How can we design Robot Interactions that support fluent Mental Models while avoiding biases and stereotypes?

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Introduction and Motivation

Voice Assistant: Alexa
- Assistive tasks
- Voice

Pepper Robot
- Social companion
- Physical aspect [1]

AI Generated Images
- Visual representation
- Role: “Person cleaning”

Interaction Design Reinforces Gender Bias

Resorting to stereotypes is the easy and effective shortcut when designing an interaction → users are already accustomed to them and the tech is integrated seamlessly in the interaction, leveraging the existing mental models of users

Ethical concerns: consolidating already strong biases, creating an infinite cycle

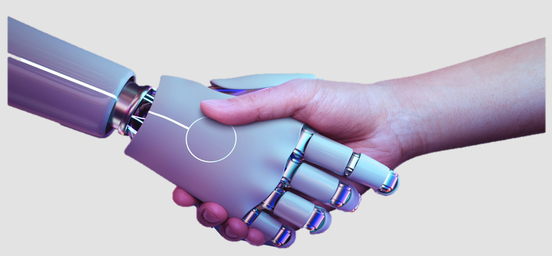
Proposed Solution

Implement Mechanical Gender to Avoid Bias

Appearance:
- Minimal and agendered humanoid features to keep the social aspect but minimize gender ascription
- No clothing or accessories

Voice:
- Agender pitch, tone and speech characteristics [2]
- Speech with mechanical tone
- Describe name and pronouns (it/its) for non-binary identity

Build Perception of Competence and Warmth with Background and Rapport



Interaction style:
- Background story describes robot’s prior success and experience with activity to build competence.
- Rapport building through warm up interactions to build warmth.

Study Design

Within -subjects exploratory study

Participants (N=12) interact with the robot during a warm-up and two collaborative tasks.

Warm Up:
- Get to know the robot and share stories to create a rapport

The robot explains the rules, then **collaborates** with the participant on each task. Before each task, the robot tells something about itself and its story, creating a **background** conducive to enhancing perceived competence of the robot

Neutral Gendered Task:
- Tower of Hanoi as logic puzzle, with limited gender association.
- Collaboration should engrain perception of robot’s expertise and competence

Stereotypically Feminine Gendered Task:
- Sorting task, assembling a gift basket with make up / cosmetic products [3]
- Task likely perceived as feminine may evoke stronger gender bias in mental model [4]

Verbal Interaction: the robot does not interact physically with the objects, but provides verbal support and helps the participant solving the tasks

Conclusion

Outcome measures:
1. Persistence of **pronouns** for mechanical gender (indicator of Mental Model)
2. Perceptions of robot **warmth, competence and discomfort** (RoSAS [5])

Expected Impact:
1. Explore persistence of mechanical gender to avoid gender bias supported by:
    1. Agendered Appearance
    2. Agendered Voice
    3. Competence Focused Interaction style
2. Well -described robot **background** supports mental model of robot **competence** while avoiding gender biases.
3. **Rapport** building supports mental model of robot **warmth** while avoiding gender biases.
4. Design supports persistence of **mechanical gender** , even in stereotypically female task, and limits perceptions of robot as strange or creepy (**discomfort)** .

References

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