ICS 463: Intro to Human Computer Interaction Design

4. Understanding Users: Collaboration

Example Applications

- Workgroups
  - Meeting support (GDSS)
  - Distributed teams (CSCL)

- Communities
  - Of practice
  - Of interest

- Learning (CSCL)
  - Classroom support
  - Online learning (ALN)

Collaborative Systems (CSCW/L)

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Communicative Issues

- CMC: Computer Mediated Communication
  - Lose proximal cues such as intonation, gesture, gaze, posture
  - Gain privacy, time to reflect (as well as distance)

- Deixis: reference to entity in extralinguistic context
  - Important for “grounding” (mutual awareness and meaning)
  - Physically shared context is lost
  - Gestural deixis is harder - need alternatives

Group Awareness Issues

- “Articulation work”
  - Not directly concerned with the task
  - Synchronous systems: coordination includes floor control
  - Asynchronous: scheduling, work coordination

- Online Identity
  - How to build familiarity and trust?
  - Anonymity: Loss of inhibition: good and bad

- Group history, protocols, knowledge
  - How to record/summarize and who will do it
  - How to induct newcomers

Representational Issues

Two results from my research ...

- Representational Guidance
  - Shared representations constrain what can be said and make some information more salient than others
  - Thus they can guide collaborating users to use certain ontologies, search for certain information, talk about certain issues

- Role of Online Representations
  - A representation that is an object of discussion in FTF may also become a discourse medium online as participants use all available resources to compensate for lack of FTF channels

http://lilt.ics.hawaii.edu/lilt/research/pubs.html
Deixis Study (will explain ...)

- We analyzed the use of graphs as conversational resources
- Online use of graphs involved:
  - Far less use of gestural deixis
  - About the same use of verbal-only deixis, but only for temporally focused items (no reintroductions)
  - A greater percentage of reintroductions through direct manipulation
  - Essays of online participants showed poorer integration of information
- Design all media for communication
- Reminders of previous work / issues are needed

Synchronous Co-located

Let’s look for these issues in some historical and current systems, beginning with group meeting support systems ...

Colab (1987-1992)

- Xerox PARC
- Liveboard, individual workstations
- Software
  - Cognoter
  - Argnoter
  - Boardnoter
- Can work in private or public spaces

Colab: Hardware innovations

- Liveboards
  - Light-based
  - Ultrasonic

Colab: Cognoter and Argnoter

- Cognoter: Preparing an outline of a presentation
- Argnoter: Presentation and evaluation of proposals
- Three-phase model (others use this too)
  - Brainstorm/Propose - placed in the workspace
  - Organize/Argue - annotated by participants
  - Evaluate - rank evaluation criteria and apply under different belief sets
- Example of a Group Decision Support System (GDSS)
- http://www2.parc.com/att/members/stefik/movies/colab.mov

Colab: Portable meetings & ideas

- Vision: Colab workspaces available everywhere, interconnected
Synchronous-Remote CSCW

• Typically two components:
  - Shared workspaces
  - Natural language interaction
    • Video
    • Audio
    • Textual "chat"

• Commercial tools: NetMeeting, Polycom videoconferencing etc.

Activity / presence awareness

• Is Jan in his office?
• What is he doing?
• Is he willing to talk?

How to know when someone is available?
Portals: video image of other office. Research focuses on privacy issues.
Surrogates: move your towards the other to indicate interest in conversation. Other’s will shake. If he moves his towards yours, he is accepting: video will appear.

Tickertape (Segall and Arnold, 1997)

• Tickertape is a scrolling one-line window, going from left to right
• Group name, sender’s name and text message
• Activity coordination, instant collaboration

Babble (IBM, Erickson et al, 1999)

• Circle with marbles represents people taking part in conversation in a chatroom.
• Those in the middle are doing the most chatting.
• Those towards the outside are less active in the conversation.

How does this assist the user in his/her task?

Eye Contact Solutions

Hydra

Each display has a person’s head and a camera: can tell who you’re looking at

Video Tunnel

ClearBoard

• Example of an attempt to reintroduce FTF cues with a video tunnel
• Expensive specialized hardware

Working on a chalkboard facing each other reenacts shared representations and generating for dialog while also solving the gaze problem.

Question: how does this keep the image from being reversed on the other side? Must reverse image — also reverse video image of person or gestures are reversed!
Access Grid (HITS on steroids?)

Hypermirror (Morikawa and Maesako, 1998)

- "Allows people to feel as if they are in the same virtual place even though in physically different spaces"

I think …

- High bandwidth technology is great if we can afford it
- The real issues are in designing the workspaces (representations, collaborative work tools) and activity structures to make effective use of it

Bridging FTF & online interaction

- Some conversations are best started in person, but need to be continued at a distance
- Can we design for this transition?
  - Introduce shared workspace while co-present
  - Continue at a distance
  - Summarize and bring virtual work back to group meetings
- Addresses technology unfamiliarity and establishment of mutual meaning
  - NetLearn Example …
Asynchronous Examples

- Discussion tools, e.g. Email, Threaded discussions
- Document repositories
  - BSCW http://bscw.gmd.de/
- Document annotation systems
  - MS Office
  - Kukakuka, Pink
  - JIME http://www.jime.open.ac.uk/
- Multimedia/Mixed
  - Knowledge Forum http://kloo.utoronto.ca/kfdemo/kfdemo.html
  - Teamwave
  - Groove http://www.groove.net/

Variety of tools
- User organizes into rooms
- Rooms are whiteboards
- Synchronous (chat) and asynchronous (discussion tool, workspaces)
- Group awareness - who’s where - radar view

Coherence Problems

How is it possible for online discussion to be coherent? Traditional linguistic theory says that coherence is built out of relationships between contiguous discourse units. But that is violated in online chat/discussion.

A: Shall we meet at 8?
B: Wow, look at him?
A: Yes what a funny hairdo!
B: Um, can we meet a bit later?

Sources of coherence problems:
- Lack of simultaneous feedback
- Lack of shared (physical) context
- Disrupted turn adjacency

Manifestations:
- Some messages not addressed
- Redundant and parallel postings
- Topic decay or fragmentation


Possible Solutions

- Not a problem?
  - Lack of constraint is liberating
  - Simultaneous typing is more efficient
  - Multiple simultaneous conversations more interactive
  - Persistent text aids processing
- Users’ solutions:
  - Turn completion signals
  - Linking and quoting for context
  - Moderators
- Designers’ Solutions...

Design Solutions

- Mechanisms to increase feedback
  - Two way transmission as well as permanent log
  - Not linear: difficult to log
  - Space limitations
- Enhanced logging/archiving
- Tracking and linking threads
  - Automated linking? beyond current NLP technology
  - Users indicate message replied to? Extra cognitive processing
  - How to display? graphical chains, trees...
Convergence Problems

- Media for threaded discussion are inherently divergent
- CSILE and Knowledge Forum: Allow reference to multiple contributions


Convergence in Knowledge Forum


Statement Categories

- Language as action
- Make the role of contributions in asynchronous discussion explicit with labels
- Examples ...

Sentence Openers, Synchronous

- Can we favor the incidence of communicative acts believed to lead to learning gains?
- Scripting and dialogue grammars too inflexible
- Flexible structuring via categorization of Communicative Acts
  - biases in favor of certain communicative acts
  - prompts reflection on acts
  - helps system “understand”
  - But extra user work is required


C-CHENE

- Compared structured sentence opener and dialogue box interfaces
- Results:
  - more task focus in structured
  - slightly more reflective
- Alternate explanations:
  - Reduced cost of production, asynchrony, speaker change
  - Increased formulation cost, leads to reflection.
- Note: Other studies show problems with premature commitment, “incorrect” or lazy use of categories
Visualizing Conversational Trends

• How to quickly grasp discussion trends, e.g., a community’s resolution of issues or evaluation of artifacts?
• CSILE example ...
• But this maps reply structure, not content!
NetLearn Example ...

Summarizing Comments (NetLearn)

(Image not approved for release)

Summary Document for Convergence

Summary: Synchronous Issues

• Awareness
  - Who is on right now?
  - What are they doing?
• Coherence
  - Who is answering whom?
  - What is he referring to?
• Value of video
  - Demonstrations, negotiation, familiarity
  - Talking heads: when interpersonal issues are involved

Summary: Asynchronous Issues

• Group Awareness
  - Are there any new messages?
  - Has anyone been reading my proposal?
• Single versus multiple workspaces
  - Multiple threads in a single workspace
  - Movement of ideas between multiple workspaces and groups
### Asynchronous Issues Cont.

- **Context and coherence**
  - Artifact-centered discourse
  - What is this message about?
  - Where are the messages about this artifact?
  - Picking up where we left off
    - What was the last idea proposed?
    - What is she responding to?
  - Converging
    - What is the conclusion of this discussion?
    - When are we ready to move on?

### Miscellaneous General Issues

- Identity and trust
- Cross cultural communications
- Serendipity of informal interactions
  - Always-on shared spaces?
  - Virtual coffee pot?
- Local conventions develop: acclimate newcomers
- Large groups may require facilitation (especially synchronous meetings)

### Discussion Questions

- I will post some questions online.
  
  **Example:**
  - Is it better to develop technologies that allow people to talk at a distance as if they were face to face, or to support new ways of interacting that are not possible without technology?

### Assignment 3: Project Proposals

1. Come up with ideas
2. Form project groups
3. Each group member writes “memo to boss”

### Other slides I did not use

Saving for future use
**Will video be a success using G3 mobile phones?**

- Will the judder, sudden jerks and shadows disappear?
- Will it be possible to establish eye contact and read lips on such a small image?
- Will people find it socially acceptable to talk to an image of someone in the palm of their hands?


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**Creating personal space in Hypermirror**

1. Turn the room more apart to allow person in other space more 'virtual' personal space.
2. Two in this room are invading the 'virtual' personal space of the other person by appearing to be physically on top of them.

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**Everyone happy**

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**Collaborative virtual environments**

The rooftop garden in BowieWorld, a Collaborative Virtual environment (CVE), supported by Worlds.com. Users take part by "dressing up" as an avatar. There are 100s of avatars to choose from, including penguins and real persons. Once an avatar has entered a world they can explore it and chat to other avatars.

Source: [www.worlds.com/bowie](http://www.worlds.com/bowie)