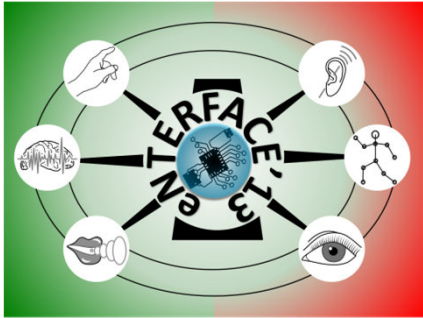


Body ownership of virtual avatars



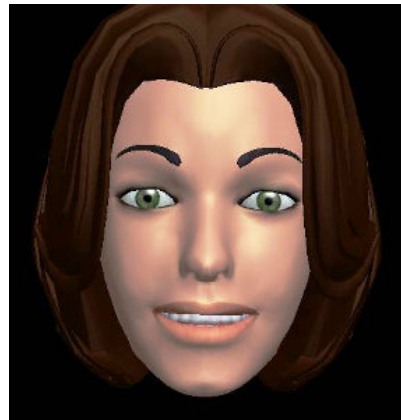
An affordance approach of telepresence

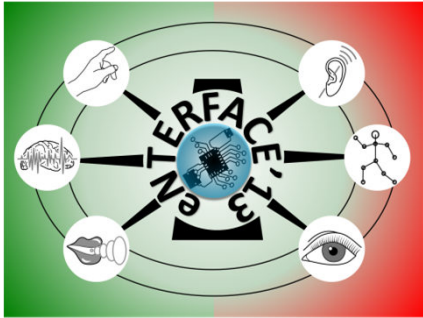




➤ of artificial agents

- 4 in 9 projects of eINTERFACE'13.
- European projects (e.g., LIREC).
- Virtual avatars, robot companions...

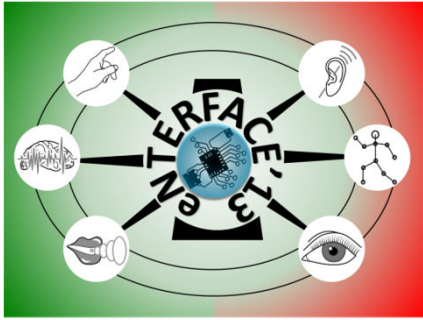




HMI cornerstone

- Interaction as natural as possible.
- All projects of eINTERFACE'13.
- Key questions:
 - How to assess that the interaction is natural?
 - What features are important to enhance a natural interaction?
 - Is there a difference between a physical and a virtual body?

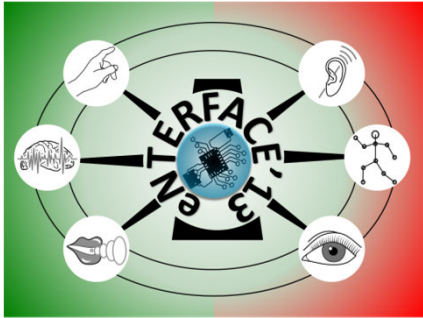




Our approach

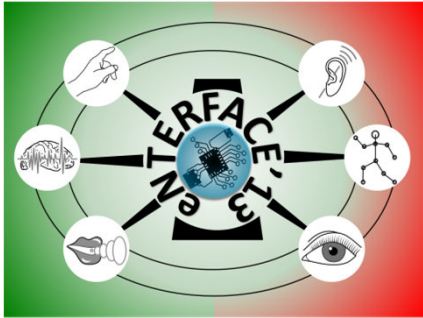
- Telepresence:
 - The feeling of being present at a place other than the physical location of the individual.
 - Teleoperation, virtual reality...





How to assess this feeling?

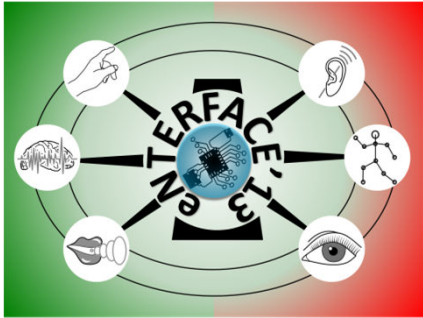
- Questionnaires
 - Any possible questions
 - Is there a more accurate scale level number?
 - Subjective
- Physiological parameters (heart rate, GSR...)
 - Quantitative measurement
 - Limited assessment
 - Interpretation in terms of telepresence?
- Behavioural assessment (motor performance)



What behaviours?

- Affordance concept:
 - “Activities that it offers or affords for an organism with certain action capabilities. Such functional possibilities for action are determined by the fit between properties of the environment and properties of the organism’s action system.” (*Gibson*)
 - Some examples:
 - Object affords grasping if its shape is compatible with the organism’s hand.
 - Aperture affords passage if its width $>$ organism’s width.



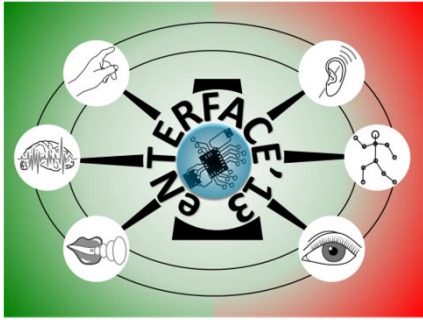


Aperture-to-shoulder-width ratio

- Critical A/S marking the transition from frontal walking to trunk rotation is (*Warren & Whang, 1987*):

$$A/S = 1.30$$

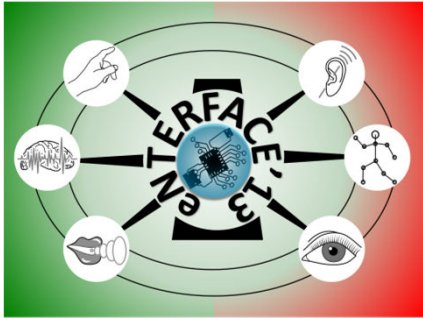
- 2 questions regarding the ownership:
 - Is this ratio preserved when the human being performs the action through a virtual avatar?
 - Which avatar features (morphologic and functional) are critical to ensure this ownership?



Technical description

- Interaction:
 - Kinect NUI
- Modelling:
 - Avatars (Blender)
 - Environment (Unity 3D)
- Parameters to manipulate:
 - Morphologic (standard vs tailored)
 - Functional (partial vs full motion capture)
- Experiments with participants.

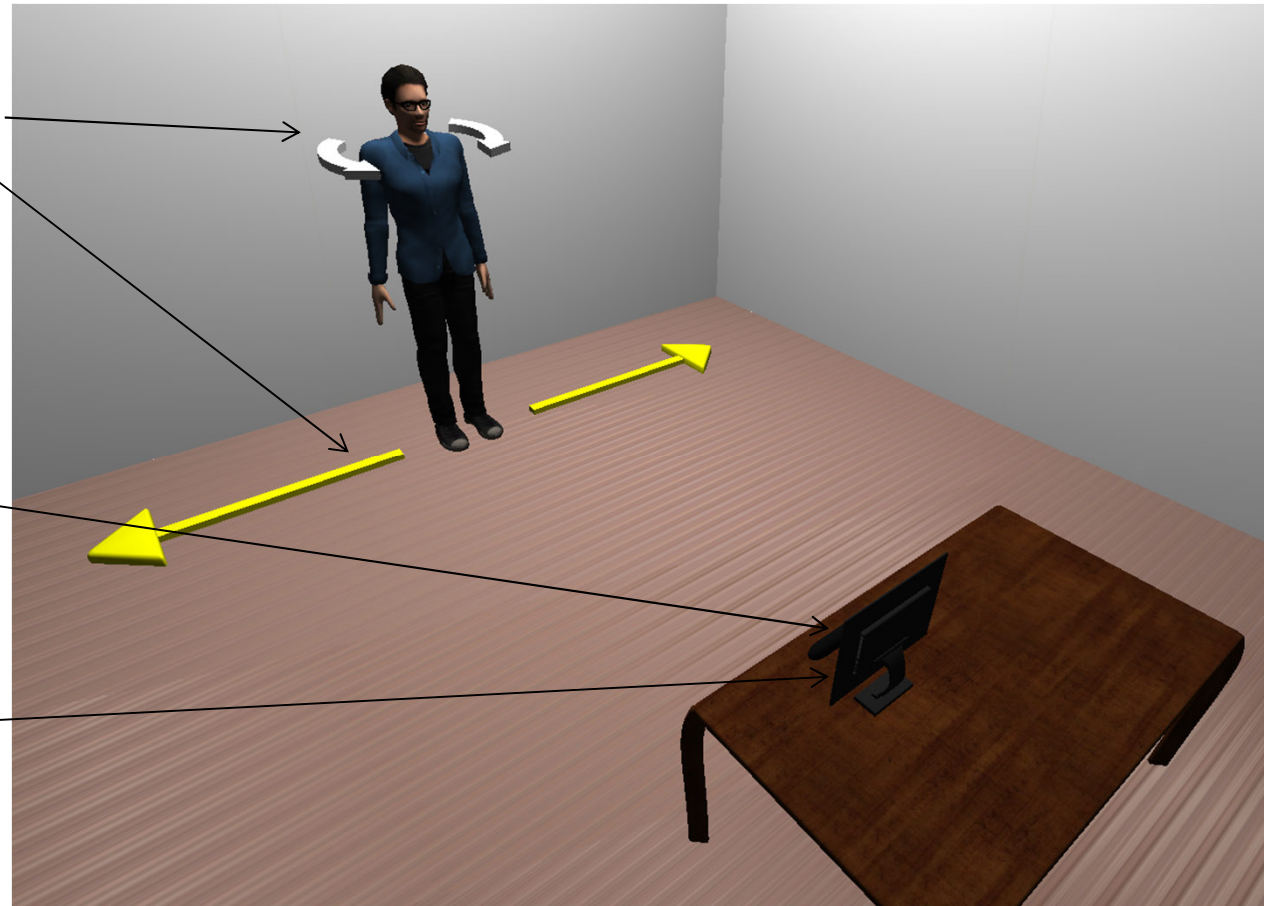




Experimental environment

Main movements:

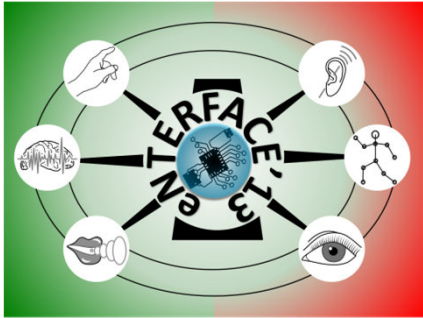
- Trunk rotations
- Lateral translations



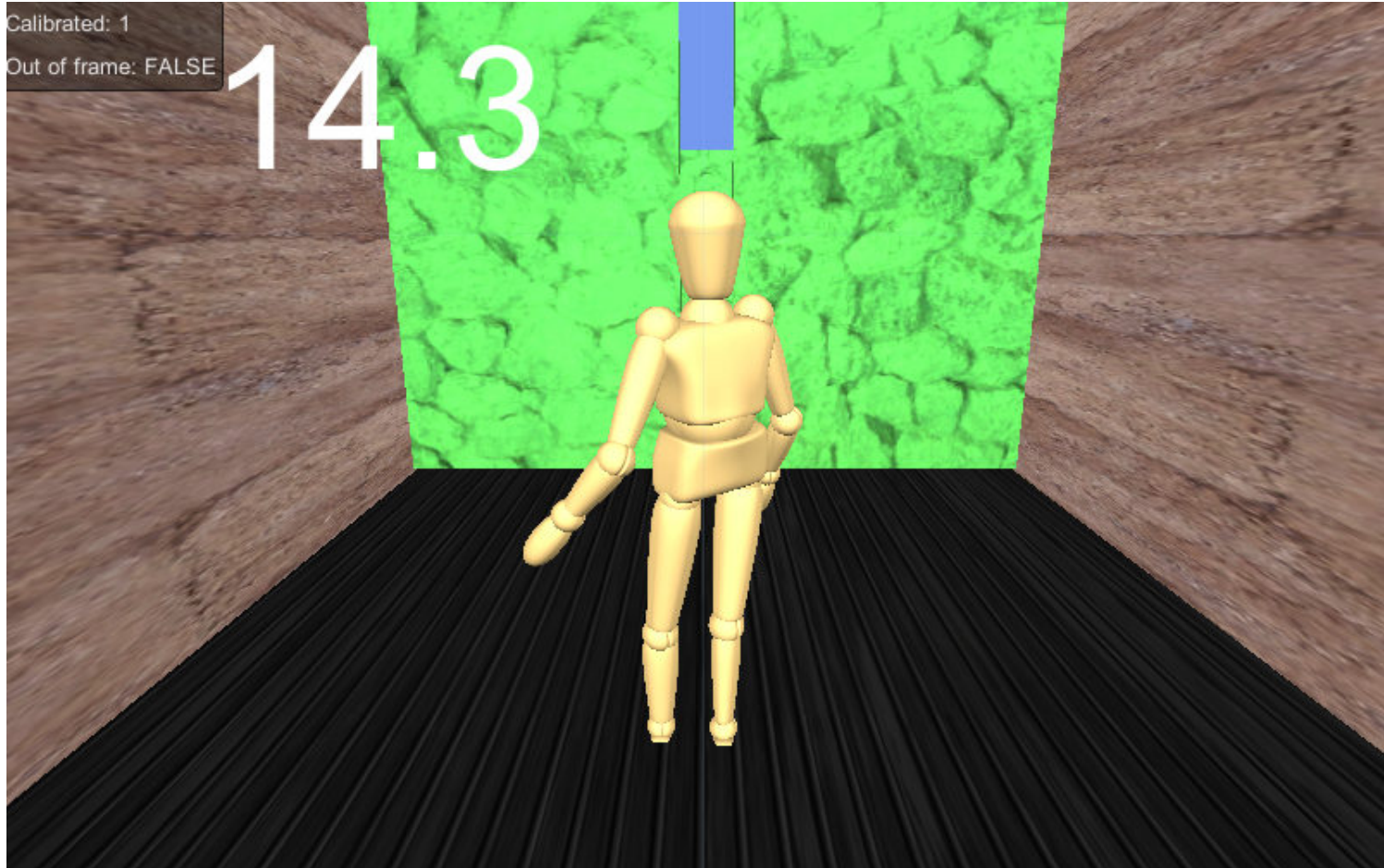
Kinect sensor

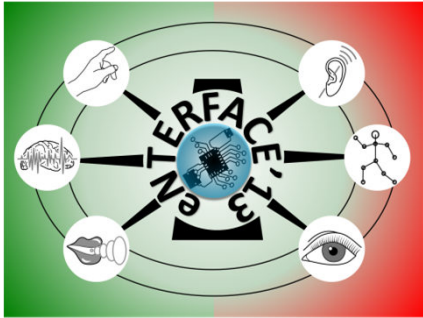
Display





Virtual environment

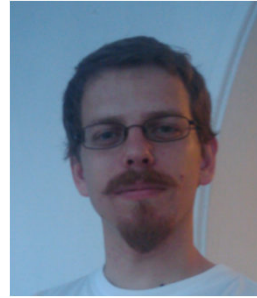




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