

**Unil.**

**TRAIL**  
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# **LAIGO: Learning Assembly Instructions from Gestures and Objects**

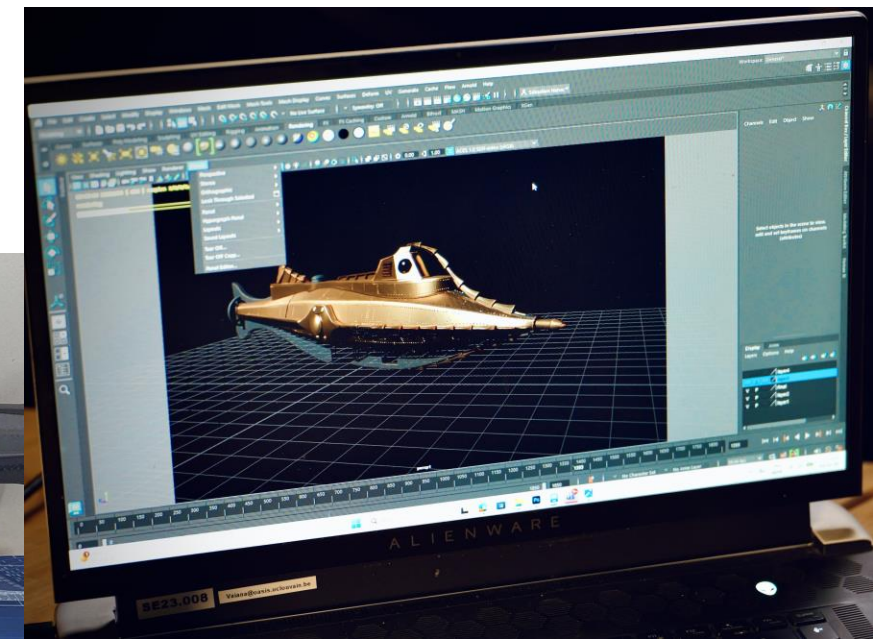
Human-Centered Spatial AI for Mixed Reality Assembly Guidance

**WAL4XR**

Project n°13

# I 01

## Context



MiiL, UCLouvain

- Industry 4.0
- Expert demonstrations of assembly tasks
- Tacit knowledge: gestures, sequence, object placement
- Spatial Mixed Reality guidance linked to real parts and workspace
- AI perception: object tracking, hand tracking, motion analysis
- Tutorial generation and learner validation

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## Founding Team

- *Thierry RAVET*
  - UMONS (ISIA/Le CLICK)
  - XR, AI, CV, motion analysis, HCI
- *Bryan BARTOLONI*
  - UCLouvain (MiiL)
  - Full-stack development, XR expertise
- *Thomas BALDASSARRE*
  - UMONS (ISIA)
  - VR, Agentic AI, HCI
- *Evelyne MEURISSE*
  - UMONS (ISIA/Le Click)
  - AI, HCI, motion analysis

- *Alexandre PHILIPPON*
  - UMONS (ISIA)
  - XR, AI, Spatialized audio
- *Dorian Van Nieuwenhove*
  - UCLouvain (MiiL)
  - XR development, AI integration

### Remote contribution

- *Kevin El Haddad*
  - UMONS (ISIA)
  - Agentic AI, project management, ...
- *Adrien Kinart*
  - UMONS (ISIA)
  - AI, CV, XR, 3D, computational attention

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## Work Plan

- *WPI – Multimodal Perception & Benchmarking*

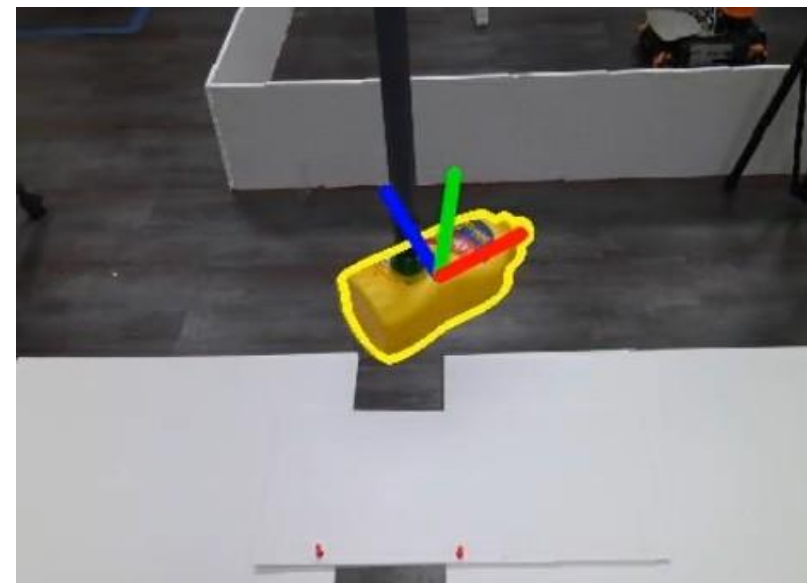
### Perception modalities

#### Object modality

Assembly part detection · segmentation  
6DOF pose estimation · tracking

#### Motion modality

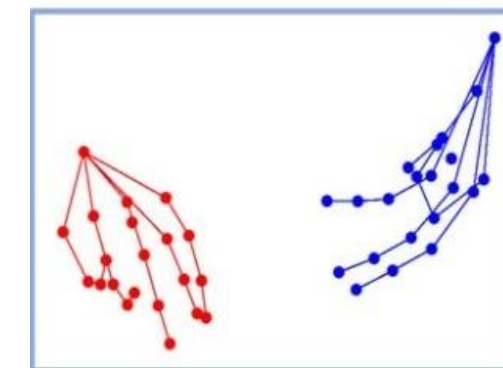
Body pose estimation · hand / finger tracking  
Gesture / action recognition



Wen et al. FoundationPose, 2024



Shamil et al., HandFormer, 2024



### Benchmarking & selection phases

1

#### Dataset benchmarking

Evaluate each modality on retained datasets  
Use reference metrics · measure inference time

2

#### Prototype benchmarking

Integrate selected models into the technical prototype  
Evaluate them on recorded assembly signals

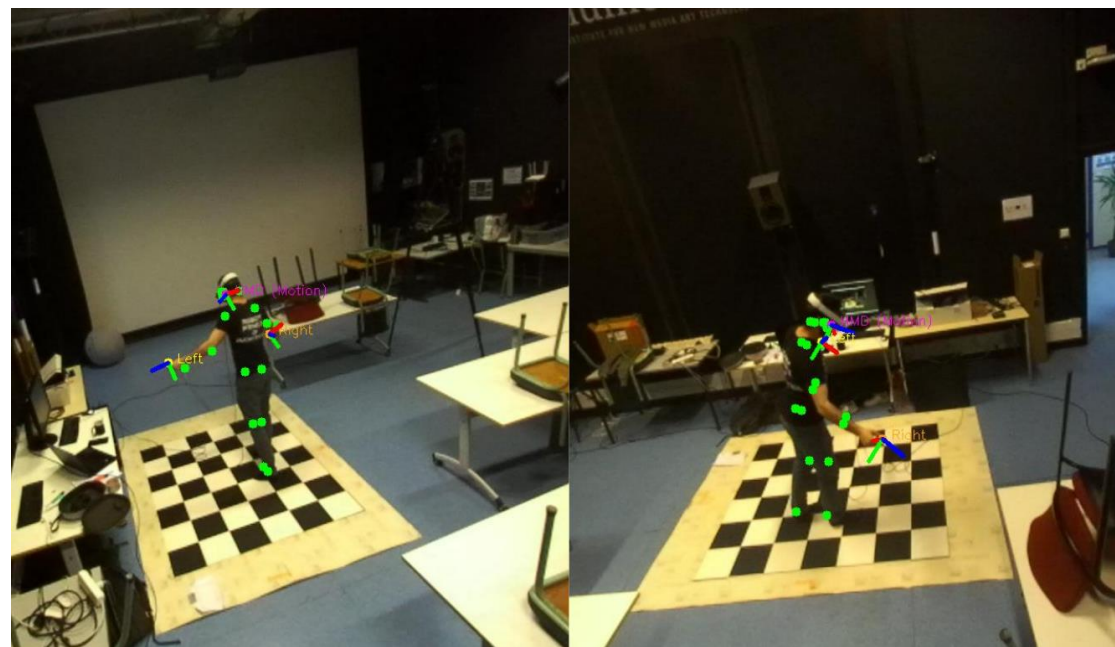
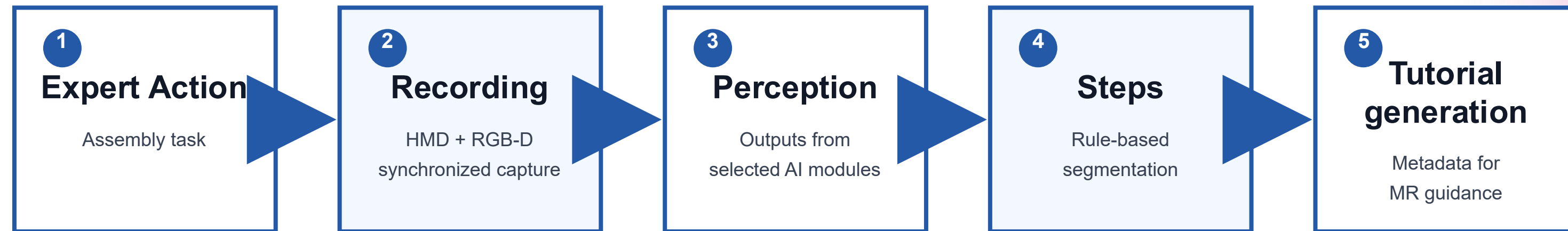
# I04

## Work Plan

- *WP2 – MR Tutorial Generation Pipeline*



StereoLabs\*



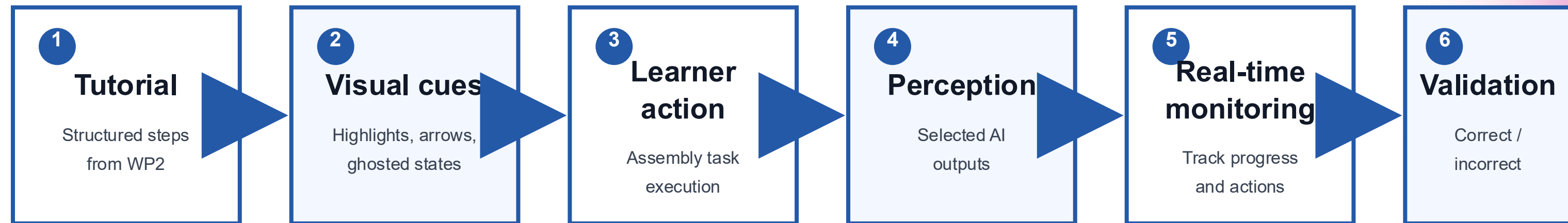
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## Work Plan

- *WP3 – MR Learning Validation Pipeline*



StereoLabs\*



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## Expertise Sought

Interested in AI perception, XR interaction, learning, or turning expert knowledge into procedural guidance?

**1 Computer Vision**

- Object detection and segmentation
- 6DOF pose estimation and object tracking

**2 HCI Design**

- Human-computer interaction and design
- Spatial guidance user interfaces and XR-based assistance

**3 Human-Centered Evaluation**

- Usability and UX evaluation
- Cognitive load, learning processes, and procedural understanding

Potential contribution: WP4

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THANK YOU FOR YOUR ATTENTION !

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