

Analyzing the Rules of Social Dialogue and Building a Social Dialogue Model in Human-Robot Interaction

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RO-MAN 2020 workshop

Introduction

With the recent advancement of artificial intelligence technology, social robots are also developing using the latest technology. However, since social robots are not humans, they lack empathy, emotion, and reasoning skills. So it is necessary to build intimacy and elicit empathy and emotion through social dialogue with robots.

Therefore, this research focuses on dialogue from the social aspect and tries to build a social dialogue model when humans interact with robots.



Table 1. Definition of Social Cues

Social cues	Defination
Greetings	Start of the conversation
Self-disclosure elicitation	Leading one/s interlocutors to provide information about themselves.
Self-disclosure	Revealing personal and private information about themselves.
Suggestion	An idea or plan to put forward for consideration.
General statement	Information or experiences heard from others
Yes/no answer	Simple answer("yes", "no") for questions
Acknowledgement	Harmony or accordance in opinion or feelings, a position or results of agreeing
Praise	The expression of a favorable judgement of an attribute, behavior or product of other person.
Termination	End of the conversation

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Result1 : Analysis Conversation Data

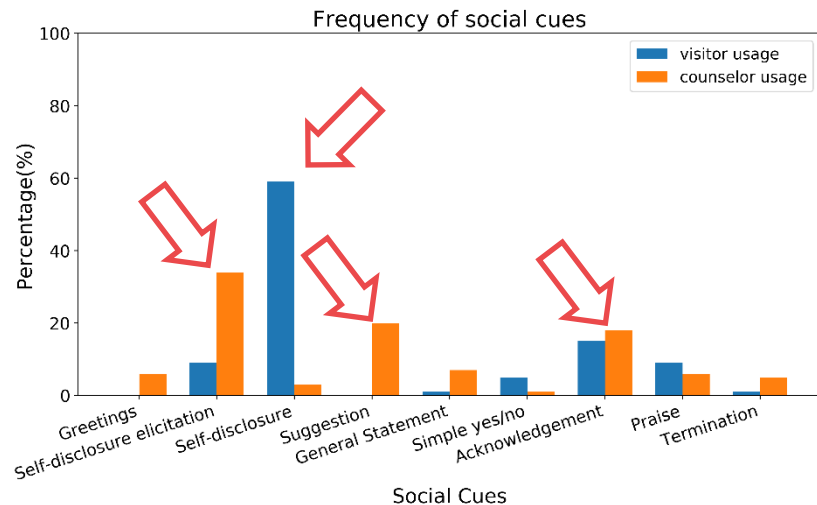


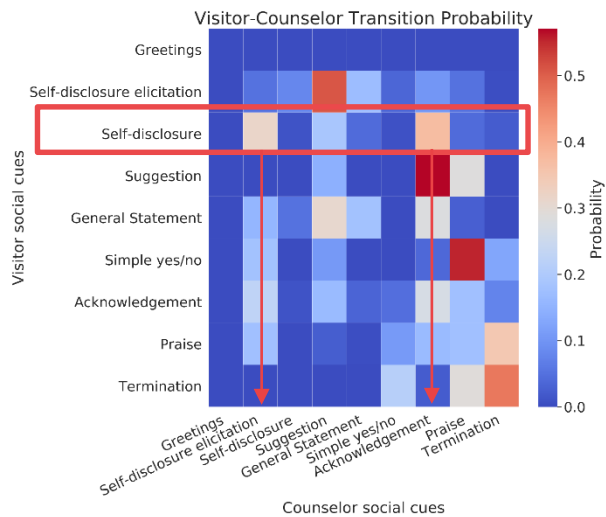
Figure 1. Percentage of social cues between a visitor and a counselor

1. Visitors use **'Self-disclosure'** 4.8 times more than other social cues.
2. Counselors often use **'Self-disclosure elicitation'**, **'Suggestion'**, and **'Acknowledgement'**.

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Result1 : Analysis Conversation Data



Meaningful probabilities

counselor used **"Acknowledgement"** and **"Self-disclosure Elicitation"** as 40% as the response to **"Self-disclosure"**, the most frequently used social cue by visitor.

High probabilities

"Self-disclosure Elicitation", **"Suggestion"**, and **"Simple yes/no"** social cues, where the number of utterances by the visitor was small, showed a high probability that the counselor response with **"Suggestion"**, **"Acknowledgement"**, and **"Praise"**

Figure 2. Transition probability of social cues

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Result2 : HMM prediction accuracy rate & Conclusion

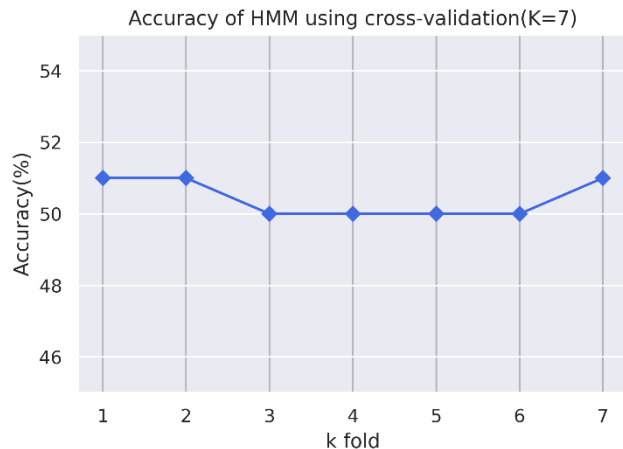


Figure 3. Accuracy of HMM model

Accuracy of hmm

The average accuracy of hmm is 50%, the accuracy was calculated with the number of HMM(hidden markov model) prediction cues for the total number of turns in the conversation in permutation.

conclusion

Next step is to develop a better predictive model for social dialogue model in the future. We are going to apply the developed model to a chatbot or AI speaker to conduct user evaluation.

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**Thank you
for listening**