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Robot understands events in your story

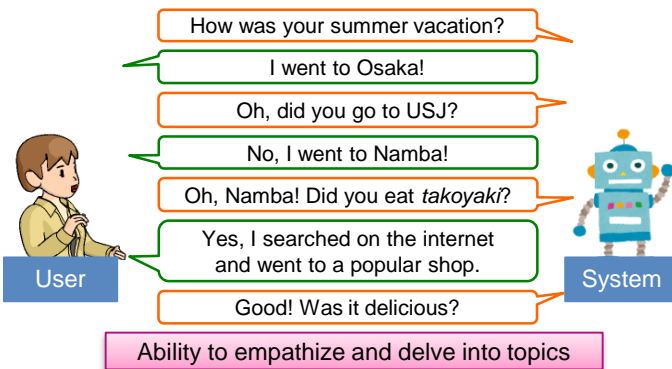
- Chat-oriented dialogue system based on event understanding -

Abstract

The proposed chat-oriented dialogue system can make users think **the system understands the user's utterances**. By understanding the user's utterances as an event structure (a group of time, place, person, etc.), we achieve a chat-oriented dialogue system that can sympathize and delve into topics during a chat. To understand a user's events from the user's utterances, a system must understand various words/phrases in user utterances. To tackle this problem, we focus on **general words and phrases that are familiar in a chatting situation** but difficult to extract by conventional methods. Using this technology, systems can extract a user's utterances by organizing the extracted information. In the future, we aim to **foster a world where humans can converse with systems like humans with mutual understanding** by grounding the extracted information to the system and external knowledge.

System utterance generation based on event understanding

The system generates its next utterances corresponding to the user's event, extracted from the user's utterances as structured event information, by comparing the event with system knowledge.



Example of an extracted event structure

Time	Summer vacation
Place	Osaka/Namba
Person	
Action	ate <i>takoyaki</i>
Feeling	

Example of similar events (system knowledge)

Time	in vacation	Time	in September
Place	Osaka/USJ	Place	Osaka/Namba
Person	with family	Person	with friends
Action	saw turtles	Action	ate <i>takoyaki</i>
Feeling	was cute	Feeling	was delicious

This system was developed based on the dialogue system that won *first prize* in a live competition in Japan (2019).

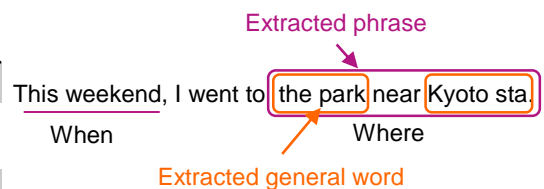
Phrase detection in user utterance

To understand user's events from his/her utterances, various types of words/phrases must be extracted. By analyzing such words and phrases in chats, we achieve this extraction.

Example of location words/phrases in chats

User utterance (Red is location phrase)	Conventional NE extraction	Proposed extraction
I went to Italy .	Italy	Italy
We went to the park near Kyoto station .	Kyoto station	park near Kyoto Station
I often go to electricity shop .	(none)	electricity shop

70% chance that phrases that are not Named Entity (NE) appear in chats (in case of location words/phrases)



Ability to extract general words and phrases

References

- [1] H. Narimatsu, H. Sugiyama, M. Mizukami, "Detecting Location-Indicating Phrases in User Utterances for Chat-Oriented Dialogue Systems," in *Proc. The Fourth Linguistic and Cognitive Approaches to Dialog Agents Workshop (LACATODA)*, 2018.
- [2] H. Sugiyama, H. Narimatsu, M. Mizukami, T. Arimoto, "Empirical study on domain-specific conversational dialogue system based on context-aware utterance understanding and generation," *JSAI SIG-SLUD*, 2018. (in Japanese)
- [3] M. Mizukami, H. Sugiyama, H. Narimatsu, "Event Data Collection for Recent Personal Questions," in *Proc. LACATODA*, 2018.

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