



UNIVERSITÀ
DEGLI STUDI
FIRENZE

SCUOLA DI INGEGNERIA
Corso di Laurea Magistrale in Ingegneria
Informatica

Improving WATSS web application with Computer Vision techniques

Visual and Multimedia Recognition

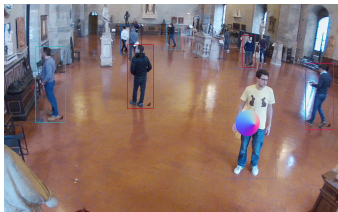
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Introduction

WATSS, **Web Annotation Tool for Surveillance Scenarios**, is a web-based annotation tool developed to annotate dataset in surveillance systems.

Main goal: improve WATSS with some **Computer Vision approaches**, in order to make easy for users to use this tool and make the annotation process more *automatic*



Comparative analysis of annotation tools

LabelMe

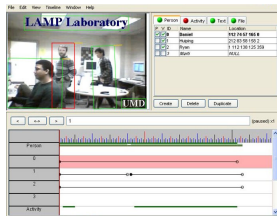
- **Web-based** tool, also for mobile applications
- Annotate scenes with **polygonal areas**
- **Nested** objects and **occlusion** annotation
- *Zoom in* and *out* of the scene



Comparative analysis of annotation tools

ViPER-GT

- **Java application** tool
- Annotate scenes with **geometrical shapes**
- **Timeline** and **annotation highlighting** on time change
- Linear **interpolation** between annotations
- *Zoom in* and *out* of the scene



Comparative analysis of annotation tools

VATIC

- **Online** tool
- Developed for **object detection**
- **Crowd-sourcing** to Amazon's *Mechanical Turk*
- Multiple **plugins**: *object tracking, sentence annotation, etc.*



Comparative analysis of annotation tools

WATSS

- **Web-based** tool
- Annotation with bounding box
- **Occlusion** area
- Coarse **gaze** estimation
- **Groups** and POI under observation
- **Multiple cameras** manager



Improvements


- **User interface** renovation
- Simpler annotation making and editing
- Video **timeline** for annotations
- Annotation automatic **proposals** generation
- **Scene geometry**-based enhancement
- Easy **setup** process

User interface renovation

The **old** WATSS user interface

HomeGT MakingExport ResultsLegend

Welcome, Guest



Change Frame: F000017

◀ Prev FrameNext Frame ▶

− +

ID	Color	Face	Body	Group	Artwork	
59		(0,0)	(0,0)	No Group	No opera	✕
60		(0,0)	(0,0)	Group_1	David Bronzo Verrocchio	✕
61		(0,0)	(0,0)	Group_1	David Bronzo Verrocchio	✕
62		(0,0)	(0,0)	Group_2	No opera	✕
63		(0,0)	(0,0)	Group_1	David Bronzo Verrocchio	✕

Showing 1 to 5 of 8 entries

◀ 1 2 ▶

Add person

ID	Name	NPeople
G1	Group2P_1	2
G10	G2G_meet	2
G11	Group6P	8

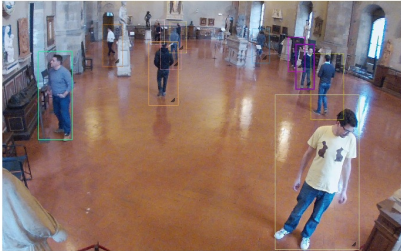
User interface renovation

The **new** WATSS user interface

WATSS

HomeGT MakingExportLegendSettings

Options>Welcome, Guest




Go to frame: 4115

Prev FrameNext Frame

Search

Timeline



People

Add person

ID	Color	Face	Body	Group	POI
9		(220,310)	(165,0)	Nessun gruppo	Nessuna Opera
10		(200,0)	(0,0)	Nessun gruppo	Nessuna Opera
11		(295,350)	(0,0)	Nessun gruppo	Nessuna Opera
14		(180,0)	(0,0)	Nessun gruppo	Nessuna Opera
40		(30,355)	(0,0)	Nessun gruppo	Nessuna Opera

Showing 6 to 10 of 11 entries

« 1 2 3 »

Groups

Add group

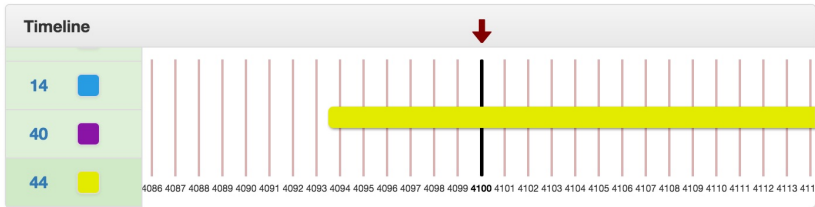
ID	Name	People
1	Gruppo Visitatori 1	7
2	Visitors 1	6
3	Gruppo Visitatori 2	4

Showing 1 to 3 of 6 entries

« 1 2 »

Video timeline

In the video **timeline** all the video frames are shown, coloring the ones with at least one annotated person.



Selecting a person in the list, the timeline displays its **history** highlighting frames where it is present. It is possible to navigate video frames by clicking on it.

Proposals generation

It is possible to generate **proposals** for a person in some selected frames based on previous annotation of a it using timeline: just click and drag highlighted annotation. Proposals generation is based on the combination of three different techniques:

- **Motion detection** using a *background subtractor*
- **Pedestrian detection** using *HOG descriptors*
- **Kalman filter** for the *motion estimation*