METAPO
A ROBOTIC META PORTAL FOR INTERSPACE COMMUNICATION

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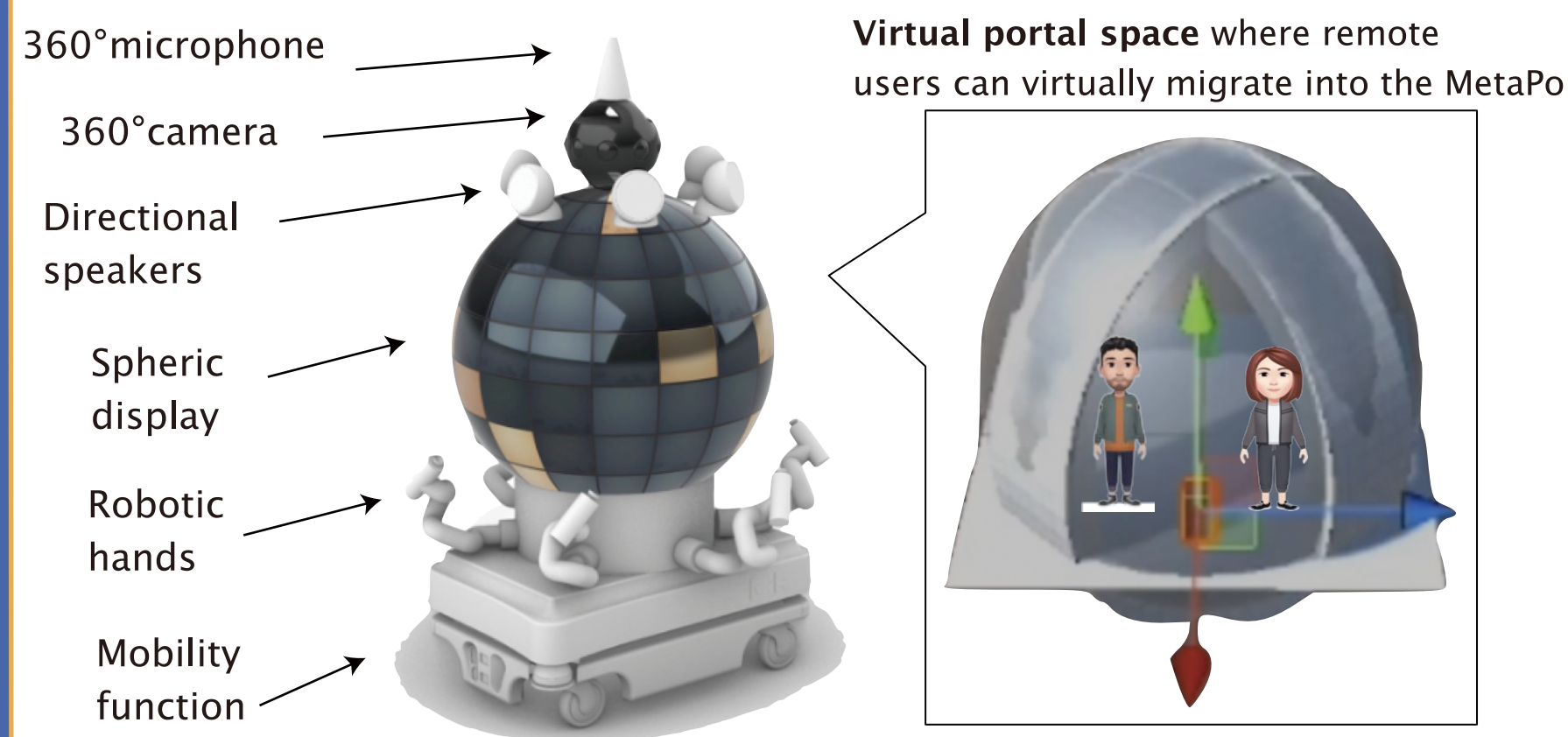NAGOYA UNIVERSITY · TMI · SIGGRAPH 2022 VANCOUVER+ 8-11 AUG

PROBLEM

A key question:

"What is the unified way to connect distributed physical and cyber spaces?"

Information technology extends our living space to cyber space, i.e., virtual reality or the so-called metaverse. In addition, as the digital counterpart of a physical space, the concept of digital twins[3] attracts many researchers in both academia and industry in the smart city context. Thus, methods to connect or integrate such various spaces are getting more important for enhancing communication and services among these spaces.

METHOD

Designing a new device for interspace communication

360°microphone
360°camera
Directional speakers
Spheric display
Robotic hands
Mobility function

Virtual portal space where remote users can virtually migrate into the MetaPo

MetaPo is a four-wheeled robot which equips several I/O components such as 360° camera and microphone, directional speakers, spheric display, and robot hands for physical interaction. In addition, each MetaPo has its corresponding virtual portal space where remote users can virtually migrate into the MetaPo. This enables immersive group telepresence via VR devices, allowing various kinds of apps within the MetaPo platform.

We assume that one-to-many remote communication creates a psychological load to both sides due to its asymmetric relationship. It would mean, that applications that connect remote spaces should provide multi-user capability for any service. Therefore, MetaPo supports panoramic I/O function and multiple robot hands for multi-users experiences, as well as conventional one-to-many communication.

MetaPo in physical space

MetaPo in cyber space

METAPO INTRODUCES A NEW LINKING MODEL OF SPACES, THAT HANDLES BOTH PHYSICAL AND CYBER SPACES EQUIVALENTLY, ENABLING A UNIFIED AND SEAMLESS COMMUNICATION BETWEEN THEM.
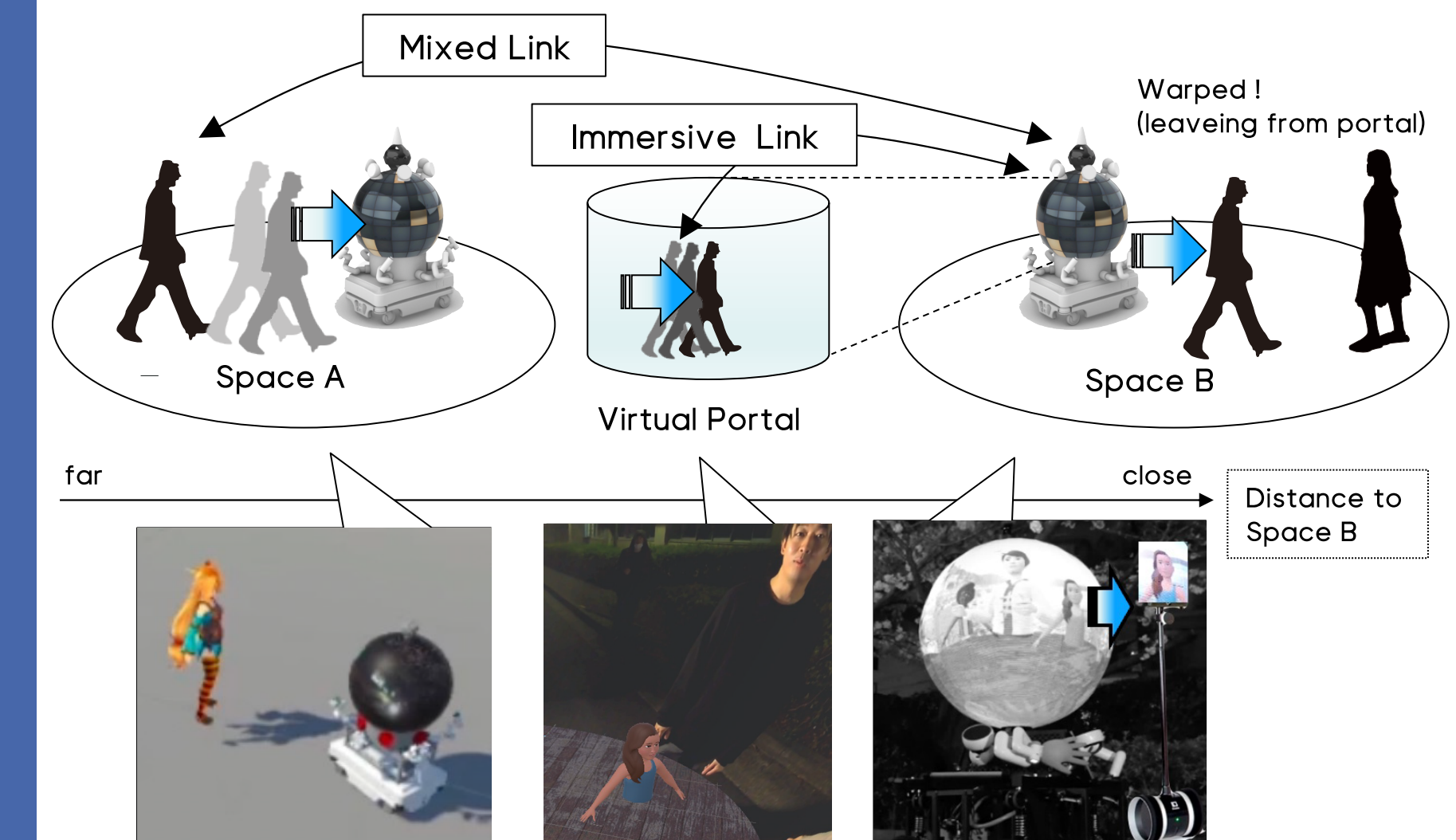
Mixed Link: 360°media call

Immersive Link: Immersive group telepresence

APPROACH

Interspace Communication Model by MetaPo

Mixed Link · Immersive Link · Warped! (leaving from portal)
Space A · Virtual Portal · Space B
far · close · Distance to Space B

RELATED WORK

Existing work has introduced similar conceptual methods for multi-users communication in different ways, such as panoramic communication with spherical display[2] or immersive group telepresence[1].

MetaPo provide a seamless integration of those communication modes through its hardware and software combination and adds several actuating and mobility functions.

REFERENCES

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VIDEO · PDF

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