

A study on the slot filling method for the Korean restaurant reservation system

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Abstract. As the deep learning-based research is active, research on the conversation system based on the deep learning model is being activated. However, since these studies are based on a large amount of data, the necessity of data construction research is increasing. Most of the dialogue corpus is composed of English and it is difficult to apply to the Korean dialogue system.

Keywords: Dialogue System, Slot filling, Korean Corpus

1 Introduction

The dialogue system is a natural language understanding system that aims to allow natural communication between humans and computers. Users can be divided into user-driven questions and system-driven questions that ask the user the necessary information to achieve the purpose. The conversation system has structures such as input, natural language understanding, conversation management, response generation, and output, and is a system to which various technologies such as QA system (Question Answering System) and chat system are applied. The dialogue system understands the context of the dialogue and presents appropriate responses for natural dialogue, which is the greatest feature of the dialogue system.

2 Building Korean Dialogue Corpus

The dialogue management methods include rule-based finite state automata management, frame management, plan management, plan management, information state management, and data-based approaches. Finite state management is a method of expressing the order in a fixed dialogue context. It takes less time to develop, is used in a system with a fixed dialogue form because of a fixed dialogue sequence, and has low domain scalability. Frame-based management Improved the limitations of the finite state management method. The dialogue is managed by a frame composed of slots for the purpose of the dialogue. This enables natural dialogue processing, and unlike finite state management, the system's questions and user's answers do not have to be in a specific order. Frame-based management proceeds in the form of asking the

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user questions and receiving the necessary information for the service required by the user. Plan-based management adopts a dialog plan schema according to the purpose of the dialogue, and has the advantage of being free to speak. Information status management is a dialogue processing method using information obtained from the context of the dialogue. [1].

In this paper, we use the slot filling method for frame-based management. Slots are basic data and additional data, and there are 12 in total. If there are data among 6 basic data that are not provided by the user, the system asks the user to collect the data. In addition, each slot is tagged to facilitate data utilization. Figure 1 shows an example of collected dialogue and tagging.

| | |
|---------|---|
| User: | [[오늘 날짜]] [[저녁 시간]] [[이태원 위치]] 근처 식당 추천해줘 |
| System: | 어느 종류의 식당을 원하시나요? |
| User: | [[이탈리안 종류]] 레스토랑 |
| System: | 원하시는 가격대를 말씀해 주세요. |
| User: | [[1인당 15000원~20000원 가격]] |
| System: | 언제 방문할 예정인가요? |
| User: | [[오늘 날짜]] [[저녁 7시 시간]] |
| System: | [[이태원 위치]] 근처의 예약 가능한 [[이탈리안 종류]] 레스토랑은 [[비스테카 식당],[[피제리아까사 식당],[[오레노 식당]]입니다. |
| User: | 또 다른 식당은? |
| System: | [[하베스트 식당],[[레뒤플라 식당],[[라쿠치나 식당],[[라코르테 식당]]입니다. |
| User: | [[오레노 식당]] 예약해줘 |
| System: | 몇 명인가요? |
| User: | 음... [[4명 인원]] 예약해줘 |
| System: | [[오늘 날짜]] [[저녁 7시 시간]] [[오레노 식당]]에 [[4명 인원]] 예약하였습니다. |
| User: | [[오레노 식당]] 전화번호 알려줘 |
| System: | [[02-794-0055 전화번호]]입니다. |

Figure 1. example of dialogue and tagging.

Table 1. example of slot tagging

| | Slot | Example |
|-----------------|------------------|-------------------|
| Required data | Location | 이태원 |
| | Type of food | 이탈리안 |
| | Restaurant | 비스페까, 피제리아까사, 오레노 |
| | Date | 오늘 |
| | Time | 저녁 7 시 |
| | People | 4 명 |
| Additional data | Price | - |
| | Reservation tool | - |
| | Phone number | 02-794-0055 |
| | Address | - |
| | Parking service | - |
| | Parking lot | - |

3 Conclusion

The dialogue system is a natural language understanding system and is applied to various fields such as artificial intelligence speaker, education system, and service support, and the need for research is increasing. However, there is a lack of dialogue corpus for researching Korean-specific dialogue systems. Therefore, in this paper, we collected the dialogue data for restaurant reservation and recommendation for the establishment of the dialogue corpus, and increased the utilization of the data through tagging. More data will be collected in the future, and based on the collected data, a dialogue system for restaurant reservation and recommendation will be developed.

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