



SoftNet 2021 Experts Panel III Design and Synthesis of Personalities

(synthesis of personalities, adoption of AI digital, conversational user interfaces, observability, ramifications of personalities, emotional intelligence, digital co-workers)

CENTRIC
2021

Presenter

Supporting Observability through Social Cues

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- Approaches to artificial personalities
- How personality can be visualized in different modalities
- Related research to the visualized personality

→ How do each of these personality traits demonstrate observability?

→ Common patterns that emerge from our review

→ Design recommendations



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Education

- PhD Student, Information Science, Cornell Tech
- B.A., Cognitive Science, UC Santa Cruz

Current Projects

- Collecting dataset of faces reacting to robots making mistakes
- Designing clothes for robots + exploring the functions of clothes

Summary

Motivation

- Important to have a mental model of what a robot:
 - can do,
 - Is currently doing,
 - Is about to do.
- How can social cues help people understand what is going on 'under the hood'?

Method

- Review of 40 papers with instances of robot or software agent personality traits influencing observability.
- Selected and assessed six cues to clarify their relationship to observability.



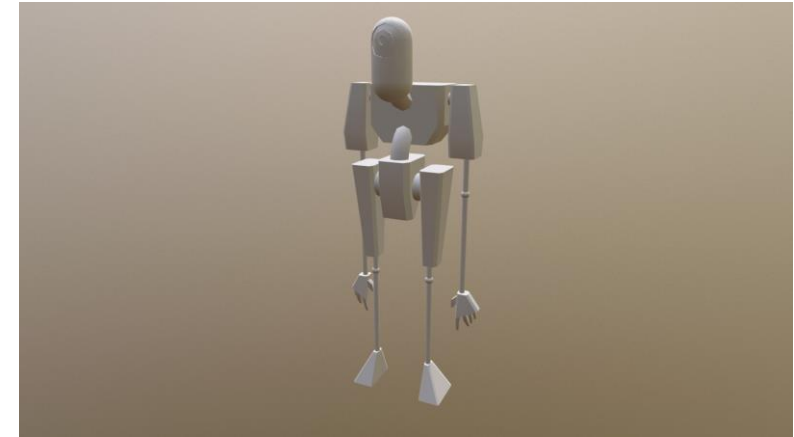
Introduction

Observability

- Through transparency, teammates generate:
 - a shared understanding of the task [6]
 - calibrate trust based on the team members' capabilities [6]
 - situational awareness of the task, robot, and environment [7][8].
- Enhance perception of system reliability

Personality and Social Cues

- “characteristic sets of behaviors, cognitions, and emotional patterns that evolve from biological and environmental factors” [9].
- Example: Slouching after failure



Methods

1. Reviewed “A Taxonomy of Social Cues for Conversational Agents” by Feine et al. [4], which systematically identifies 48 social cues.
2. In parallel, search keywords in ACM Digital Library and Google Scholar:
 - “observability”
 - “mental model”
 - “status”
 - “common ground”
 - “predictability”
 - “machine personality”
3. Narrowed results using the following criteria:
 - Display system state dynamically (not static features like gender and name).
 - Applied to both physical and virtual agents.
 - One representing posture, voice, and dialogue.

Social Cues + Relationship to Observability

Social Cue	Feine's Definition [4]	Relationship to Observability	Source
Head movement [Posture]	The agent moves its head. (I.e., nodding and turning)	In addition to more obvious indicators of agreement and disagreement, head movement can be used to indicate nuanced beliefs and goals such as confidence, thinking, and remembering	[18]
Facial expression [Posture]	The agent expresses a gesture by executing one or more motions with his facial muscles (i.e., smile or eyebrow raise)	Facial expressions, like raising eyebrows (in conjunction with relaxing hands) can show that an agent is letting a person speak.	[30]
Voice Tempo [Voice]	The pace of the agent's voice.	The speed of computerized speech conveys urgency of a situation in a predictable and systematic way, and speech pacing conveys confidence.	[21][22]
Pitch Range [Voice]	The degree of variation from the agent's average pitch. (I.e., monotone, animate voice)	Exaggerated pitch range can draw attention to important or high-confidence information. Humanlike pitch range should be appropriate to the trustworthiness and competence of the machine.	[25]
Greetings and farewells [Dialogue]	The agent expresses a word of welcome or marks someone's departure.	Small talk, which include greetings and farewells, can improve perception of an agent's good will and credibility.	[30]
Ask to start/ pursue dialogue [Dialogue]	The agent requests the user's permission to start, continue, or end the conversation	Asking to start or pursue a dialogue communicates that the human is in charge and is in support of the Human-Machine Teaming theme of Directability	[3][32]

See paper for references.

Discussion

Risks:

- Setting wrong expectations:
 - Moving eyes on a robot might be perceived that a robot can see, which could lead to a mistrust of an agent.
- Universal vs. cultural
 - Social cues may be sensitive to the cultural context
 - Universally, lowered eyebrows, lips firmly pressed, and bulging eyes to convey anger.
- “Uncanny valley” [33], in which robots that look a lot like humans, but not quite human, are perceived as creepy and cause revulsion.

Design recommendation:

- Multiple cues in a row, or different modalities demonstrated in parallel ideal for observable personality

Conclusion

- Importance of understanding what is going on “under the hood”
- Assessed:
 1. definitions of the cue,
 2. examples of the cue,
 3. the relationship to observability
 4. associated risks of using the cue inappropriately.
- Cues should be used in parallel with other cues.

See paper for references.



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