ETISEO Project

Video Understanding Evaluation

David CHER
R&D department
SILOGIC S.A. , Toulouse, France

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ETISEO / Techno-Vision

ETISEO is part of the Techno-Vision program

Partially funded by the French government.

2 years duration, started in January 2005

To evaluate vision techniques

for video surveillance applications.

Coordinated by 

and 

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The way for ETISEO evaluation

- To support **resources** generation & diffusion,

-To create specific **tools** & **metrics**,

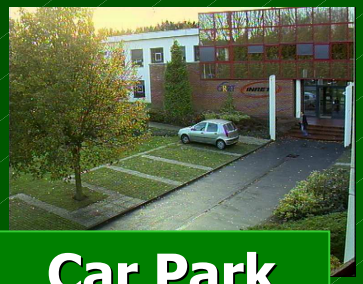
-To support evaluation **cycles**,

- To encourage a large & active **participation**

- To communicate evaluation **results**.

ETISEO Scenes


Apron




Car Park

Building Entry





Corridor


Car street


subway

ETISEO Corpus 1

Provider	Site	Sequence #	Persons	Vehicle	Multiview
Silogic	Apron	1 to 5	✓	✓	✓
RATP	Station	7 to 10	✓		
CEA	Corridor	11 to 13	✓		IR / visible
CEA	Road	14 to 17	✓	✓	IR / visible
INRETS	Building entry	18 to 20	✓	✓	✓

Ground Truth

Physical object annotations include:

- Bounding Box
- Type of the object: Person, Vehicle, Group, …
- Sub-Type : as Car, Truck or Loader for vehicle …
- States: Static, occluded …

Event annotations include:

- Event type (Ontology)
- Starting time (frame),
- Ending time (frame),

Metrics (1)

T1- DETECTION OF PHYSICAL OBJECTS OF INTEREST

C1.1 Number of physical objects

C1.2 Number of physical objects using their bounding box

T2- LOCALISATION OF PHYSICAL OBJECTS OF INTEREST

- C2.1 Physical objects area (pixel comparison based on BB)
- C2.2 Physical object area fragmentation (splitting)
- C2.3 Physical object area integration (merge)
- C2.4 Physical objects localisation
  - 2D and 3D
  - Centroïd or bottom centre point of BB

metrics (2)

T3- TRACKING OF PHYSICAL OBJECTS OF INTEREST

- C3.1 Frame-To-Frame Tracking: Link between two frames
- C3.2 Number of object being tracked during time
- C3.3 Detection time evaluation
- C3.4 Physical object ID fragmentation
- C3.5 Physical object ID confusion criterion
- C3.6 Physical object 2D trajectory
- C3.7 Physical object 3D trajectory

T4- CLASSIFICATION OF PHYSICAL OBJECTS OF INTEREST

C4.1 Object Type over the sequence

C4.2 Object classification per type

C4.3 Time Percentage Good Classification

$$\text{card}\{ RD \cap C, \text{Type}(C) = \text{Type}(RD) \} / \text{card}(RD \cap C)$$

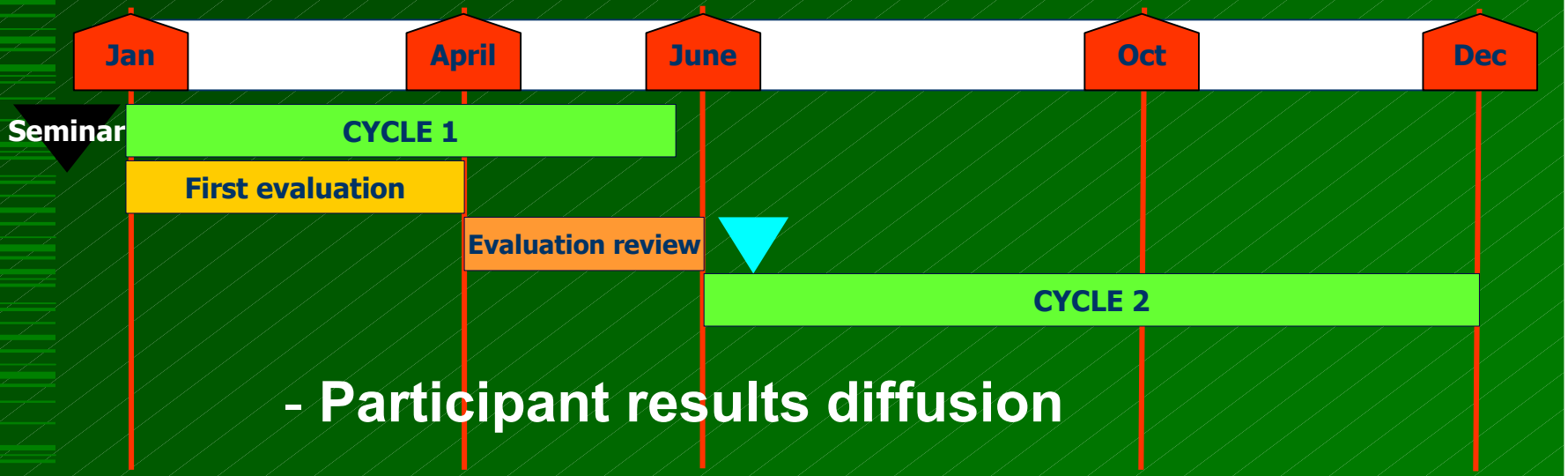
T5- EVENT RECOGNITION

C5.1 Number of Events recognized over the sequence

C5.2 Scenario parameters

ETISEO
Cycle 1

- Cycle 1 : ETISEO first results



- Participant results diffusion

Cycle 1 main objective :

To evaluate the evaluation cycle is reached.

Corpus 1
Tasks processing

Tasks	Partners submission													
	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
T1-Detection	1	1	1	1	1	1	1	1	1	1	1	1	1	13
T2-Localisation	1	1	1	1	1	1	1	1	1	1	1	1	1	13
T3-Tracking	1	1	1	1	1	1	1	1	1	1	1			11
T4-Classification	1	1		1		1			1	1				6
T5-Event recognition	1					1		1		1				4

Strong participation

Large results comparison on commun tasks and video sequences

Encoureaging participation for classification & event recognition evaluation

Corpus 1
Sequences processing

Partners submission																
video sequences		1	2	3	4	5	6	7	8	9	10	11	12	13	Total	
AP	ETI-VS1-AP-1	1	1						1			1		1	5	12
	ETI-VS1-AP-2	1	1	1				1	1					1	6	
	ETI-VS1-AP-3	1	1	1	1	1	1	1	1	1		1	1	1	12	
	ETI-VS1-AP-4	1							1						2	
	ETI-VS1-AP-5		1						1					1	3	
MO	**ETI-VS1-MO-7**	1	1	1	1	1	1			1			1	1	9	9
	ETI-VS1-MO-8														0	
	ETI-VS1-MO-9														0	
	ETI-VS1-MO-10														0	
BC	ETI-VS1-BC-11	1						1							2	2
	ETI-VS1-BC-12														0	
	ETI-VS1-BC-13														0	
RD	ETI-VS1-RD-14														0	13
	ETI-VS1-RD-15														0	
	ETI-VS1-RD-16	1	1	1	1	1	1	1	1	1	1	1	1	1	13	
	ETI-VS1-RD-17								1			1			2	
BE	**ETI-VS1-BE-18**	1		1		1	1	1	1	1			1	1	9	9
	ETI-VS1-BE-19								1						1	
	ETI-VS1-BE-20			1											1	
Total		8	6	6	3	4	4	5	9	4	1	4	4	7		

Priority sequences have been processed

Partners produced strong efforts

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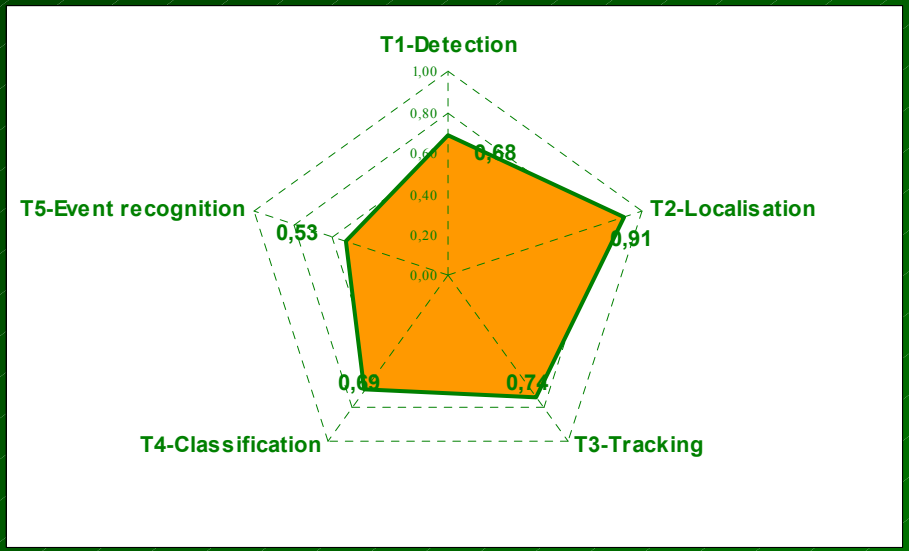
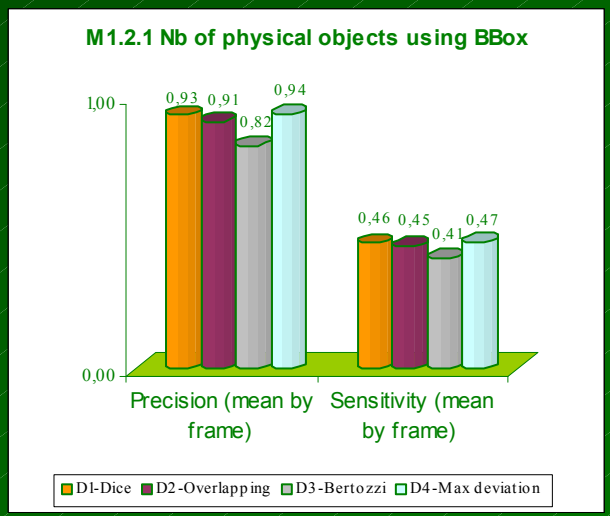
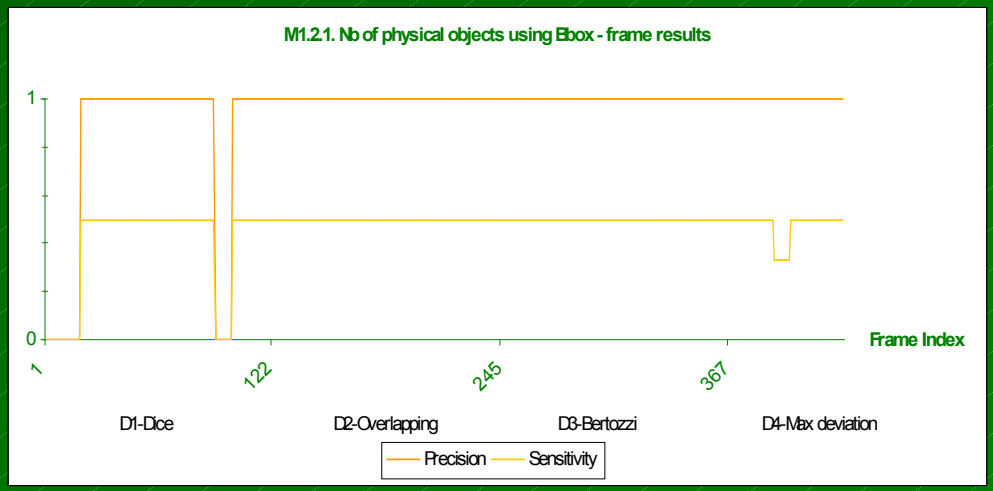
Partners
Metric results







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Corpus 1
Priority sequences - Results

	ETI-VS1-AP-3-C4				ETI-VS1-AP-3-C7				ETI-VS1-BE-18-C1				ETI-VS1-BE-18-C4			
	Mean	std. Dev.	Min	Max	Mean	std. Dev.	Min	Max	Mean	std. Dev.	Min	Max	Mean	std. Dev.	Min	Max
T1-Detection	0.61	0.2	0.06	0.74	0.57	0.19	0.05	0.78	0.6	0.29	0.07	0.92	0.39	0.22	0.05	0.77
T2-Localisation	0.88	0.04	0.76	0.9	0.88	0.05	0.74	0.91	0.88	0.07	0.77	0.97	0.81	0.06	0.7	0.88
T3-Tracking	0.67	0.12	0.4	0.74	0.63	0.14	0.39	0.8	0.65	0.12	0.5	0.8	0.51	0.13	0.33	0.65
T4-Classification	0.51	0.29	0	0.7	0.41	0.25	0	0.6	0.56	0.37	0.19	0.93	0.11	0.08	0.02	0.17
T5-Event recognition	0.44	0.25	0.27	0.72	0.44	0.27	0.18	0.72	0.21	0.29	0	0.42	0.11	0.14	0.01	0.28

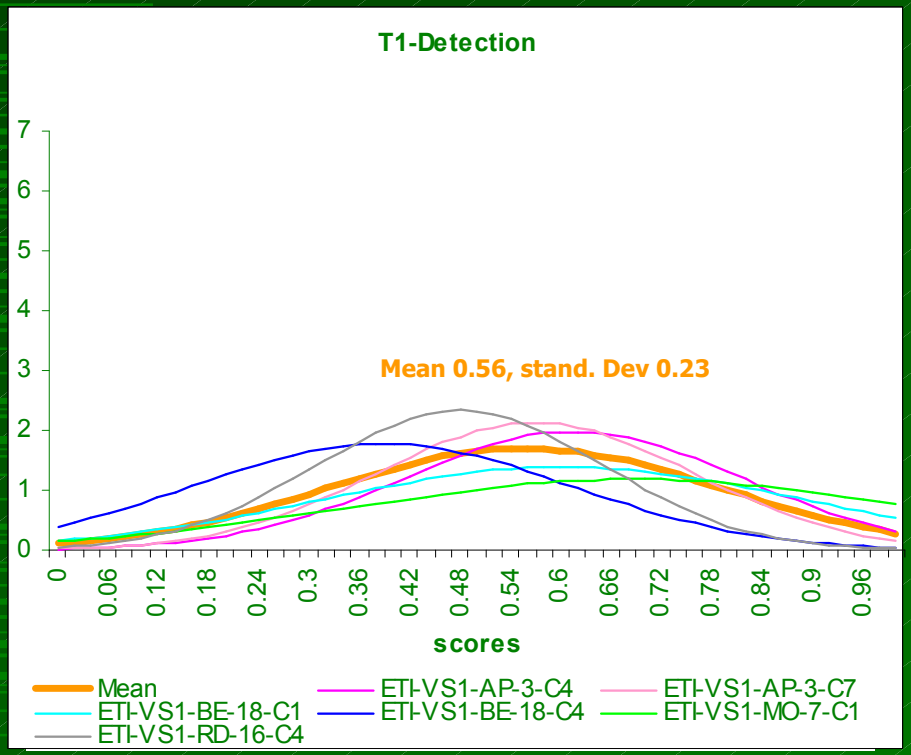
	ETI-VS1-MO-7-C1				ETI-VS1-RD-16-C4				Total			
	Mean	std. Dev.	Min	Max	Mean	std. Dev.	Min	Max	Mean	std. Dev.	Min	Max
T1-Detection	0.69	0.34	0.04	0.92	0.48	0.17	0.04	0.64	0.56	0.23	0.04	0.92
T2-Localisation	0.91	0.11	0.71	0.98	0.82	0.03	0.74	0.85	0.86	0.06	0.7	0.98
T3-Tracking	0.8	0.08	0.73	0.91	0.55	0.11	0.37	0.69	0.63	0.12	0.33	0.91
T4-Classification	0.13	0.02	0.11	0.15	0.39	0.2	0.14	0.57	0.35	0.2	0	0.93
T5-Event recognition	0.31	0.22	0.16	0.47	0.68	0.15	0.56	0.85	0.37	0.22	0	0.85

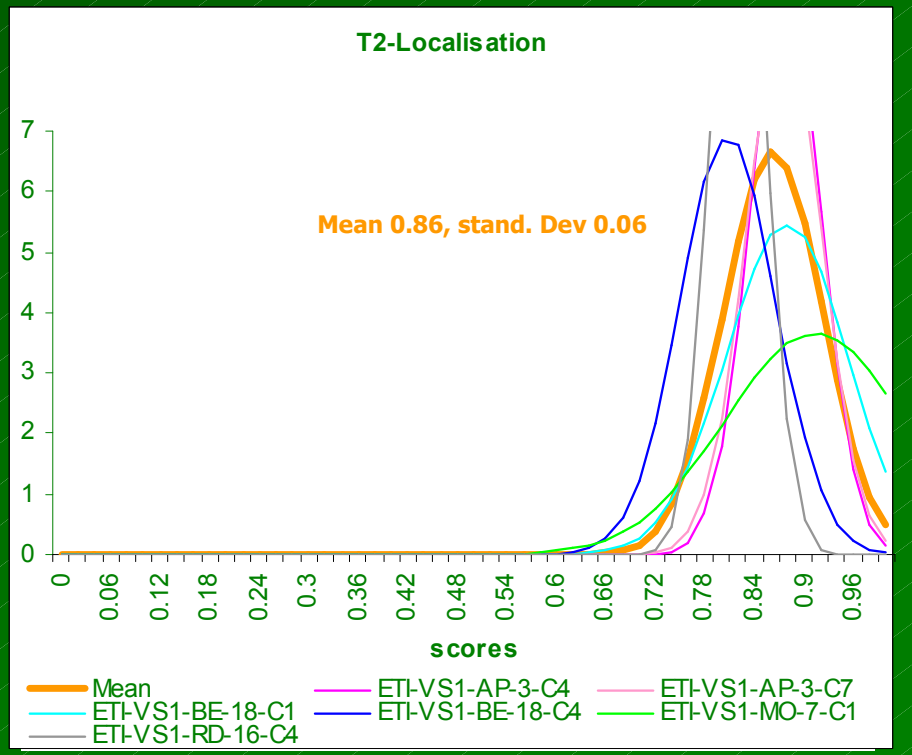
for each task the mean, standard deviation, minimum and maximum of participant results for each priority sequences.

The task scores are computing using the mean of related task metrics notes (precision, sensitivity…).

Corpus 1
Results – Priority sequences

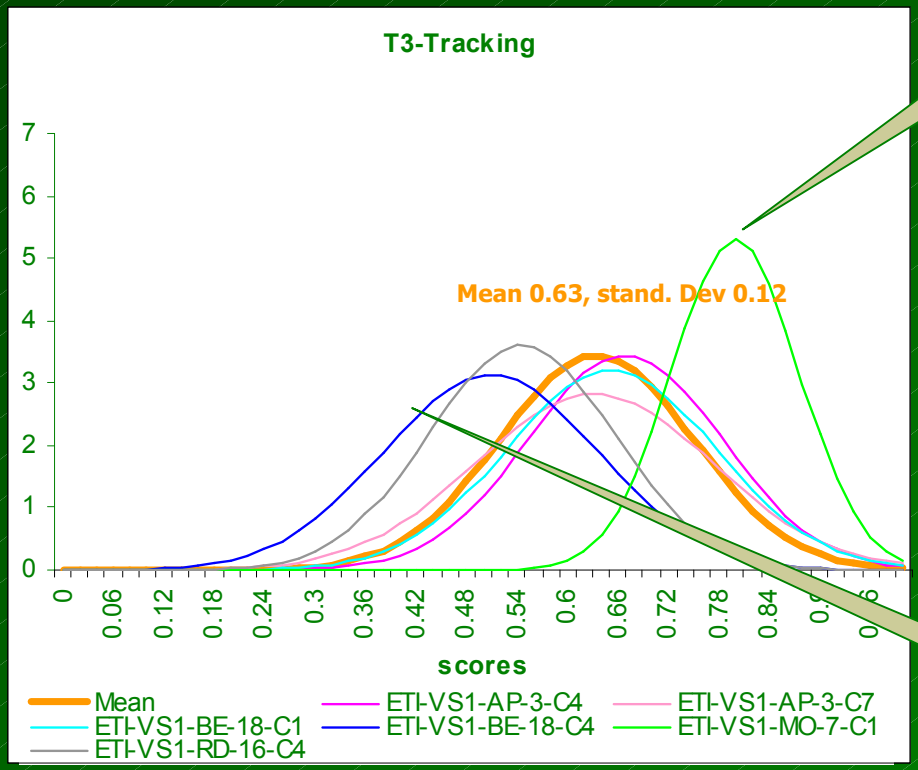
- Mean and standard deviation of participant results on the **priority sequences** for **detection** and **localisation** tasks





Corpus 1
Results – Priority sequences

- Mean and standard deviation of participant results on the **priority sequences** for **tracking**

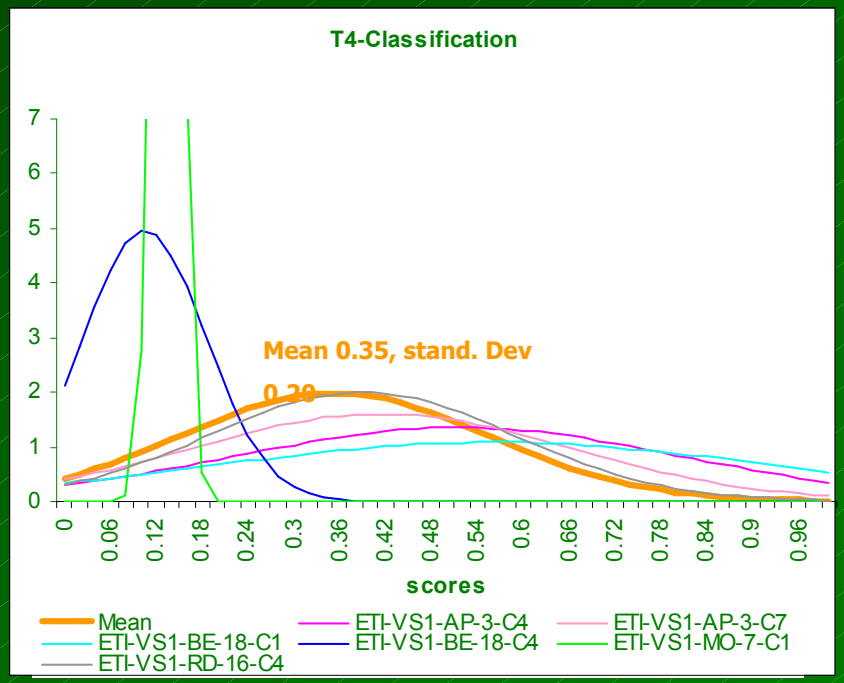


Easier tracking

Complex tracking

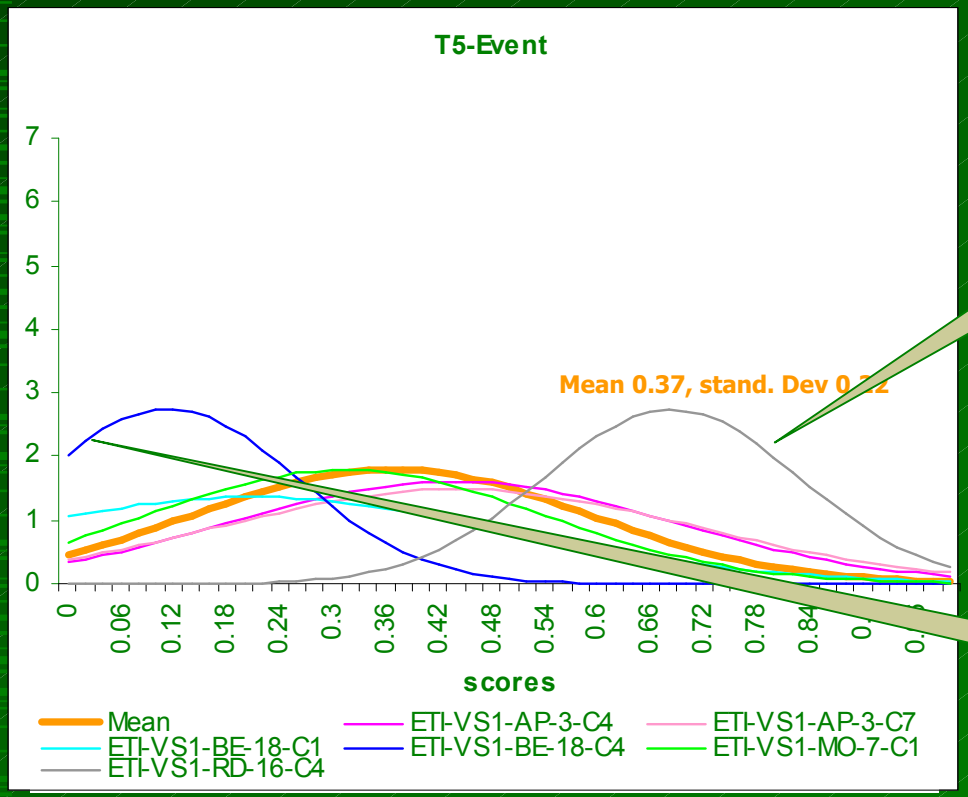
Corpus 1
Results – Priority sequences

- Mean and standard deviation of participant results on the **priority sequences** for **classification** task



Corpus 1
Results – Priority sequences

- Mean and standard deviation of participant results on the **priority sequences** for **event recognition** task



Mean 0.37, stand. Dev 0.22

Easier events

Complex events

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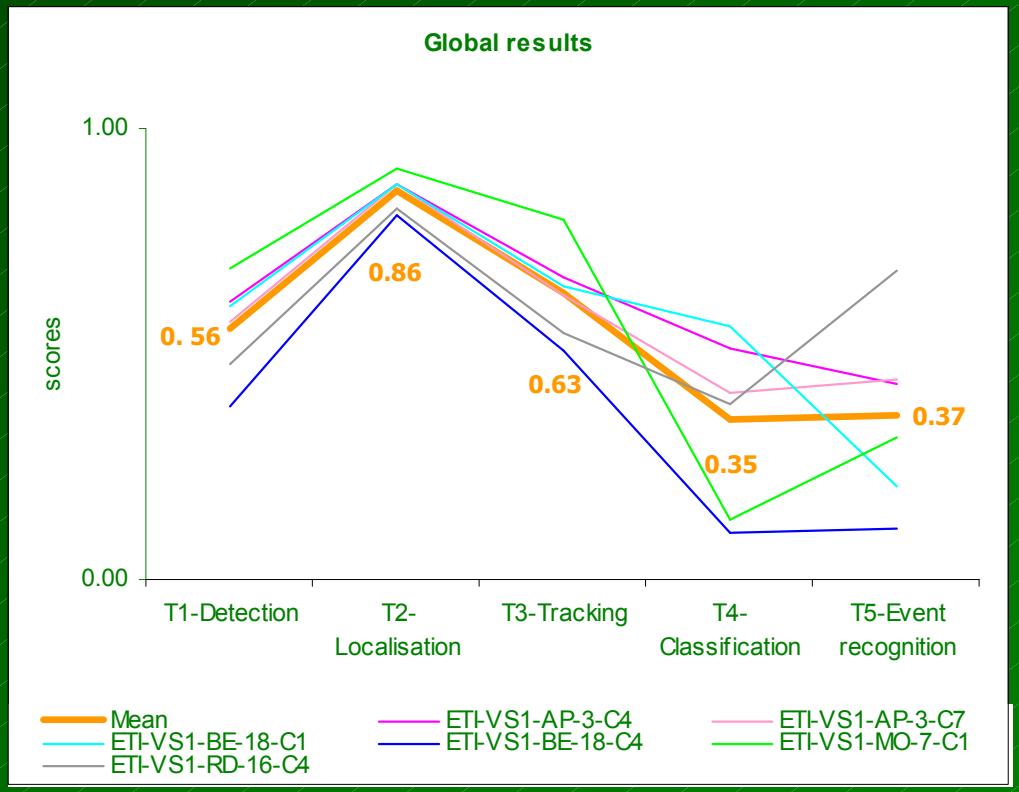
Corpus 1
Results – Priority sequences

- **Mean of participant results on the priority sequences for all tasks**

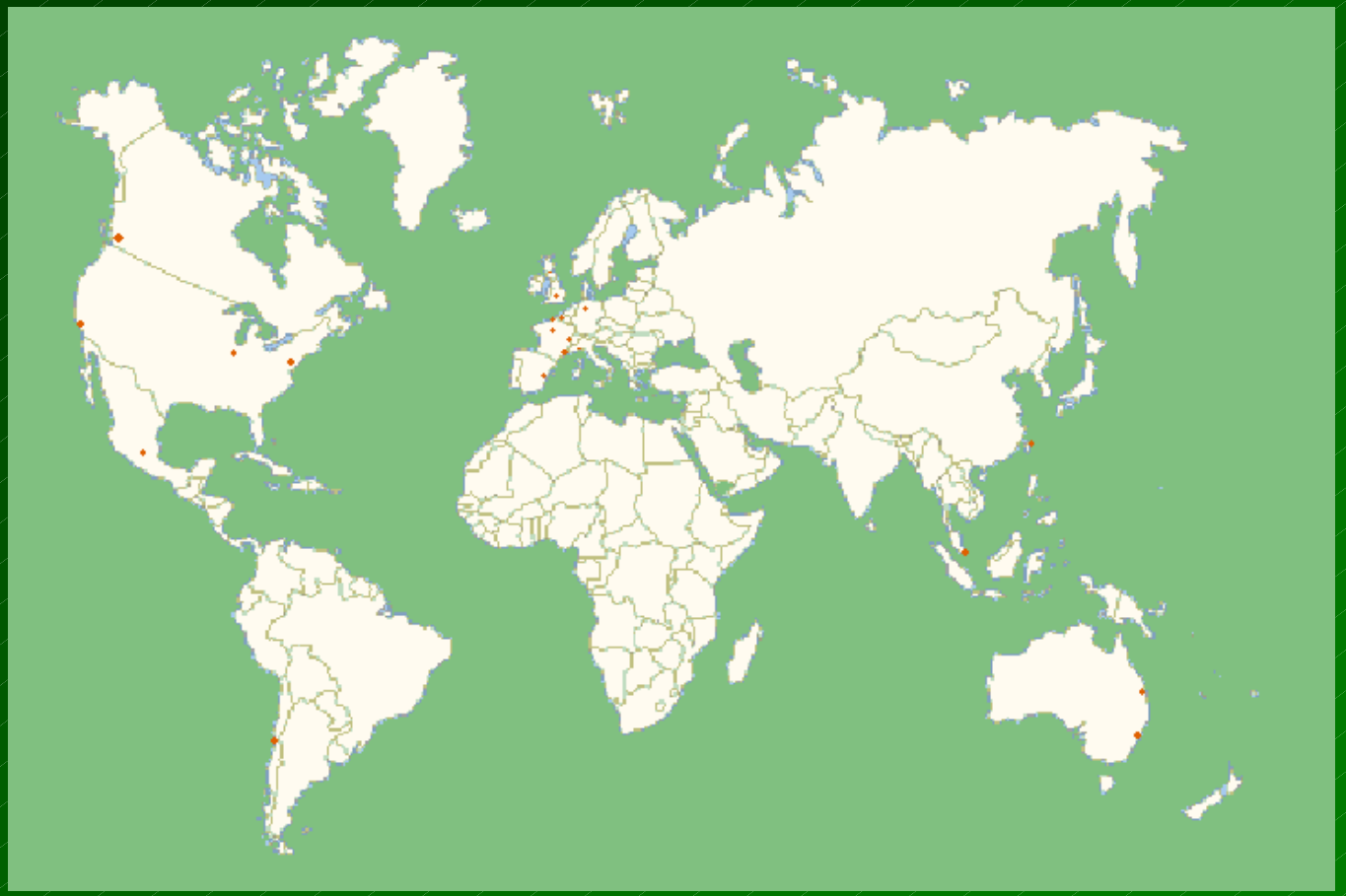


Corpus 1
Results Analysis

- **Good scores for detection, localisation and tracking tasks**
  - **- Detection precision: 0.63**
  - **- Localisation precision: 0.54**
  - **- high scores for merging/splitting and persistence/confusion metrics**

- **Low scores for classification and event recognition**
  - **- less participant**
  - **- dispersed results (differences between participants and sequences)**
  - **- low sensitivity: not all object categories and events are recognised**

World participation



AUSTRALIA, BELGIUM, CANADA, CHILE, France, GERMANY, ITALY, MEXICO, SINGAPORE, SPAIN, SWITZERLAND, TAIWAN, UK, USA.

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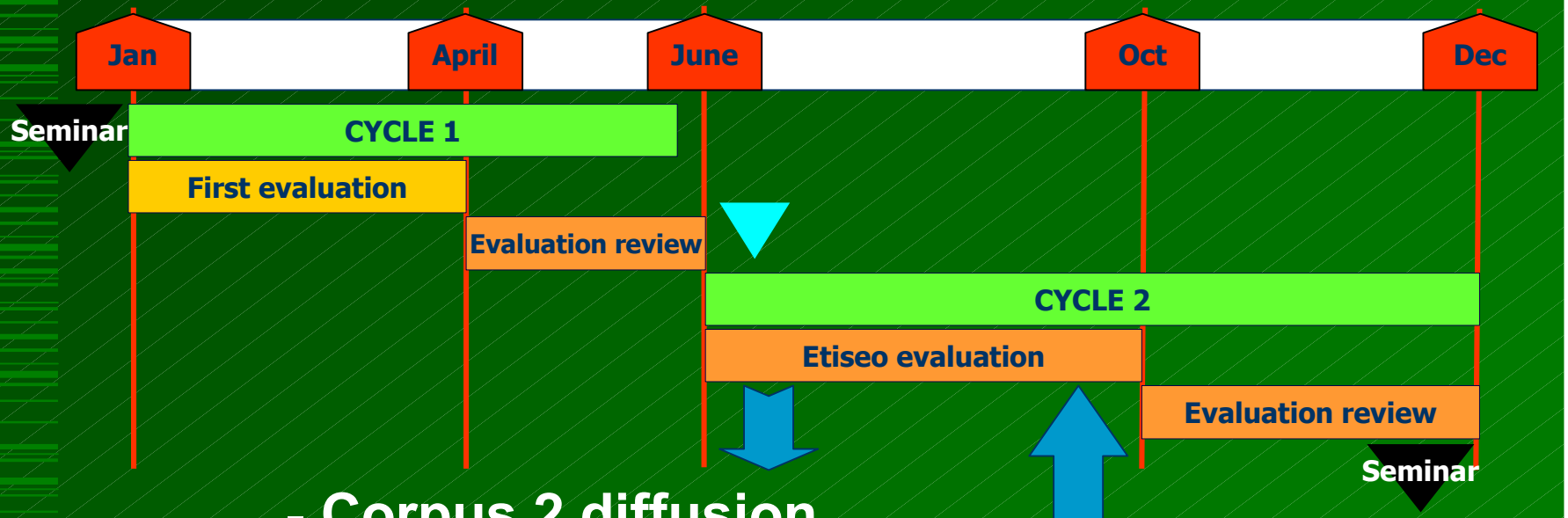
ETISEO
Cycle 2

- Cycle 2 : ETISEO evaluation cycle



- Corpus 2 diffusion,
- partners processing,
- results submission,

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Participation

- All participants are welcome to participate.

- **Voluntary** is the rule:
participants are expected to test their algorithms **on their own** and to **send their results** to the evaluator.

- After the participant's commitment,
video database will be transmitted.

- All participants will be welcome to attend freely workshops organized during the project.

ETISEO
Final Seminar

Last seminar ending ETISEO evaluation will occur
December 7th - 8th 2006

NOVOTEL NICE ARENAS
NICE - FRANCE

This seminar is prioritary dedicated to active participants during ETISEO evaluation cycles.

Registration for the ETISEO second cycle evaluation & last seminar on www.etiseo.net

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Contact Points

Project coordinator david.cher@ silogic.fr

Mr. David CHER Phone : + 33 (0)5 34 61 93 57

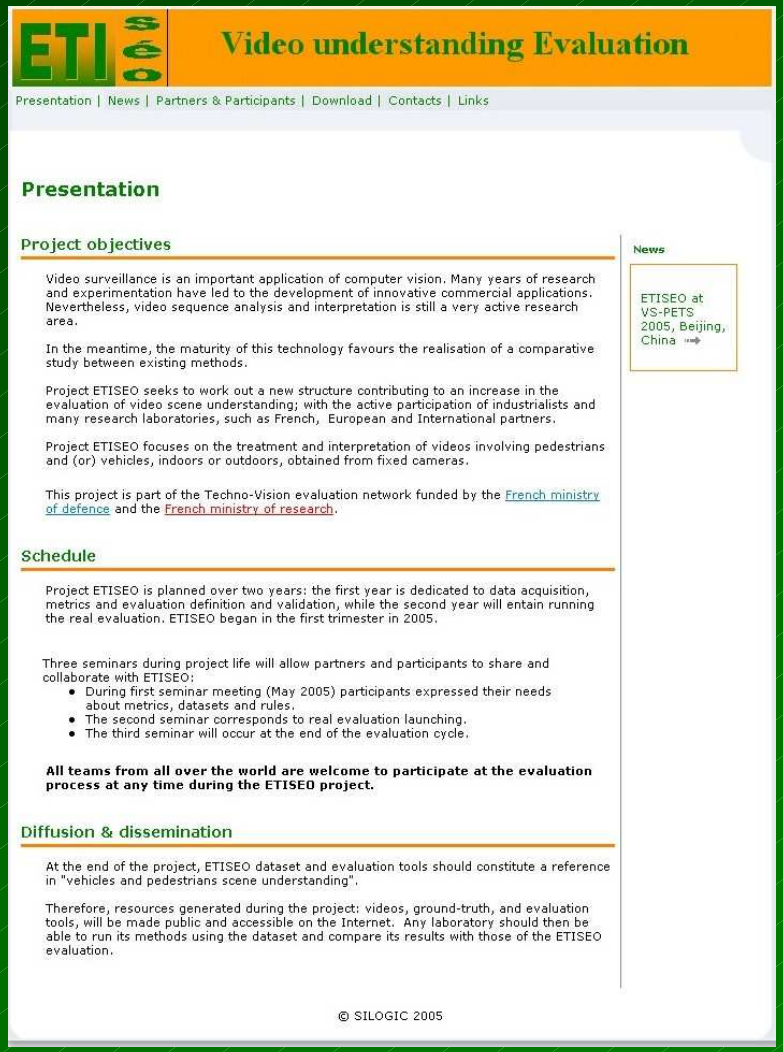
www.silogic.fr

Scientific leader francois.bremond@ sophia.inria.fr

Mr. François BREMOND Phone : + 33 (0)4 92 38 76 59

www-sop.inria.fr /orion

www.etiseo.net



Video understanding Evaluation

Presentation | News | Partners & Participants | Download | Contacts | Links

Presentation

Project objectives

Video surveillance is an important application of computer vision. Many years of research and experimentation have led to the development of innovative commercial applications. Nevertheless, video sequence analysis and interpretation is still a very active research area.

In the meantime, the maturity of this technology favours the realisation of a comparative study between existing methods.

Project ETISEO seeks to work out a new structure contributing to an increase in the evaluation of video scene understanding; with the active participation of industrialists and many research laboratories, such as French, European and International partners.

Project ETISEO focuses on the treatment and interpretation of videos involving pedestrians and (or) vehicles, indoors or outdoors, obtained from fixed cameras.

This project is part of the Techno-Vision evaluation network funded by the French ministry of defence and the French ministry of research.

News

ETISEO at VS-PETS 2005, Beijing, China

Schedule

Project ETISEO is planned over two years: the first year is dedicated to data acquisition, metrics and evaluation definition and validation, while the second year will entain running the real evaluation. ETISEO began in the first trimester in 2005.

Three seminars during project life will allow partners and participants to share and collaborate with ETISEO:

- During first seminar meeting (May 2005) participants expressed their needs about metrics, datasets and rules.
- The second seminar corresponds to real evaluation launching.
- The third seminar will occur at the end of the evaluation cycle.

All teams from all over the world are welcome to participate at the evaluation process at any time during the ETISEO project.

Diffusion & dissemination

At the end of the project, ETISEO dataset and evaluation tools should constitute a reference in "vehicles and pedestrians scene understanding".

Therefore, resources generated during the project: videos, ground-truth, and evaluation tools, will be made public and accessible on the Internet. Any laboratory should then be able to run its methods using the dataset and compare its results with those of the ETISEO evaluation.

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