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The Effect of Relevant Responses from Conversational Agents on Behavior during Deception

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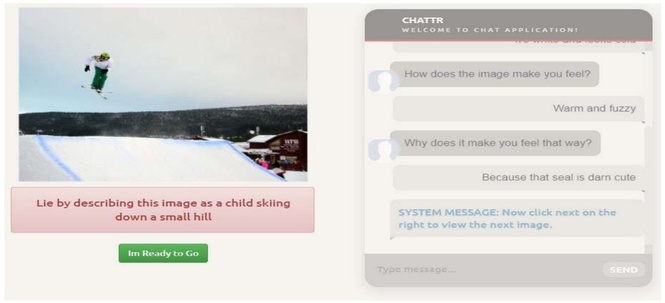
ABSTRACT

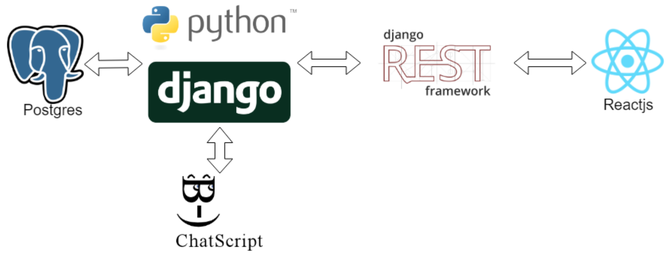
Conversational agents (CAs) are an integral component of many personal and business interactions. Many recent advancements in CA technology have attempted to make these interactions more natural and human-like. The influence of these elements of CA design on human behavior is currently unclear. It is possible that a more humanlike CA could change people's behavior in ways that make deception detection more difficult. This research investigates one CA design factor: conversational relevance. We show that relevant responses make people slow down when responding to questions, and causes a different response when lying than when telling the truth.

Material/Method

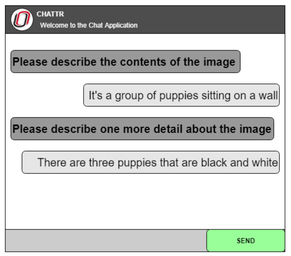


- Chatbots (text-based agents) are a common type of CA and were developed for each experiment.in this study using ChatScript language (Wilcox, 2015).
- The participants' responses were split into two data streams—the content of the message, which was processed by natural language processing (NLP) algorithms used by ChatScript to formulate responses—and the keystroke timing, which was sent to a separate processing application for analysis.
- A laboratory experiment was conducted at the University of Houston.
- The instructions were worded in such a way that participants were not told whether their chat partner was human or computer, but that it could be either
- Participants were shown a series of images. The CA asked them questions about the image on the screen. Half the time they were instructed to lie, and half the time they were to tell the truth.

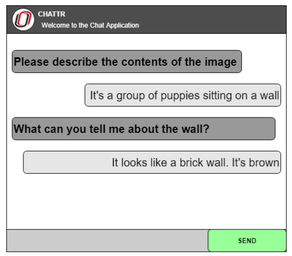
Chat Application Architecture



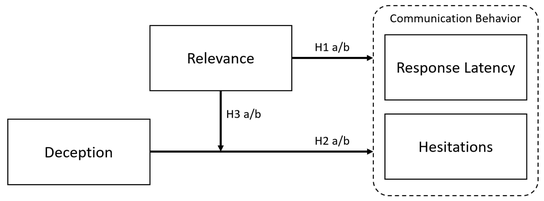
Nonrelevant



Relevant



Research

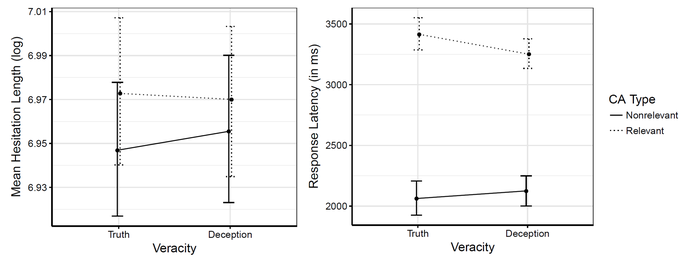


People's behavior is different depending on who they are communicating with, and what they are communicating about. We monitored participants' keystrokes and analyzed two main variables: response latency and hesitations.

Response latency is the time between when the chatbot's message appeared on the screen and the first keystroke the person typed to respond. When people lie, often their response latency increases because of the cognitive effort it takes to lie convincingly.

Hesitations are pauses longer than 500ms during typing. When people speak, filled (umm, uh, etc.) and unfilled (silent) pauses can indicate cognitive effort. We looked at silent pauses during typing. We expected pauses to be longer for people chatting with the relevant bot, but shorter when lying.

Results



Our results show that people with relevant chatbot think longer before beginning their responses, and pause for longer while writing. When they were lying, people talking to the smarter CA responded slightly faster than when they were telling the truth.

Only one statistically significant result showed for hesitations: people pause for longer when they are talking to the relevant agent than with the nonrelevant agent.

Conclusion and Future Directions

- When the interviewing CA is better able to respond to users, they treat it more like a person
  - Response latency (the time between seeing a message and starting to respond) increases
  - People pause for longer periods when creating their responses
- People try harder to deceive their interviewer when it appears to be "smarter"

When we build CAs to detect deception, we have to consider how the apparent intelligence of the conversation will affect how people think about and react to the interview questions. This study shows that **a better conversational agent isn't always better.** The capabilities of the CA need to be matched to the desired behavior.

Future work:
- High stakes lies
- Comparing different bot personalities
- Would you lie to Alexa?

References

- Wilcox, B. (2015). ChatScript. Retrieved from http://chatscript.sourceforge.net/
- Ekman, P., & Friesen, W. V. (1974). Detecting Deception from the Body or Face. *Journal of Personality and Social Psychology*, *29*(3), 288–298. https://doi.org/10.1037/h0036006

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