Technology and trainer support in simulation

The case of Arc Sim'Pro and the use of ZED2 cameras for detailed participant monitoring

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1 Background and issues

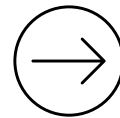**2** ARC Sim'Pro Project

3 Camera ZED 2

4 Results and outlook

Content

1. Background

Overview of the training system available (1)

Training of future teachers (secondary) implemented by the INAS at the University of Mons - Belgium (3 faculties).

→ Micro-teaching simulation
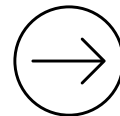
Each future teacher gives a lesson to another future teacher playing the role of a pupil.

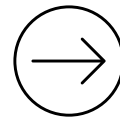→ These students are asked to be authentic as possible

The trainer observes the lesson and then comments on it in a video debriefing session with the future teacher who has given the lesson.

(1) Bocquillon, M. (2020). *Quel dispositif pour la formation initiale des enseignants ? Pour une observation outillée des gestes professionnels en référence au modèle de l'enseignement explicite* (Doctoral thesis). Université de Mons, Belgique.

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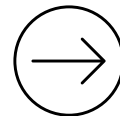
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o Trainer collects information for debriefing

o Lesson dense with simultaneous and transitory information.

o Many things for the trainer to observe

- *On the part of the "future teacher"*
- *On the part of the "pupils"*

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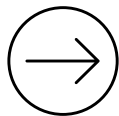
→   Difficult even with a coding tool such as "The Observer XT."

Teachers need **tools** that will help them to identify and process certain elements of the "classroom" in an **automatic way**.

2. ARC Sim'Pro project*

Objectives:
o Enhance detail of the trainer's observations
o Alleviate the trainer's cognitive load and workload
o Automate the collection of data

Features:
o Non-intrusive as possible
o Adaptation to contexts and environments
o Reasonable cost

* Funded by the Wallonia-Brussels Federation (French-speaking Belgium)

2. ARC Sim'Pro project

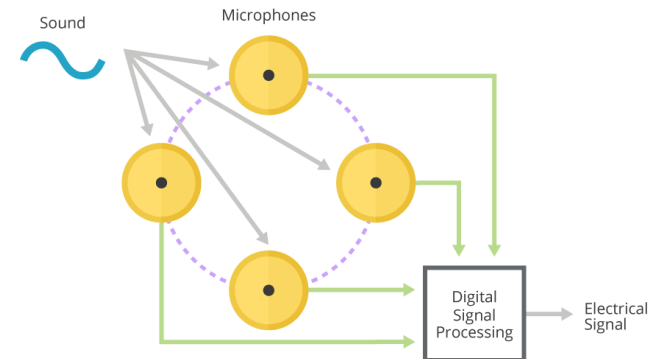## Tools

1   **EYETRACKING GLASSES**

2   **CAMERA ZED2**

3   **MICROPHONE NETWORK**

2. ARC Sim'Pro project

Tools

1 EYETRACKING GLASSES

2 CAMERA ZED2

3 MICROPHONE NETWORK

- Eye tracking data

- Visual environment data
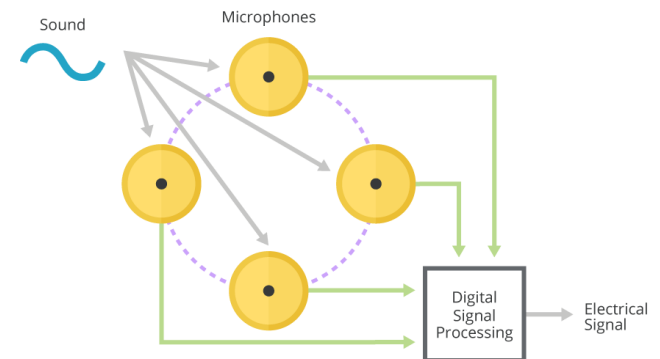
- Audible environment data

3.1. ZED2 Cameras

Role and technical overview

Technical Specifications:

- High-resolution stereoscopic cameras
- Real-time tracking (30FPS in our case)
- Captures detailed 3D data
- Uses Stereolabs' library*

Application in Simulation Training:

- Relevant data collection
- Movement's behavior analysis
- Essential for analyzing interactions and supporting trainer activity
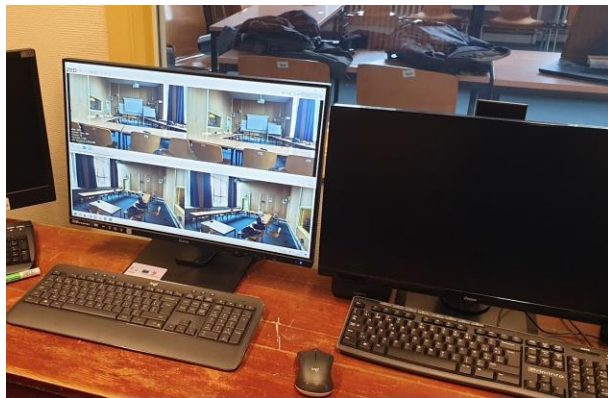

Poses estimation example

* https://www.stereolabs.com/docs
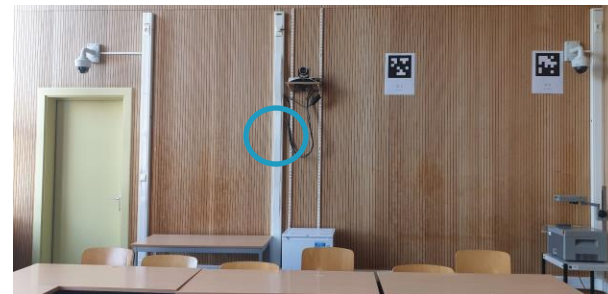
3.1. ZED2 Cameras

A Classroom set-up

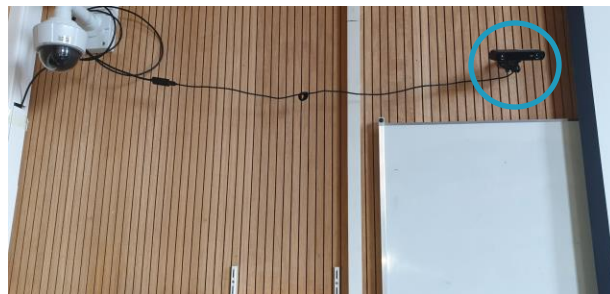**Camera Setup and Synchronization:**

o   3 cameras strategically placed to maximize coverage and minimize occlusions

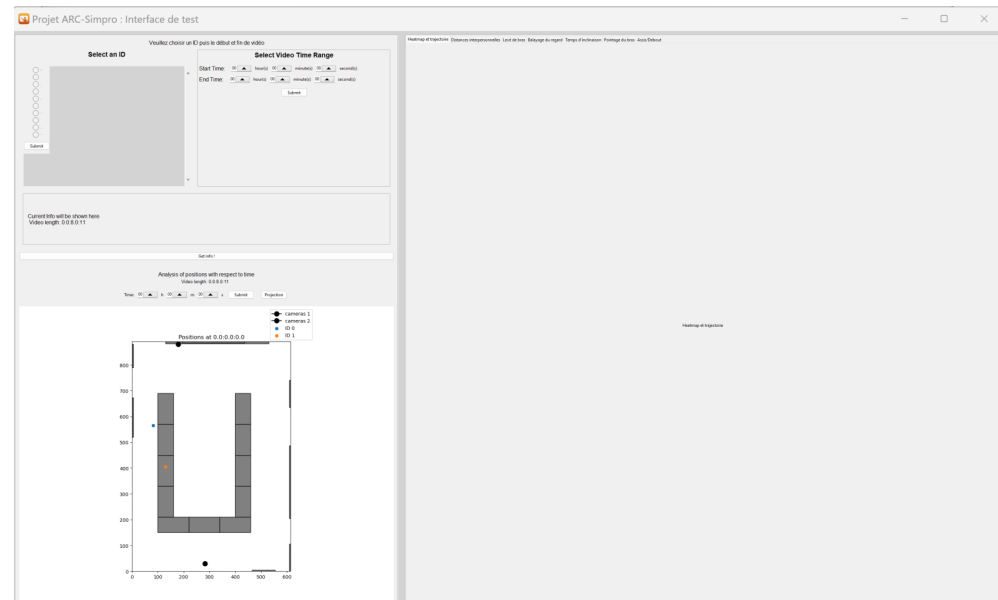Monitoring desktop

O Cameras

3.1. ZED2 Cameras

Application for data processing

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Application for data processing

1. Choose a target (ID)
2. Choose a time range
3. Visualise actors in the scene (bottom left)
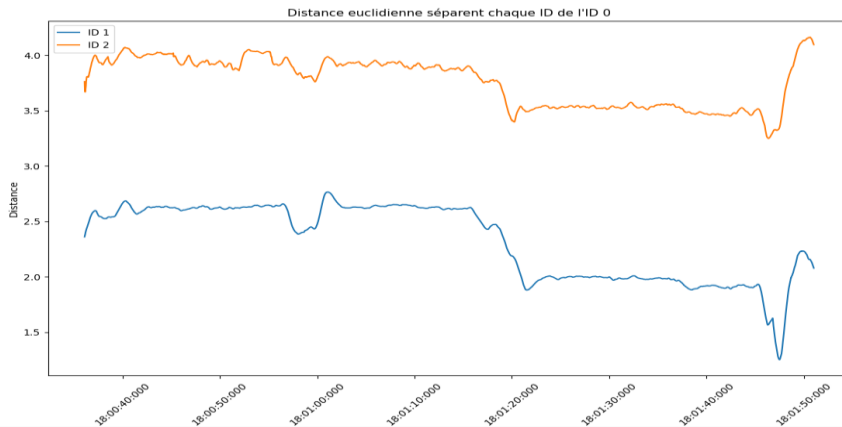4. Process useful statistics (RHS) and get results


ARC-Simpro Interface

4. Results Achieved

Behavioral Tracking and Analysis:

o Tracks participants' movements (trajectory)

o Tracks head orientation, interpersonal distances, hand pointing, raised arms, and seated/standing positions.
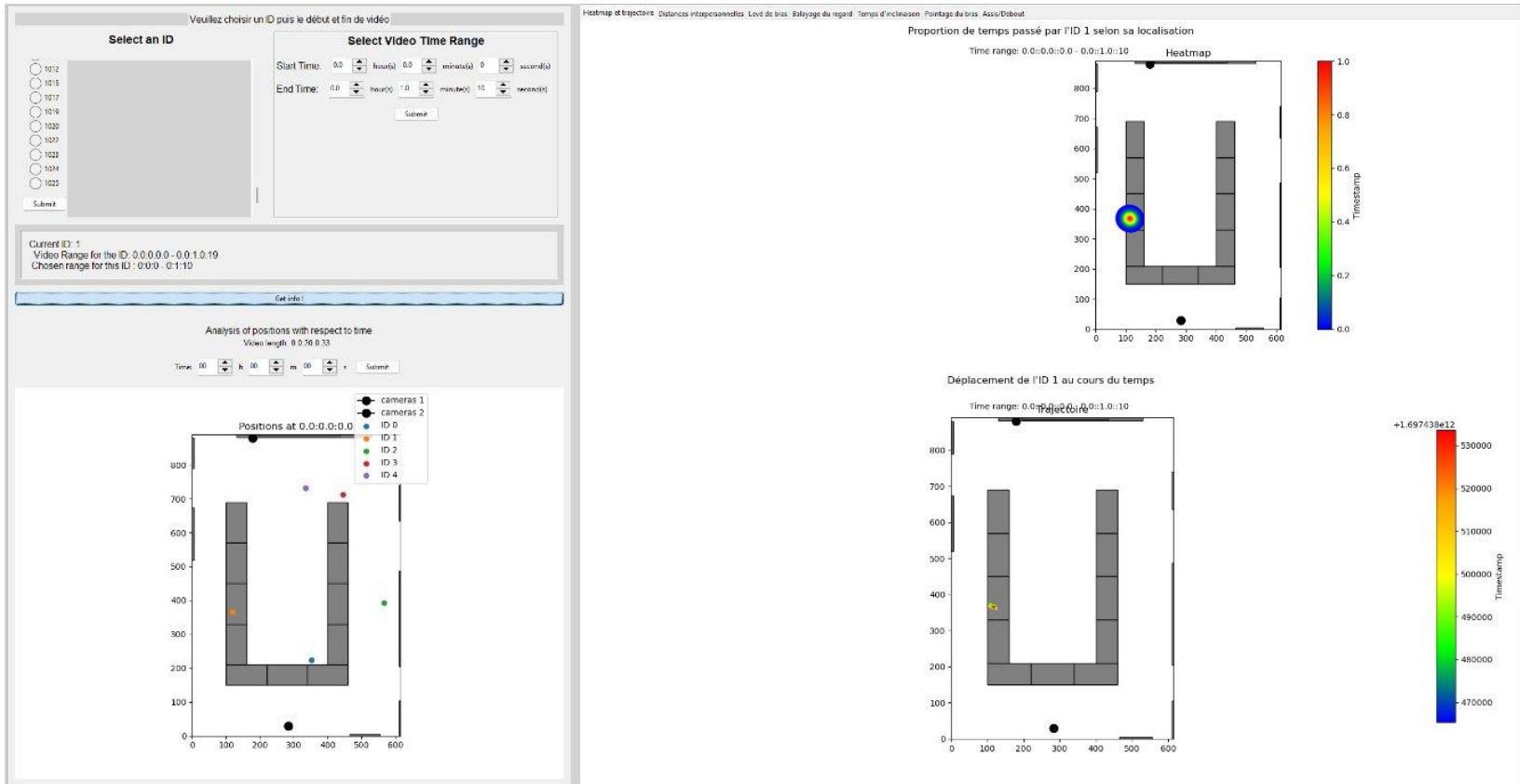
o Analyzes these behaviors over time.

Data Extraction and Analysis:

o Data can be extracted for entire sessions or specific intervals.

o This flexibility supports detailed analysis of training performance.
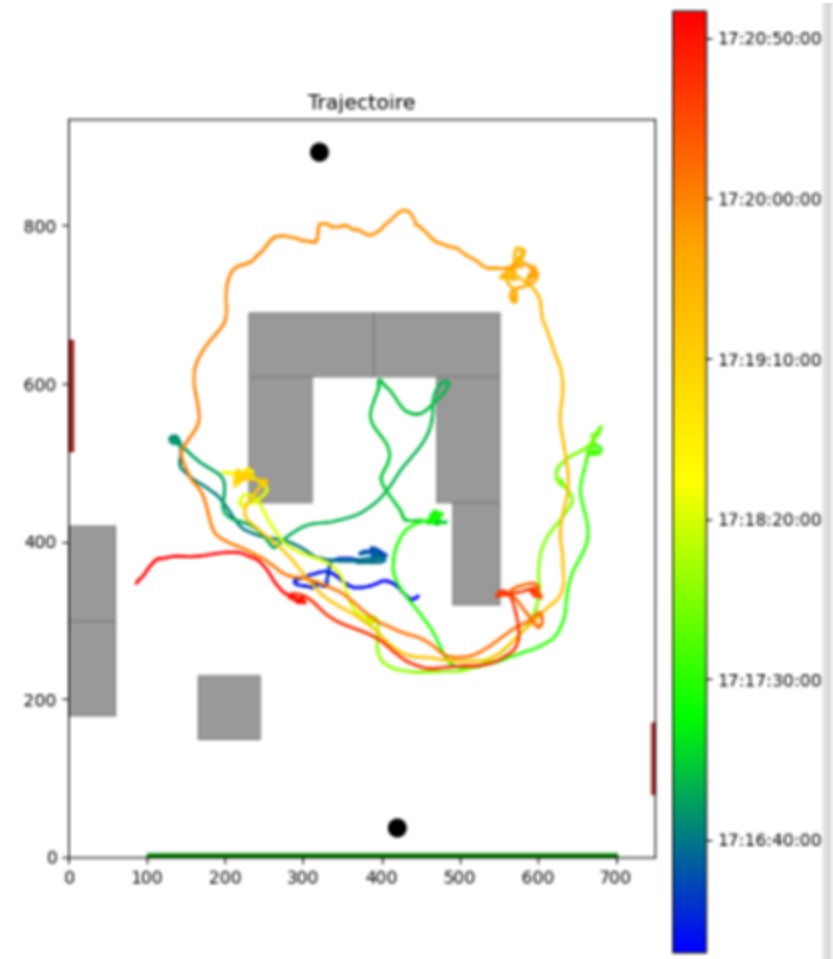
# 4. Results Achieved with ZED2 Cameras

5. Conclusion and Perspectives

Application and Benefits:

o Enhances monitoring and evaluation of training sessions

o Provides insights to improve training outcomes (e.g. : Noldus integration)

Challenges:

o **Occlusions:**

  o Targets are partially occluded with benches

  o Targets can occlude each other when moving in the scene

o **Crowded scene :** there are many targets at the same time, who are close to each other
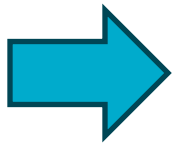
➡ Identifier loss or switching between individuals

Openings

o Train (here, fine-tune) deep learning algorithms for detecting targets in the specific context.

Thank you for your attention !

01.
WEB SITE

02.
PUBLICATION

03.
INFOGRAPHIC DEDICATED TO ZED 2 CAMERAS

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Framework