Directing Human Action
P4 User Study
Final Presentations

Outline
- System Direction of Human Action
- Strategies for Directive Systems
  - Design
  - Direction & Feedback
  - Mediation

System Direction of Human Action
SYSTEM DIRECTION OF HUMAN ACTION

Requires Direction & Feedback

TRAINING

SAFETY

MEDIA

Active Capture

one automated capture...

...drives multiple media uses.

A Design Space for Direction

- **Direction Method**
  - **Tell** Instruction
  - **Show** Demonstration
  - **Make** Physical Stimulus or Manipulation
A Design Space for Direction

- Direction Method: Tell, Show, Make
- Motivation:
  - Internal – “Act as if your whole body is on fire”
  - External - “Flail your limbs about wildly”

Motivation, Triggers

- Feedback:
  - Implicit vs. Explicit
  - Positive (“great!”) vs. Corrective (“I need you to...”) 
  - Post-Hoc vs. Real-Time

Outline

- System Direction of Human Action
- Strategies for Directive Systems
  - Context
  - Direction & Feedback
  - Mediation
Designing Directive Systems?

- Review of Existing Research & Practice
  - Speech Recognition, Multimodal Interfaces, Mediation, Intelligent Tutors, Conversation Analysis
- Mediation: resolving ambiguity and error
  - Two Types: Repetition and Choice
- Grounding between participants
  - Shared context enabling communication

Contextual Interviews

- Contextual Interviews with 7 Practitioners
  - Interview experts in human direction
  - Conducted standard interviews and observation of practice, as appropriate
- Film & Theatre Directors, Child Photographer
- Golf Instructor, Aikido Sensei
- 911 Phone Operator, Telephone Triage Nurse

Anticipation

Anticipate common errors before they happen. Actively seek out and address problems before they disrupt interaction.
Appropriate Impression

- Adopt the appropriate tone and role for the context of the interaction.

Outline

- System Direction of Human Action
  - Strategies for Directive Systems
    - Context
    - Direction & Feedback (ways of directing)
    - Mediation

Decomposition

- Break down complex actions into a series of simpler sub-actions.

Imaginative Engagement

- Immerse the subject in the experience by engaging their emotions or imagination.
**External Aids**

- Use physical props or other external aids to guide actions and provide feedback.

**Confirmation**

- Explicitly query the subject to ensure they are in the expected state.

```
125 CT: Okay (.2) is there a pillow under his head
126 C: yeah
127 C: still?
128 C: yeah

145 CT: Okay (.2) can you check in his mouth an see
146 C: (.hhhh hhhh) (.hhhh) No (.hhhh)
148 C: (.hhhh) (.hhhh) (.hhhh) No (.hhhh)
149 CT: There's no vomit?
150 C: No (.hhhh)
```

**Consequences**

- Explain the consequences, both positive and negative, of particular actions.

**Outline**

- System Direction of Human Action
  - Strategies for Directive Systems
    - Context
    - Direction & Feedback
  - Mediation (what to do when things go wrong)
**Freshness**

- Avoid repeating utterances, even when giving an instruction nearly identical to a previous one.

**Progressive Assistance**

- Provide “successively more informative error messages which consider the probable context of misunderstanding” [Yankelovich95].

**Method Shifts**

- In response to problems, vary forms of direction between **Tell**, **Show**, and **Make**.

**Modality Shifts**

- When a particular direction approach repeatedly fails, switch or augment the modalities of communication, e.g., use visual rather than auditory cues.
Level of Discourse

- Simplify vocabulary and language when people have difficulty understanding.

Graceful Failure

- When all else fails, provide natural exits from the interaction.

Backtracking

- When grounding is lost, backtrack to the last state of mutual understanding.

```plaintext
50 do you want to try CPR?
51 [.]0
52 C: >W- bu- I`c I don't know how to "do
53 [.]hat
54 CT: [.]hhh|Okay, I can "give you instructions
55 for it, but we need to make sure he's not
56 breathing first, okay? |hhh I want you to
57 ya- can you lay him flat on the floor?
```

Direction Design Guidelines

Setting Context
- Anticipation
- Appropriate Impression

Direction & Feedback
- Decomposition
- Imaginative Engagement
- External Aids
- Confirmation
- Consequences

Error Correction
- Freshness
- Progressive Assistance
- Method Shifts
- Modality Shifts
- Level of Discourse
- Backtracking
- Graceful Failure
**P4 User Study**

**P4 User Testing**

Formulate critical questions & hypotheses. Choose representative tasks to test. Conduct study with ≥ 6 representative users.

Produce a 5 part write-up:  
Introduction  
Methods  
Results  
Discussion  
Implications

**Introduction**

Describe your motivation and goals.  
What questions do you hope to address with your study? What hypotheses will you test?

**Methods**

Who are your participants? How were they recruited? Provide basic demographic info.

Describe the system setup. Are you testing different design variants of your system?

Describe the environment(s) where the study occurs. Where are you performing the study?

What tasks or instructions do you provide?  
What data (notes, logs, surveys) is collected?
Results

Describe and analyze your study data.

Examples of Quantitative Data
- Counts of errors / breakdowns by task
- Task success / failure rate
- Performance time on task
- Survey responses (e.g., Likert scale)

Examples of Qualitative Data
- Critical incidents, usage observations
- User quotes, notes from talk-aloud protocol

Discussion

Synthesize and interpret your results. Combine quantitative (stats, %) and qualitative (quotes, observations) data to assess your hypotheses.

Organize results into coherent themes. Examples: initial attention, “walk up and use” learning, gesture accuracy, error handling.

Are there any surprises? Aspects that performed better or worse than expected?

Document caveats. What are the limitations of your study or threats to validity?

Implications

Describe how you will apply your study results to your next design iteration.

What existing aspects will you remove? Why?
What aspects will you improve? How?
What new aspects will you introduce?
How will you prioritize these changes?

P4 User Test Write-Up

Due Fri 3/2 by 2pm
Introduction, Methods
You must have your methods description and participant recruitment completed!

Extension to Fri 3/9 by 2pm
Results, Discussion, Implications
Final Project Presentations

WHEN       Monday, March 19, 6-9pm
WHERE      Stanford d.school

Guests from across campus and industry will be invited to come experience your projects. A panel of external judges will score each project and award a set of prizes. You should arrive by 5:30pm to set up and test your presentation and demo.

Final Project Deliverables

Presentation - no more than 2.5 min (video OK) The goal is to give a motivating overview.

Poster - document your process. What need do you address? What were your primary design decisions? User study feedback?

Demo - provide a tour of your UI. Prepare a ~2 minute “demo script” to orient guests. Then, let them experience it themselves.

Presentation Examples (2011)

FaceStory
Elliot Babchick, Julie Fortuna, Clayton Mellina, Truc Nguyen, Nicole Torcolini

Pixtory
Alexander Blessing, Andrew Chien, Eli Marschner, Michael Yu-Ta Lu

Total Recall
Justine DiPrete, Stephen Carr, Cole Bennett, Daniel Capo