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COLLABORATIF



# Immersive collaboration across time through virtual surrogates in mixed reality

## PILOT Project

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# Introduction



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Giuseppina Pinky K. Diatmiko (Indonesia)

Educational Background:

- Bachelor of Science – Creative Technology, University of Twente, The Netherlands.
- Master of Science – Imaging and Lighting in Extended Reality (Erasmus Mundus) , KU Leuven, University of Eastern Finland, and Toyohashi University of Technology.
- PhD Student – IMT Atlantique, Department of Informatics, Lab-STICC





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# **IMMERSIVE COLLABORATION ACROSS TIME THROUGH VIRTUAL SURROGATES IN MIXED REALITY**

# Background



Figure 1: Asynchronous Collaboration in VR  
<https://www.autodesk.com/blogs/construction/virtual-collaboration-in-construction/>

Figure 2: Types of collaboration  
<https://www.avisystems.com/blog/3-benefits-of-asynchronous-collaboration-for-global-organizations>

- Asynchronous collaboration in virtual reality is still under-investigated compared to synchronous collaboration.
- Most asynchronous collaboration systems in virtual reality only rely on record-and-replay features [2].
- Limitations: Lack of interactivity and processing information [1].

# Background



Figure 3: Skyrim and Half-life Alyx Mod – GPT-driven NPC <https://www.g2a.com/news/latest/new-mod-skyrim-vr-lets-players-talk-npcs-real-life/>

- Large Language Models(LLMs) could support asynchronous collaboration because of its ability to grasp contextual information and can be used to control a virtual surrogate which can interact on behalf of a person who is not available at a particular time.

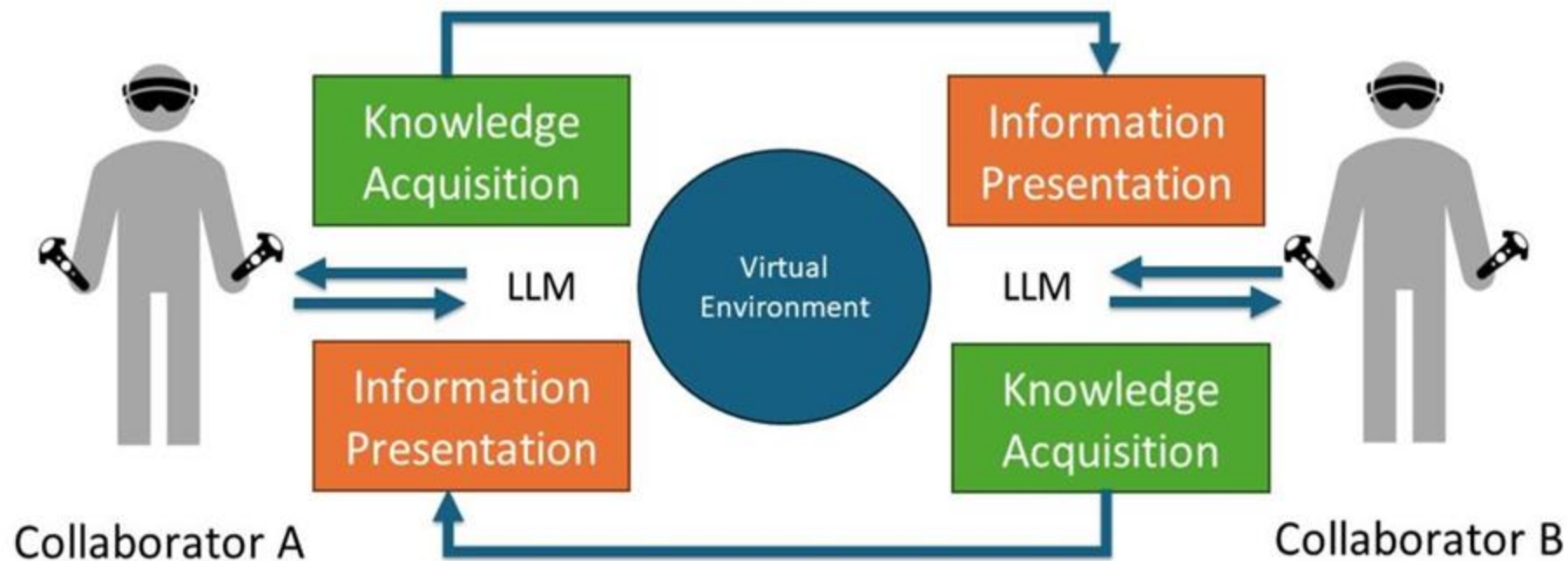
- Can an LLM understand context and capture knowledge during the recording step?
- Can an LLM be used to support interactivity during the play-back step, while shortening review of the recorded data?
- Can an LLM help support a truly iterative process between collaborators working with multiple iterations over time?

## Knowledge Acquisition:

- Verbal cues
- User movement and object translation
- Questions to certain user actions

## Information Presentation:

- Summary of activities
- Replay of user actions
- Rationale behind certain design choices



# Prototype



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# CONTRIBUTION TO PILOT PROJECT

# Contribution to PILOT Project



My research can benefit long-term collaborative practices for the future of industry by

- Supporting iterative collaboration process between people who are separated in different time zones in a long run.
- Helping create a more interconnected and cooperative world by empowering individuals and organizations to collaborate seamlessly and accomplish their objectives with greater efficiency.
- Preserving participants' interests and enforcing their specific requirements.
- Managing collaborative interaction histories

# References



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- [1] Irlitti, A., Smith, R. T., Von Itzstein, S., Billinghamurst, M., & Thomas, B. H. (2016, September). Challenges for asynchronous collaboration in augmented reality. In 2016 IEEE International Symposium on Mixed and Augmented Reality (ISMAR-Adjunct) (pp. 31-35). IEEE.
- [2] Marques, B., Silva, S., Rocha, A., Dias, P., & Santos, B. S. (2021, March). Remote asynchronous collaboration in maintenance scenarios using augmented reality and annotations. In 2021 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW) (pp. 567-568). IEEE



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# THANK YOU