Interacting with Multi-Robot Systems via Mixed Reality (1799)

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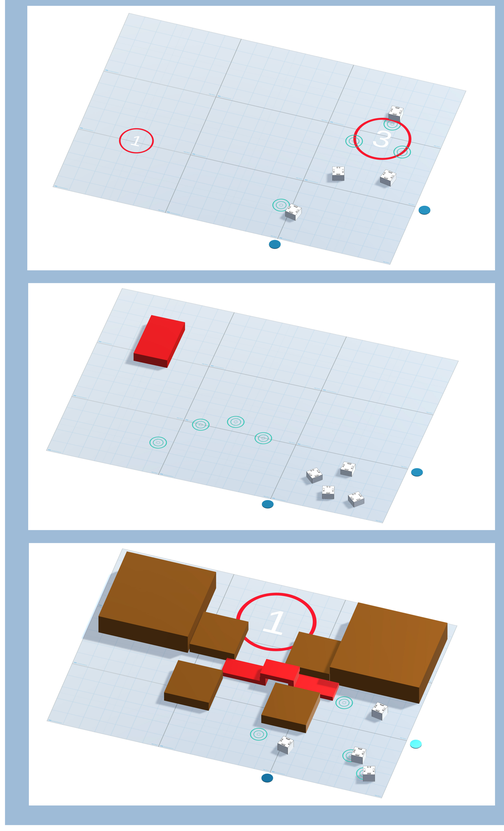
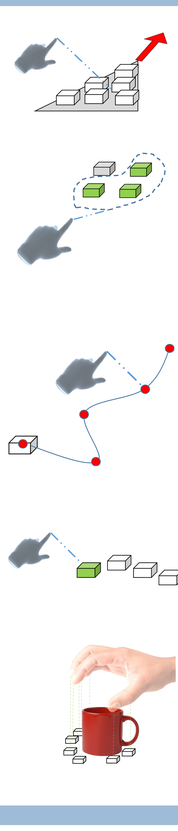
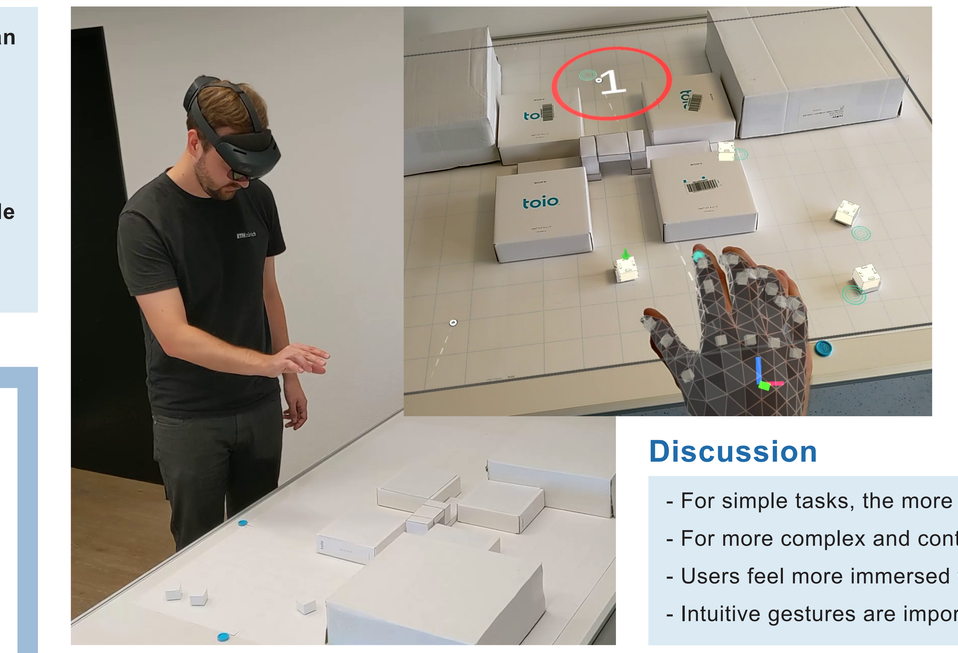
Introduction

Many tasks that involve **reasoning, long-term planning or human preferences** are still hard to automate.
An alternative to full robot autonomy can be to **actively leverage intuition and experience of human operators.**
To do this, suitable **interfaces and modes of interaction** have to be explored.
We present an interface that allows users to **interact with multiple mobile robots simultaneously** and a user study to compare the headset and tablet versions of the interface in different scenarios.

Tasks





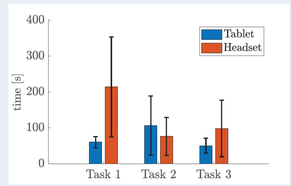


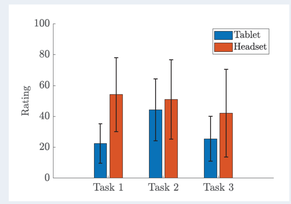
Discussion

- For simple tasks, the more familiar touch interactions are preferred by most participants
- For more complex and continuous interactions, better immersion and hand-tracking of the headset help
- Users feel more immersed with the headset, more detached from the environment with the tablet
- Intuitive gestures are important, but what exactly “intuitive” means depends on the individual participant

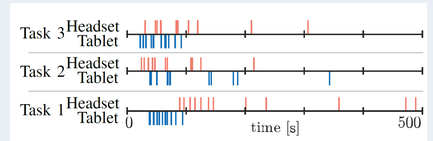
Results

Time and TLX averages

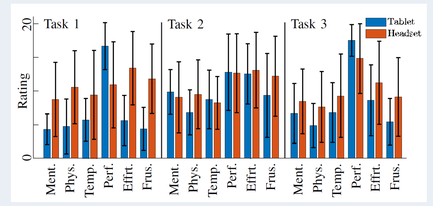




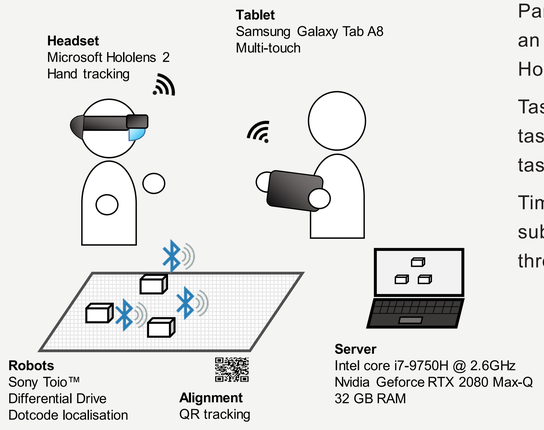
Individual performances



TLX rating per category



System Overview



Participants complete three tasks, using an AR-enabled tablet and a Microsoft HoloLens 2 headset.

Task 1 tests discrete interactions, while task 2 tests continuous interactions and task 3 allows either.

Time to completion is measured, and subjective performance is evaluated through NASA TLX and an interview.

Future Work

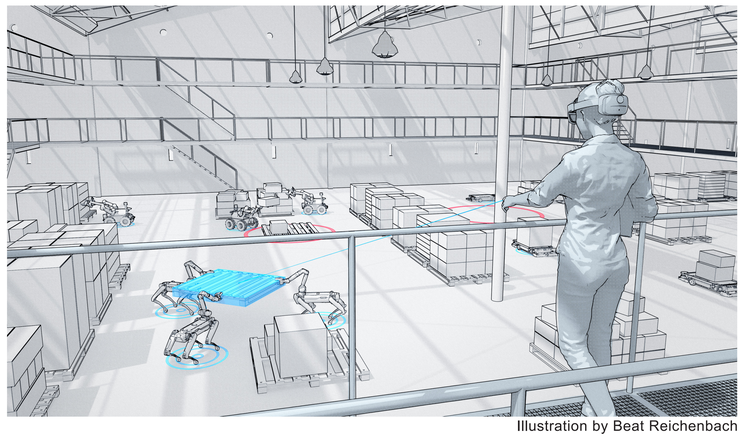


Illustration by Beat Reichenbach

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