COMS W4170
Collaboration

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CSCW
Computer-Supported Cooperative Work

- People working/playing/interacting together through or with the use of computers
  - HCI: Human–Computer
  - CSCW Human–Computer–Human

- Groupware
  - Software / platforms to support group interaction
CSCW
What’s in a Name?

“Twenty-five years after its founding, the CSCW community concluded that... [i]ts name no longer reflects the group’s activity. Each word in “Computer Supported Cooperative Work” has lost its relevance.

C: Computers are no longer the only digital devices of interest.
S: Digital technology is no longer confined to a support role; it is integral to many activities.
C: The focus was initially on small groups for which cooperation was the norm, but today’s digital world features hacker attacks, spam, privacy concerns, conflict, and competition.
W: In 1985 systems capable of supporting groups were mainly affordable in corporate work settings. It’s different now.”


Collaboration: Human Interrelationships

- Focused partnership
- Lecture/demo
- Conference
- Ecommerce
- Online community/game
- Collaboratory
- Telepresence
- …

A computer-supported environment (typically virtual) for interaction among scientists to work together: share data and instruments, perform experiments…
Collaboration: Issues

- Who are the participants?
- What can participants do?
- When do participants interact?
- Where do participants interact?
- How do participants interact?
- How are participants represented?

Collaboration Issues (cont.)

- How do participants interact?
  - Computer-mediated communication
    - Text
    - Voice
    - Video
    -...
  - Movement in 3D space
  - Coordination
  - Awareness
  - Privacy
Collaboration Issues (cont.)

- Pros and cons of different interaction modalities
  - Text
  - Voice
  - Video
  - ...

Collaboration Issues (cont.)

- **How** are participants represented?
  - Appearance and perception
  - Action
  - History
  - Communicative signals, pauses, assertiveness
  - Context: real, virtual
  - Visibility
### When and Where: Collaboration Time-Space Matrix

<table>
<thead>
<tr>
<th>Same Time (synchronous)</th>
<th>Different Times (asynchronous)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Same Space (co-located)</strong></td>
<td><strong>Different Spaces (distributed)</strong></td>
</tr>
<tr>
<td><em>Face-to-face</em></td>
<td><em>Office projects, shared physical repository</em></td>
</tr>
<tr>
<td>Class, meeting, shared display,…</td>
<td>Email, bboards, discussion groups, wikis, social networking sites,…</td>
</tr>
<tr>
<td>Shared editing, chat, conferencing,…</td>
<td></td>
</tr>
</tbody>
</table>

### Different times, different spaces

- Email, bboards, discussion groups, blogs, social networking
  - “Ping-pong” interaction
  - Inline incorporation of earlier turns
  - flaming, emoticons 😊
- Collective knowledge bases, authoring
  - Wikis
Different times, different spaces

- “Synced” file sharing and re-use
  - Dropbox

- Source code control
  - Subversion

- Repositories/Social Coding
  - GitHub

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Different times, different spaces

- Question-and-answer sites
  - Ping-pong model

- Quora

http://www.quora.com
Same or different times, different spaces

Google+

Different times, same space

- Supporting communication across time
  - Example:
    - J. Mankoff et al., CyberFridge, *Proc. CVE*, 1998
      - Notes
      - Refrigerator contents (using barcode reader)
    - Samsung RF28HMEBLBSR, 2014
      - 8” LCD
Same time, different spaces

- **Shared Apps**
  - Google Docs in Google Drive
    - Text, spreadsheet, presentation editors
    - Run in web browser
      - AJAX
    - Simultaneously modifiable by multiple users
  
  ![Google Docs in Google Drive](http://drive.google.com)

- **Multiplayer games, talk, chat, IM, twitter**
  - Possibly same space, possibly concealed through anonymity
  - Example: Adding comic strip graphics / history to textual chat

  - D. Kurlander et al., “Comic Chat,” Proc. SIGGRAPH ’96
    - [http://doi.acm.org/10.1145/237170.237260](http://doi.acm.org/10.1145/237170.237260)

  ![Multiplayer games](http://kurlander.net/DJ/Videos/ComicChatVideo.shtml)
Same time, different spaces

- Videoconferencing
  - “Just like being there”
- Or is it?

Same time, different spaces

- Videoconferencing
  - What’s missing?
    - Direct eye contact
      - Buxton calls this the “reciprocal video tunnel”
    - Peripheral vision
      - K. Yamaashi et al., Extra eyes, Proc. CHI ’96
      - Detailed and global views are linked
      - Sensors detect interesting events, outlined in global view

http://www.youtube.com/watch?v=XUOd0odI4BA
Same time, different spaces

- Videoconferencing
  - What’s missing?
    - Spatial relationships among participants
        www.youtube.com/watch?v=n-W7OTXG4G8
    - Side conversations
      - L. Berc et al., Argo, Proc. UIST ’95

Same time, different spaces

- Videoconferencing → Telepresence
  - R. Fish, R. Kraut, B. Chalfonte, Video Window, 1990
    - Lifesize video
    - Attempt to mimic “copresence”
  - H. Fuchs et al., Telepresence Project, 2000–
    - Model scene illumination/depth
    - Head-tracked 3D stereo
      - E.g., www.cs.unc.edu/~maimone/KinectPaper/Kinect.html

http://www.youtube.com/watch?v=0Jy-Eniy5yU