

Mediated Communication

Michel Beaudouin-Lafon
Université Paris-Sud

Thanks to Nicolas Roussel, INRIA

How do you communicate?

Face-to-face
Mail
Telephone
Email
Instant messaging
Texting
Video conferencing

Other?

From telephone to picturephone

1876: Graham Bell invents the telephone
1882: Du Moncel presents the "téléphote" to the French Academy of Science
1927: First television transmission in the US



AT&T President Walter Gifford in New York (left) watches the moving image of Secretary of Commerce Herbert Hoover (right) in Washington, D.C., during the first demonstration of television transmission in the United States, April 7, 1927 (source : AT&T)

From telephone to picturephone

1964 World's Fair: "Survey results indicated that most people did not like PicturePhone. The equipment was too bulky, the controls were awkward and the picture was small."



2007 (Kubrick & Clarke, 1968)



1992

Videoconferencing rooms

Great hopes



DVE

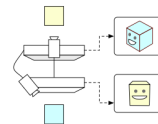


Polycom

Great disappointment

Expensive

Technical problems: sound, eye contact

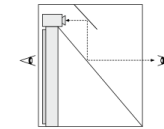


Some solutions

Video:

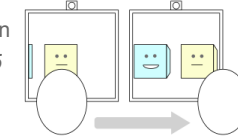
Eye-contact with a silver-mirror

Video Tunnel, Buxton & Moran, 1990



Explore remote space by head motion

Video window, Gaver et al, 1995



Multiple views

Hydras, Sellen et al., 1992



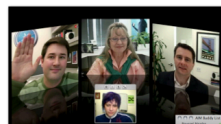
From room to desktop videoconferencing



Creative Labs Share Vision (1997)



Microsoft NetMeeting (2002)



Apple iChat (2004)

What are these systems for?

Supporting synchronous one-to-one conversation with a beginning and an end?



OR

Supporting communication while working on shared artifacts?

OR

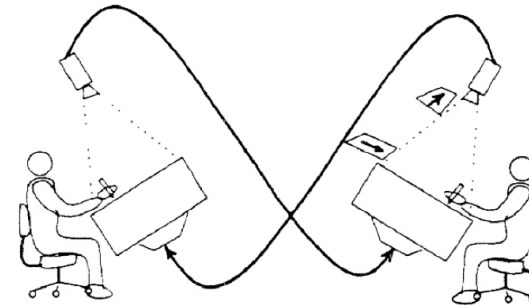
A way to share presence of one or more other people?

Communicating about shared documents



VideoDraw (Tang & Minneman, 1990)

Simple video sharing of a drawing surface



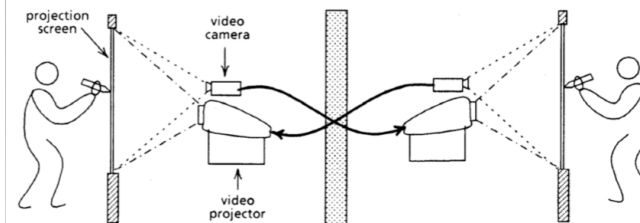
TeamWorkstation (Ishii et al., 1990)

Sharing a drawing tool with inset video streams



VideoWhiteboard (Tang & Minneman, 1991)

Larger drawing surface, an overlaid shadow of the whole body rather than just the hand



ClearBoard (Ishii et al., 1992)

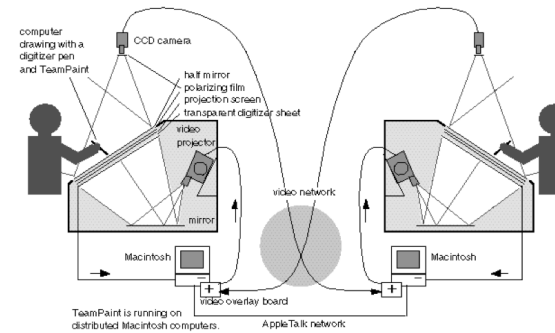
Overlays image of other participant with shared surface
Eye contact + Gaze awareness

Concept tested with a prototype
Limited to 2 people



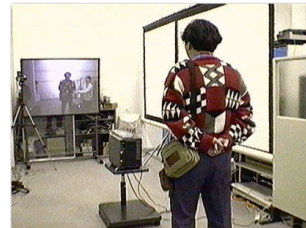
ClearBoard (Ishii et al., 1992)

A complex system



HyperMirror (Morikawa et al., 1998)

Mirror vs. transparent window: I see myself in the remote scene



The power of video communication

Instant recognition of the ability to communicate

Hole in Space (Galloway & Rabinowitz, 1980)
3-day audio-video link between Lincoln Center in New York
and Century City in Los Angeles



From formal to informal communication

Formal communication:
Planned in advance,
with an agenda and
a list of participants



Informal communication:
Unplanned, spontaneous,
serendipitous, open



Most often, both coexist

Media Space (Stults & Harrison, 1985)

Permanent audio & video link between the commons area of
the office space of two parts of the same research group,
in Portland and Palo Alto

People could not always tell if they had seen the person
locally or remotely



VideoWindow (Fish et al., 1990)

*"Imagine sitting in your work place lounge having coffee with
some colleagues. Now imagine that you and your
colleagues are still in the same room, but are separated
by a large sheet of glass that does not interfere with your
ability to carry on a clear, two-way conversation."*

Analyzed 160 hours of video:

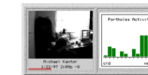
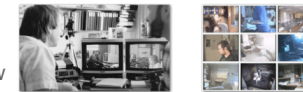
- Fewer conversations
- Hard to reciprocate
- No privacy (side conversations)
- Poor eye contact



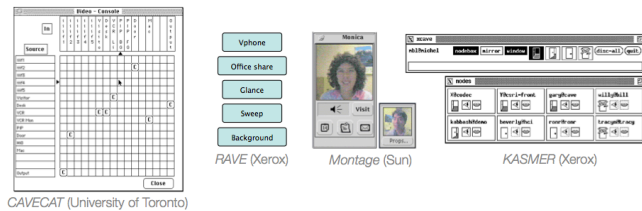
A collection of mediaspaces (1990s)

- VideoWindow and Cruiser (BellCore)
- RAVE & KASMER (Xerox), Cavecat (U. Toronto)
- Argo (DEC), Montage & Forum (Sun)
- Georgia Tech, U. Calgary, U. Paris-Sud, U. Grenoble, ...

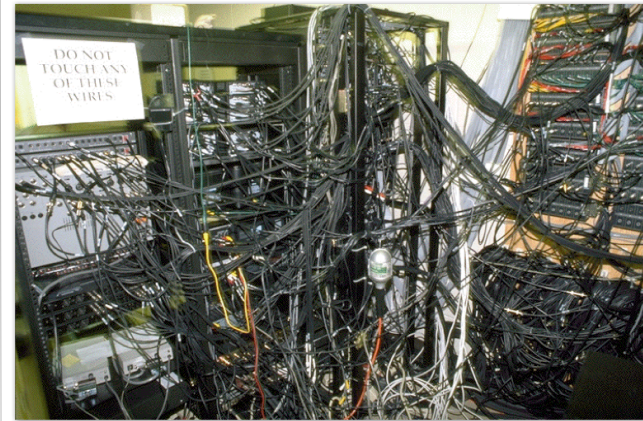
- Exploration of services:
- Mirror, Glance, Videophone
- Office share, Awareness view
- Vision-based services
- Collaborative services



Mediaspaces: user interface



Mediaspace: technical aspects



Mediaspaces: social aspects

- Levels of engagement
 - Background (public view, overview, office share)
 - Short focused call (videophone, videoconference)
 - Interruption (glance)
- Problem: how to control privacy
 - Few visual and auditory cues
 - How do I trust the system?
- Solutions
 - No control but symmetry: If I can see you, you can see me
 - Explicit control: allow every call
 - Selective accessibility

Mediaspaces: selective accessibility

Example (Ontario Telepresence Project)

Door metaphor:

- Open: glance and video call OK
- Ajar: glance OK, video call needs explicit OK
- Closed: no glance, video call needs explicit OK
- Locked: no glance, no video call

One prototype linked it to the physical door

Extensions to have different door states for different people: too complicated
Leaves newcomers out



Some lessons from mediaspaces

Challenges the telephone model:

A call interrupts, and has a beginning and an end

Instead:

Access to a person is negotiated, typically with a glance to see if the person is accessible, and then a videocall

Communications can be (very) long term: office share for several years at Rank Xerox EuroPARC

Generalizes to more than two participants

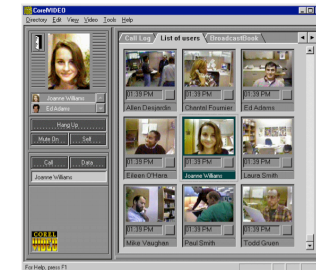
BUT: social aspects are important
users must be involved in the design and deployment

The failure of mediaspaces

While technology makes this more feasible,
there are no mediaspaces in use today

Skype, Google hangouts, iChat
miss the mark completely

Why?



Corel Video (1997)

How do people communicate?

Direct, focused communication is covered by many
technologies: email, phone, instant messaging, ...

Staying in touch, peripheral awareness are not addressed by
current technologies

People want to share private messages with small groups
of close relatives, friends and co-workers

Social networks do not address this need
(although they want you to think they do)

interLiving project

European IST FET project (2001-2003)
Disappearing Computer initiative

Study communication within distributed families

Participatory and multidisciplinary approach
Over 70 family members in France, US and Sweden
Many observations, workshops, technology prototypes



How to study technology that does not yet exist?

Technology probes (Hutchinson et al., 2003)

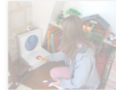
Simple “unfinished” prototypes, with a single function, designed to understand a need, not to solve it

Three goals

Design: inspire both users and designers

Build: test a specific technology in-situ

Analyze: collect usage data



VideoProbe (Conversy et al., 2003)

A device designed for sharing images of everyday life

Automatically takes pictures according to motion sensing

Automatically shares them with a similar remote device

Automatically disappears images after a few days

Explicit browsing of images

Explicit action to keep images long term



VideoProbe

Co-adaptation: participants use the device in unexpected ways



System mostly autonomous: Importance of transitions



VideoProbe: lessons learned

Families loved VideoProbe

Implicit sharing of everyday life

“day-at-a-glance” by browsing images

Personal albums

Becomes part of everyday routine

VideoProbe made families closer

Better awareness of other family members

Increased the number of phone calls

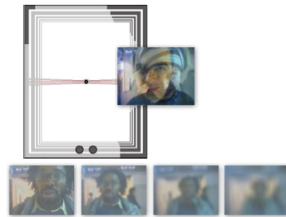
But VideoProbe was hard to deploy

Good calibration of the autonomous aspect was hard

MirrorSpace (Roussel et al., 2004)

A video communication system that uses distance to support peripheral awareness as well as more intimate communication

A mirror-like frame features
 LCD display
 Micro-camera in the center
 Proximity sensor



2 devices are linked together

Local and remote images are merged
 Image more blurry when far away, sharp when up close

MirrorSpace

Several installations in public exhibits

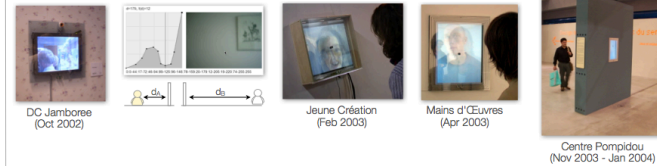


Image overlay creates intimate communication
 People who do not know each other move away
 People who know each other play with the mixed image

Multiscale communication (Roussel & Gueddana, 2007)

Social protocol to engage in communication
 Approach, Send signals to communicate
 Reciprocate signal, Engage in conversation

Computer systems do not support these social protocols
 Shifting from email to texting to phone call to videocal
 requires shifting from one system to the next

Multiscale communication supports such transition,
 from peripheral awareness
 to direct, focused communication
 and back
 => multiple levels of detail in the communication

Embodied communication

Robots as remote surrogates
 A face (LCD display), a mouth (loudspeakers)
 eyes (a camera) and ears (a microphone)
 Remotely controlled by the participant



Summary
<p>Video communication is very powerful (and with great power comes great responsibilities)</p> <p>Most people want to communicate not with the world, but with their close family and friends, privately</p> <p>Communication is a process, from peripheral awareness to direct, focused exchange</p> <p>Current technology makes the wrong assumptions</p> <ul style="list-style-type: none">- Technological mediation must be as transparent as possible- Constant shifts between levels of engagement- Privacy is critical

References
<p>The Information, James Gleick</p> <p>Video-Mediated Communication, Finn, Sellen & Wilbur, 1997</p> <p>Media Spaces – 20+ Years of Mediated Life, Harrison, 2009</p> <p>Media spaces: bringing people together in a video, audio, and computing environment, Bly, Harrisson & Irwin, Comm. ACM 1993</p> <p>Technology probes: inspiring design for and with families, Hutchinson, Mackay, Westerlund, Bederson, Druin, Plaisant, Beaudouin-Lafon, Conversy, Evans, Hansen, Roussel, Eiderbäck, ACM CHI, 2003</p>