

‘Uhm... Are you sure?’ An Exploratory Study of Trust Indicators in Robot-Directed Child Speech

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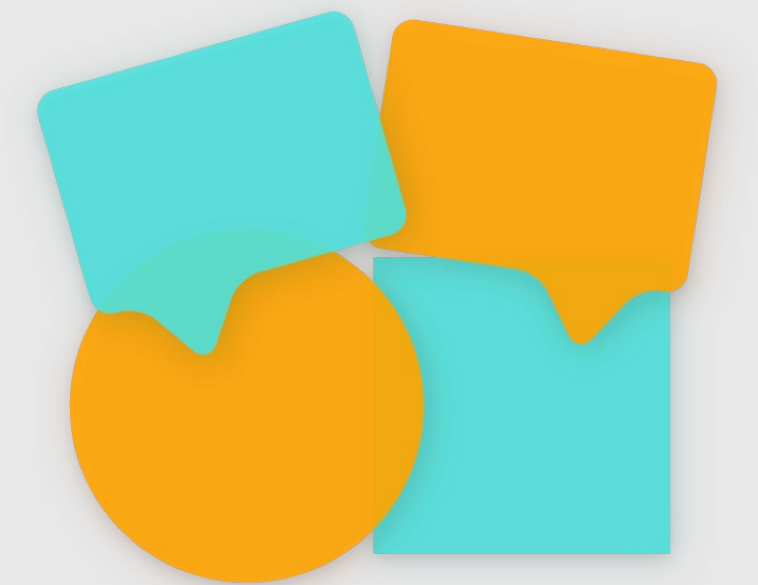
In order to calibrate children's trust in robots toward appropriate levels in the interaction, reliable trust measures are necessary. Current trust measures are not suitable for measuring children's trust in a real-time manner. While speech from adult speakers has proven to contain information on their trust, this paper presents a first exploration investigating whether these results hold up in the context of a child-robot interaction. Fifty-eight conversations between children and robots were recorded (N=29), evoking high and low trust moments in the interaction. Correlation tests showed no (strong) predictors of children's trust in their speech. Limitations and possibilities of how to advance the investigations of an automatic trust measure for child-robot interaction are discussed.

Project goal:

- Develop a spoken conversational robot for children to help find information

My goal:

- Calibrate trust between the child, robot and information to avoid risk of misinformation
- This needs a reliable trust measure for children in a robot context



Chatters

Current trust measures in child-robot interaction

Questionnaires

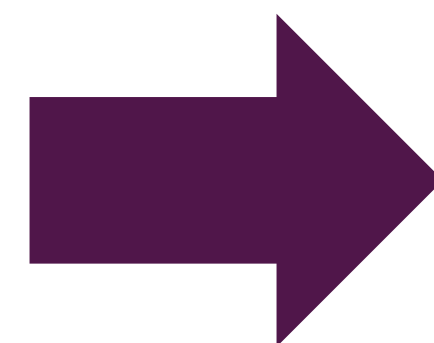
- prone to people-pleasing [1]
- administered after the interaction

Trust games

- behavioural measure
- restricting the interaction

Sensors

- behavioural measure
- real-time measure without constraining the interaction



What about speech as a measure of trust?

In adults:

- words, pitch, duration, speech rate, response time give indication of trust [2-6]

This research:

Exploring acoustic speech cues as indicators of trust in child-robot interaction

- uses sensors to measure real-time (microphone)
- goal is to give insight, rather than an automatic classifier

Method

- 35 Dutch children (10-12 years old, $M=11.13$)
- Played a quiz about information on the internet with two versions of a Furhat robot (untrustworthy versus trustworthy)
- Within-subjects design to acquire high and low levels of trust of each child
- Experiment procedure can be found in [7]

Feature extraction

- | | |
|-----------------------|---------------------------|
| duration of utterance | pitch variation |
| response time | mean intensity, |
| speech rate | voice quality |
| articulation rate | number of filled pauses |
| mean pitch (F0) | duration of filled pauses |
| pitch range | |

Results

Correlation tests (Kendall's tau) showed no evidence of trust being reflected in children's speech.

All showed small effects $-0.1 \leq \tau \leq 0.15$ with $p > 0.05$.

Discussion

Our expectations:

High trust: more variation in pitch and intensity and talking with a higher speech rate

Low trust: more intensity and taking longer to respond

Limitations

- COVID measures forced us to conduct the study over video call
- Different contexts might yield different results

Future work

- Lexical features
- Multi-modal signals

References

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