

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



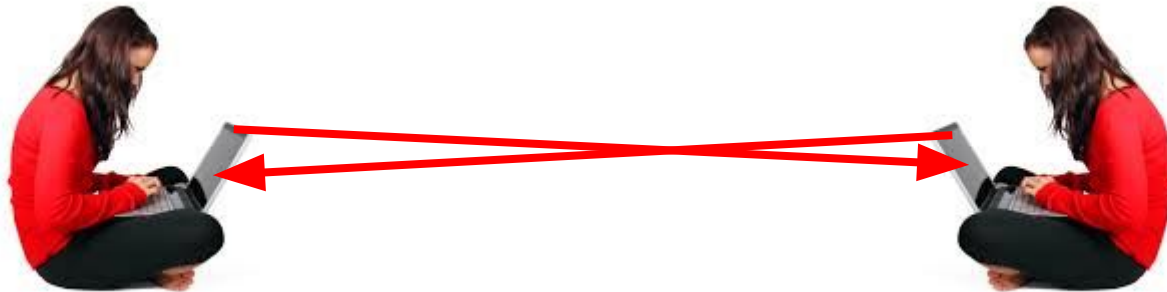
Vs. Video Conferencing

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.

“Is this the
brake cable?
Uh huh.
Okay, is that
in place?”

OBJECT
FOCUSED

“I think we ought
to emphasize
the quality of the
bikes we sell,
even if it means
a lower overall
volume.”

PERSON
FOCUSED

“I’ve never really
seen a brake
cable like this.
I’m not sure I
know how it
goes into place.
Do you think it’s
okay if I work on
something else?”

MIXED FOCUS

What are the Messages

Video conferencing: pixels and audio

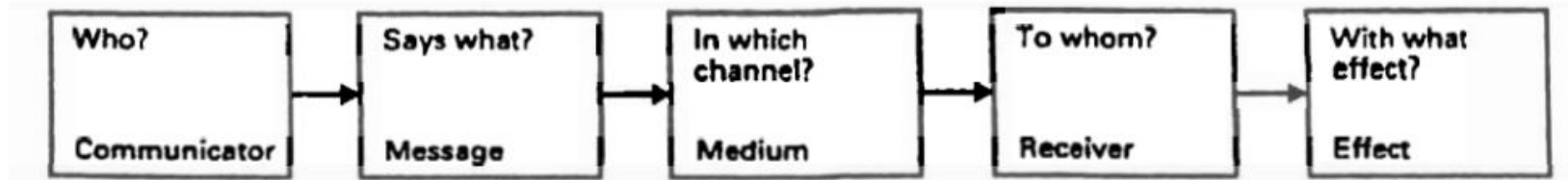


Fig. 2.1.1 The Lasswell Formula with corresponding elements of the communication process (Lasswell 1948).

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

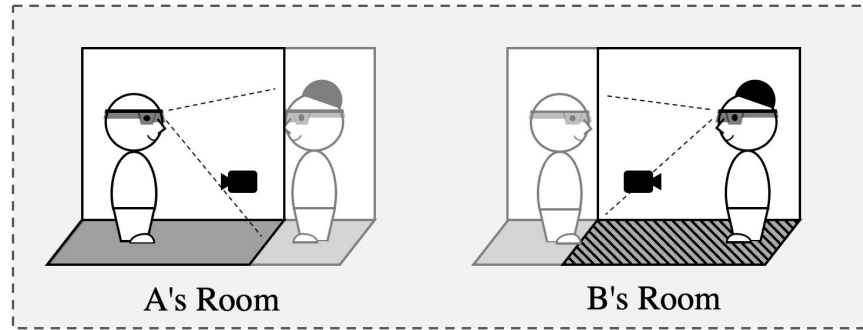
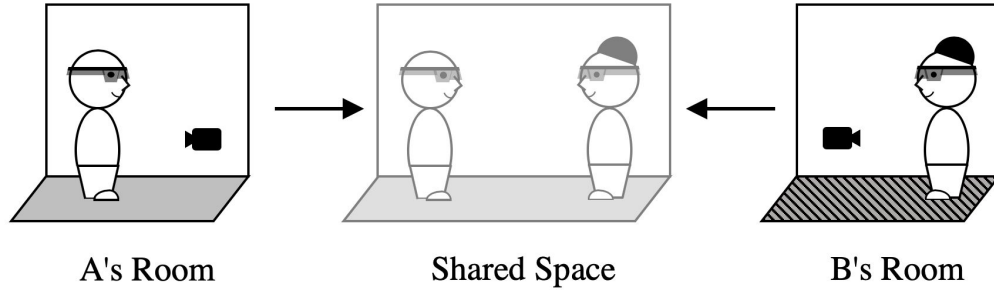
Zoom-like interpretation:

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:

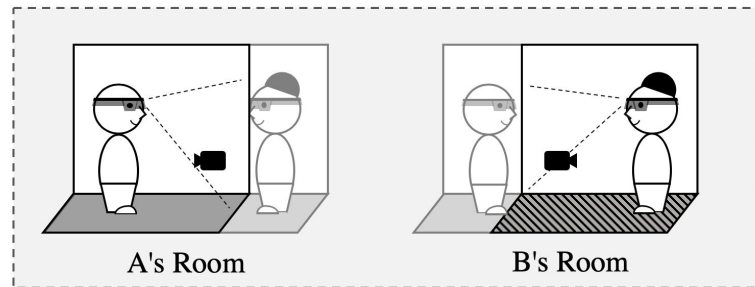
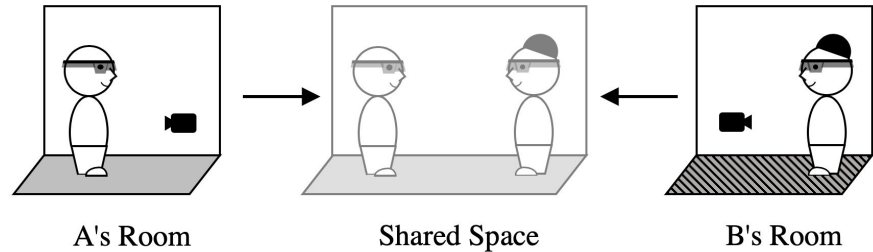
There is a shared space being built by the camera signals and everyone is seeing this space.

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

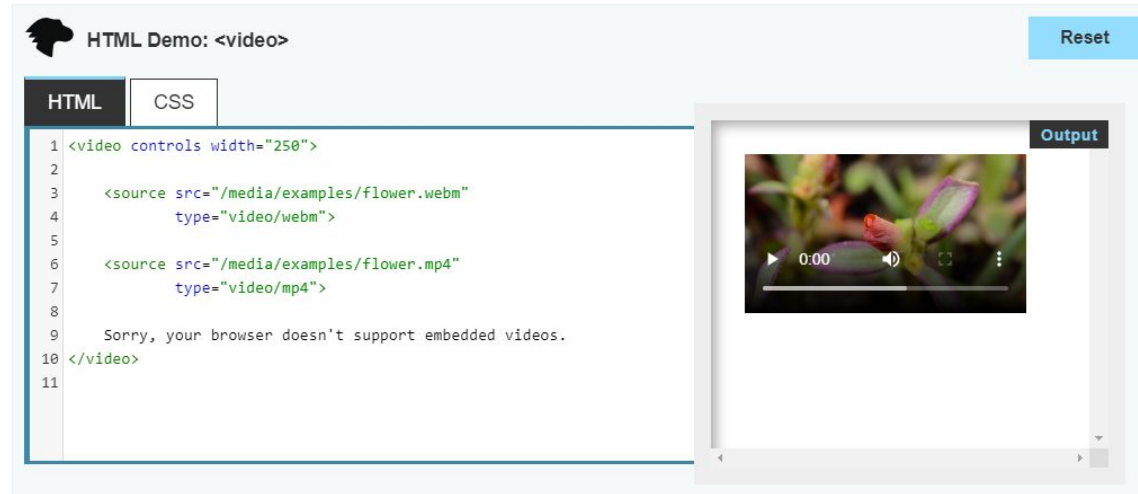
Video Conference App : Internet = Telepresence : AR Internet

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.



The screenshot shows a web browser interface titled "HTML Demo: <video>". It features a "Reset" button in the top right corner. Below the title, there are two tabs: "HTML" (selected) and "CSS". The HTML tab displays the following code:

```
1 <video controls width="250">
2
3   <source src="/media/examples/flower.webm"
4     type="video/webm">
5
6   <source src="/media/examples/flower.mp4"
7     type="video/mp4">
8
9   Sorry, your browser doesn't support embedded videos.
10 </video>
11
```

The rendered output, shown in a window titled "Output", displays a video player with a play button, a progress bar at 0:00, and a close button. The video content shows a close-up of a purple flower.

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