Understanding Telepresence Systems

Thr, August 6 (Week 7.5)

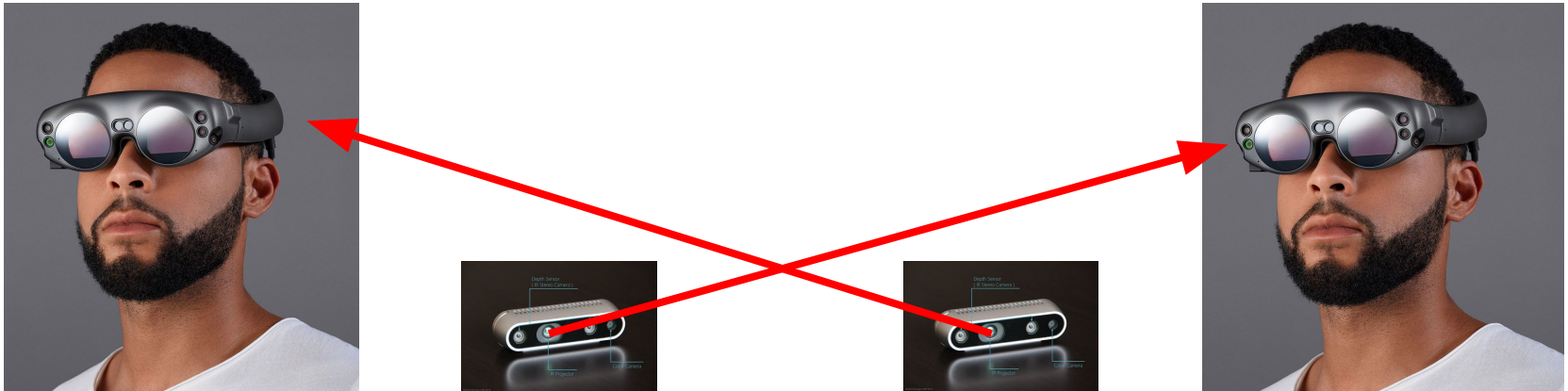
Telepresence Systems in General

Capture RGBD pixels (from one or multiple cameras)

(-> Send all pixels to a machine to construct meshes)

-> Send data over the Internet/wire to a headset

-> Render with the headset



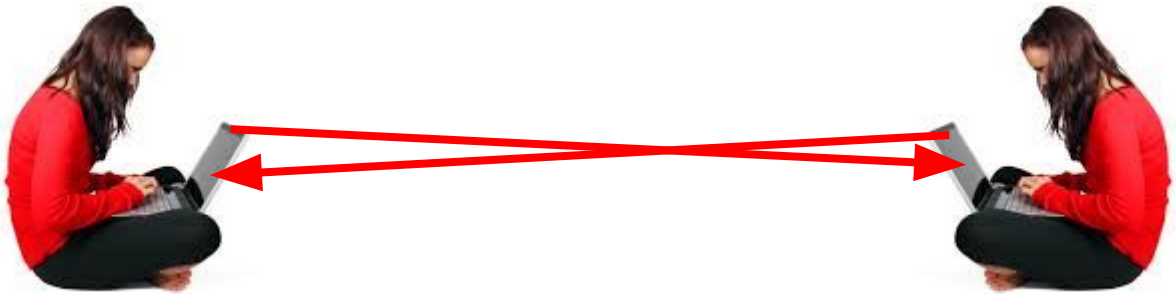
Vs. Video Conferencing

Capture RGB pixels

-> Send data over the Internet to a computer

-> Render with the computer

(A simpler case to look at before thinking about AR telepresence)



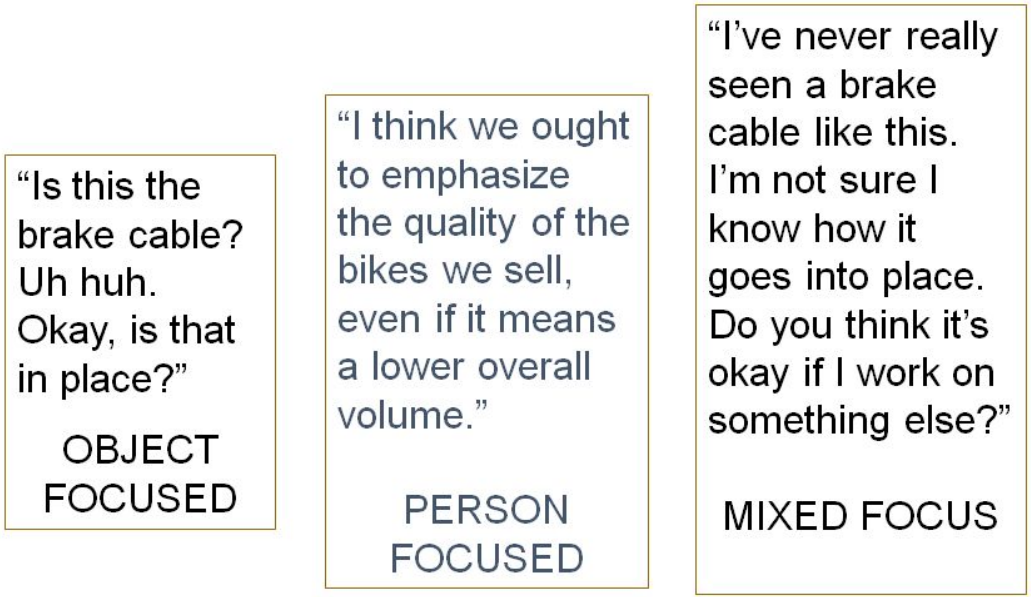
Video Conference Views

Worker in field wears
head-mounted camera,
microphone, and speaker

Expert in office sees what
worker sees,
hears worker

External Cameras for Telepresence

Headsets have cameras, but they cannot capture the person wearing the headset: external cameras are necessary for person-focused contexts.



What are the Messages

Video conferencing: pixels and audio

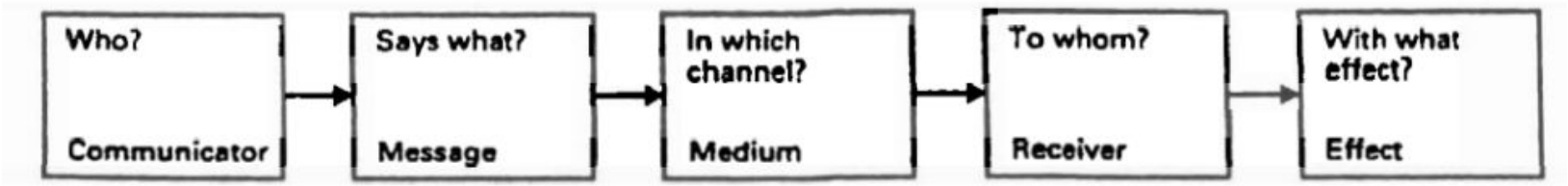


Fig. 2.1.1 The Lasswell Formula with corresponding elements of the communication process (Lasswell 1948).

Surrounding Environment as a Message

The surrounding environment: from the pixels with the camera parameters.

In video conferencing, they provide a background pattern.

In telepresence, it becomes a firm message, for example, the floor.

We always lived in the same floor when standing next to each other.

Interpretations of AR telepresence

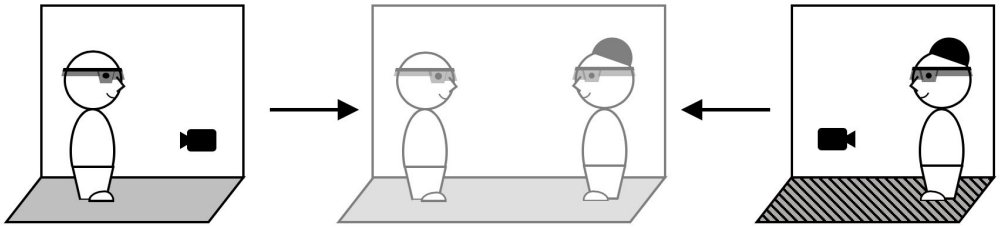
Zoom-like interpretation:

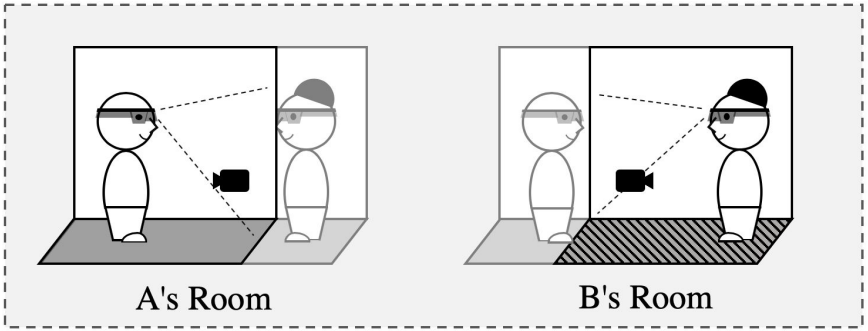
Everyone is having a spatial zoom monitor that shows other people. Each of them have their own version of the telepresence space.

Shared space interpretation:

There is a shared space being built by the camera signals and everyone is seeing this space.

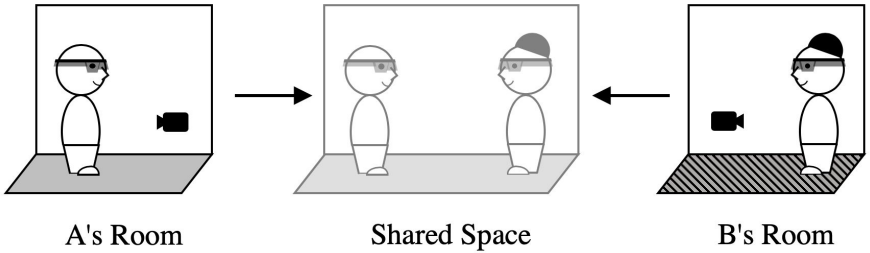
Shared Space

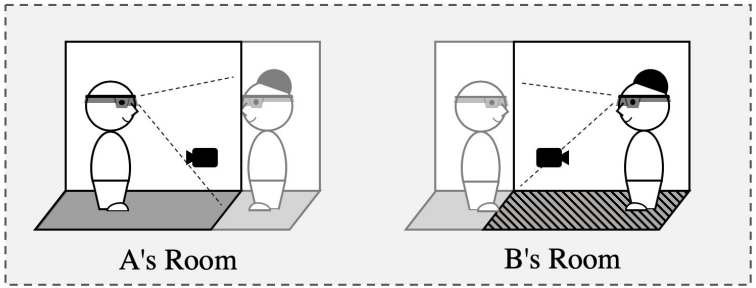




Camera as a Portal

Especially for a single camera situation, installing a camera at each of the rooms can be seen as if a portal to the shared space.





Advantage of Not Sharing Space

Building a shared space means restricting the virtual environment to have a single version.

Transformed social interaction requires not sharing space.

One possible middle ground solution: semi-shared space but with different head movements.

AR Internet

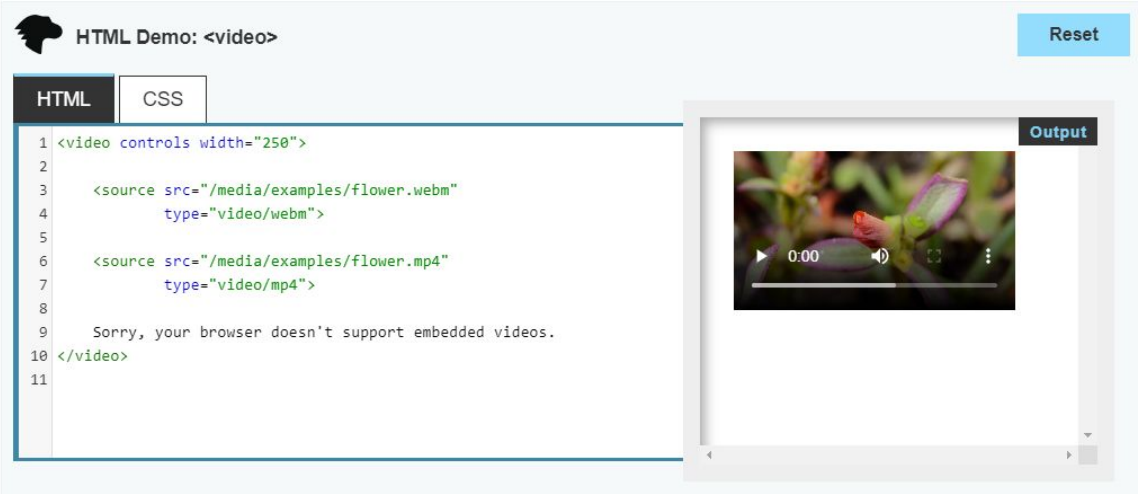
Video Conference App : Internet = Telepresence : AR Internet

Ultimate AR Application:

An AR application with a planet-scale mirror world. Wherever you go, you are connected to the spatial version of the Internet through a device that can do everything a person can do and of course what a computer can do.

AR Internet

Playing a video in a web browser: add a <video> tag inside a html file.



For AR: a holographic video, or even telepresence can become a tag.