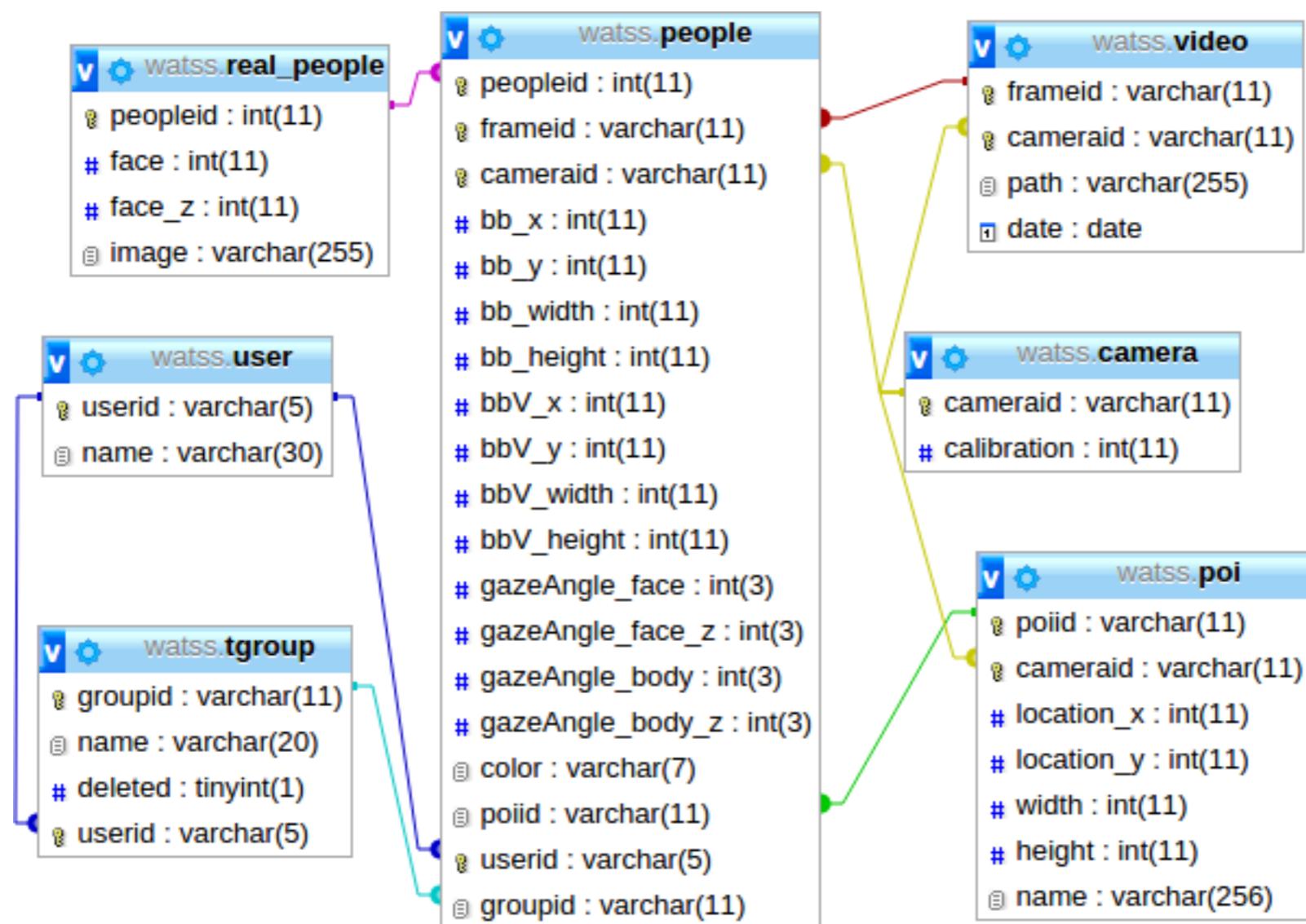
ID	Face	Body	Group	Point of Interest
1	(90,0)	(0,0)	no group	no opera
2	(5,10)	(0,0)	Four_G	no opera
3		(0,0)	Four_G	no opera
5		(0,0)	Four_G	no opera
7		(0,0)	(0,0)	no group no opera

Showing 1 to 5 of 7 entries

Web Annotation Toll for Surveillance Scenarios



ER Diagram of the WATT database:



WebAnnotation Tollfor Surveillance Scenarios



- Used to annotate the MuseumVisitors dataset [**BartoliCVPR15**] at the National Museum of Bargello in Florence, as part of the MNEMOSYNE project.
- MuseumVisitors can be used for group detection, occlusion handling, tracking, re-identification and behavior analysis
- Features:
 - Frames acquired from 3 cameras, images at resolution of 1280×800 pixels
 - 96972 detections, and gazes, 101 persons' identities over 9477 frames
 - Sequences recorded following two scenarios: Individuals and Groups



(a) Camera 1 - Individuals



(b) Camera 2 - Individuals



(c) Camera 3 - Individuals



(d) Camera 1 - Groups



(e) Camera 2 - Groups



(f) Camera 3 - Groups

Link to download MuseumVisitors: <http://www.micc.unifi.it/vim/datasets/museum-visitors/>

Web Annotation Tool for Surveillance Scenarios



System Usability Scale (SUS) test:

- 5 people
- about 3 months of annotations

	Str.	Dis.	Dis.	Neutr.	Agr.	Str. Agr.
1. I think that I would like to use this system to perform an annotation task	0	0	2	2	1	
2. I imagine that most people would learn to use this system very quickly	1	3	0	1	0	
3. I found the system very cumbersome to use	2	2	0	1	0	
4. I thought the system was easy to use	0	1	0	4	0	
5. I think that I would need the help of a technical person to use this system	2	2	1	0	0	
6. I found the various functions in this system were well integrated	0	0	4	1	0	
7. I thought there was too much inconsistency in this system	2	2	0	1	0	
8. I found the system unnecessarily complex	2	2	0	1	0	
9. I needed to learn a lot of things before I could get going with this system	2	2	0	0	1	
10. I felt very confident using the system	1	0	1	2	1	

SUS result of WATSS:

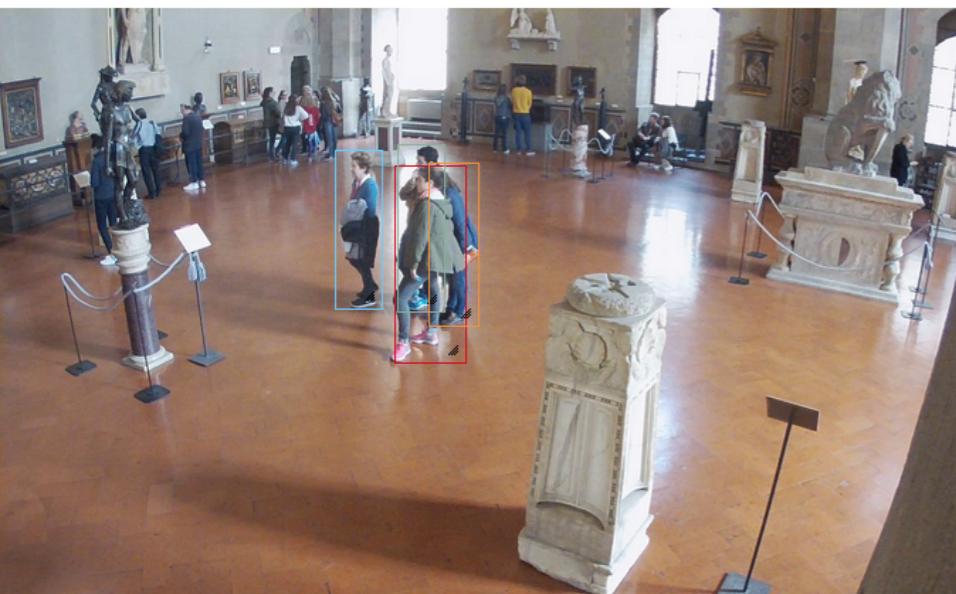
- easy to learn and use
- annotators felt productive and confident in using it

WebAnnotation Tool for Surveillance Scenarios



The tool is available at <http://bitbucket.org/fbert/watss>, under GPLv3 License

Home GT Making Export Results Legend Welcome, Charon



Change Frame: F000001

ID	Color	Face	Body	Group	POI	X
6	Red	(-95,-175)	(0,0)	Four_G	David Bronzo Verrocchio	
5	Green	(0,0)	(0,0)	Four_G	David Bronzo Verrocchio	
1	Blue	(0,0)	(0,0)	Four_G	David Bronzo Verrocchio	
7	Orange	(0,0)	(0,0)	Four_G	David Bronzo Verrocchio	

Showing 1 to 4 of 4 entries

Add person

ID	Name	NPeople
G1	Four_G	4

Showing 1 to 1 of 1 entries

WATSS can be tested at <http://150.217.35.152/watss> (with Name=Guest)

TIME TO DEMO

Conclusions and future works

- We presented a web annotation system designed for annotating multi-camera video sequences.
- Source is available on bitbucket, under GPLv3 License
- WATSS was tested and used to annotate our publicly released MuseumVisitors dataset.
- Main Features:
 - specific interface to annotate occlusions and user gaze
 - easy user identity selection through avatar image
 - bounding box and gaze hints for subsequent frames based on the previous frames annotations.

We plan in the future to add more sensible proposals for unannotated frames both for gaze and detections in order to reduce the complexity of the annotation process.

Happy Annotation to Everyone...!!!

References



- [BartoliACM15]** F. Bartoli, L. Seidenari, G. Lisanti, S. Karaman, and A. Del Bimbo, "WATSS: a Web Annotation Tool for Surveillance Scenarios", in Proc. of ACM Multimedia Int. Open Source Software Competition, Brisbane, Queensland, Australia, 2015.
- [BartoliCVPR15]** F. Bartoli, G. Lisanti, S. Seidenari, Lorenzo Karaman, and A. Del Bimbo. "Museumvisitors: a dataset for pedestrian and group detection, gaze estimation and behavior understanding". In Proc. of CVPR Int.'l Workshop on Group And Crowd Behavior Analysis And Understanding, Boston, USA, 2015.
- [RussellJCV08]** B. C. Russell, A. Torralba, K. P. Murphy, W. T Freeman, "LabelMe: A Database and Web-Based Tool for Image Annotation", Int. Journal of Computer Vision, Hingham, USA, 2008.
- [ViPER-GT03]** A Video Metadata Markup Tool: ViPER-GT, url=<http://viper-toolkit.sourceforge.net/products/gt/>, 2003
- [VondrickJCV12]** C. Vondrick, D. Patterson, and D. Ramanan, "Efficiently Scaling up Crowdsourced Video Annotation", Int. Journal of Computer Vision}, Springer Netherlands