

Wrap Up

Multimodal Interaction

22 July 2010

Overview

- ❖ People follow gaze and gestures,
- ❖ Establish joint attention,
- ❖ Assign intentions, propositions to visually attended objects,
- ❖ Are influenced by appearance and / or behaviour,
- ❖ Integrate / show interference between modalities.

Reading

- ❖ B. Mutlu et al. (2006). A storytelling robot: Modeling and evaluation of human-like gaze behavior. HUMANOIDS'06
- ❖ F. Hegel et al. (2008). Theory of Mind (ToM) on robots: A functional neuroimaging study. HRI'08
- ❖ V. Groom et al. (2009). I am my robot: The impact of robot-building and robot form on operators. HRI'09
- ❖ C. Yu et al. (2010). Investigating multimodal real-time patterns for joint attention in an HRI word learning task. HRI'10

Task

- ❖ 15-minute presentation
 - ❖ Summary of paper (~ 10 min)
 - ❖ Outline issues for discussion (~ 5 min)
- ❖ Send us slides day before!

Discussion

- ❖ Functions of gaze, directing attention, gestures, appearance / motion for communication
 - ❖ Structural organisation
 - ❖ Information relevance
 - ❖ Encoding additional information
 - ❖ Triggering 'Like-me' hypothesis

Discussion

- ❖ Are these functions realised and helpful in HRI?
- ❖ Can phenomena like joint attention appear in HRI?
 - ❖ Limitations vs. necessary features?

Back to the beginning...

Multimodal Interaction with Intelligent Agents (slide1)

- ❖ What does this mean?
 - ❖ Multimodal: Several information channels.
 - ❖ Interaction: Encoding, sending, and decoding messages.
 - ❖ Intelligent: Good question.
 - ❖ Agents: People, Virtual Characters, Robots

Multimodal Interaction with Intelligent Agents

- ❖ What does this mean?
 - ❖ Multimodal: **Speech, Gaze, Pointing**
 - ❖ Interaction: **Production & Comprehension**
 - ❖ Development of understanding intentional cues, interpreting and integrating cues, evaluation of various production patterns
 - ❖ Intelligent: **Considered intelligent? ToM?**
 - ❖ Agents: People, Virtual Characters, Robots

Multimodal Interaction with Intelligent Agents (slide2)

- ❖ Why is this interesting?
 - ❖ How are different pieces of information combined to convey (parts of) a message and facilitate understanding / production thereof?
 - ❖ Using agents may help to study this while also “improving” agents.

Multimodal Interaction with Intelligent Agents

- ❖ How are different pieces of information combined to convey (parts of) a message and facilitate understanding / production thereof?
 - ❖ **Influence of gaze/visual attention on language processing**
 - ❖ **Influence of gestural, directional cues (on lang. processing)**
- ❖ Using agents may help to study this while also “improving” agents.
 - ❖ **Turn-taking, rheme/theme patterns, congruency effects**

Eye-Movements & Language (slide 42)

- ❖ Attention and Joint Attention
 - ❖ What are the prerequisites? What processes are involved? What are the results?
- ❖ Which tools / cues can be used to direct attention?
 - ❖ When and why are different cues used? How do they interact? Are they used intentionally or unconsciously?
- ❖ How does the look and use of such a tool / cue affect its influence and perception? Could also affect whether joint attention is / can be established?

Eye-Movements & Language

- ❖ Attention and Joint Attention
 - ❖ What are the prerequisites? What processes are involved? What are the results? **(Flo & Sara: ToM, intention inference)**
- ❖ Which tools/ cues can be used to direct attention?
 - ❖ When and why are different cues used? How do they interact? Are they used intentionally or unconsciously? **(Tristan: pointing & head movement)**
- ❖ How does the look and use of such a tool/ cue affect its influence and perception? Could also affect whether joint attention is/ can be established? **(Katerina: Uncanny robots/virtual agents)**

Conclusions?

- ❖ Is joint attention achievable / achieved in HCI?
 - ❖ If not, why?
- ❖ What are the most important features / cues / modalities that influence communication?
- ❖ What are the most important features / cues / modalities that shape HCI?
 - ❖ In terms of appearance & behaviour
- ❖ How generalisable are results from HCI? What more can we learn from such studies?