Chatbots - keeping track of context

Carl Balmer
University of Bern
Matr. Nr.: 13-120-431
Email: carl.balmer@students.unibe.ch

Mathias Fuchs
University of Bern
Matr. Nr.: 09-923-764
Email: fuchsmat@students.unibe.ch

Abstract—**Nowadays chatbots become more and more sophisticated conversationalists, due to recent advances in the field. Chatbots are especially popular in handling customer service tasks. However it is crucial for a bot to be able to keep the context of a conversation. In this paper we give an overview over the different ways of contexts, the current state of the art in context tracking and we test a nerual network approach in an experiment, using the ubuntu dataset [1].**

I. Introduction

As the popularity of chatbots increases it becomes more important to increase their quality. This is why it is crucial for a chatbot to be able to keep track of the context. For example should the bot be able to know the nationality of the person using it or whether a person means his mother when saying "she" or his wife.

There are different types of context: The world knowledge(time, location, weather) , the user knowledge(relationships, preferences) and the dialogue context(Knowledge learned during the conversation), which is also called dialogue state. (need citation here?). In the following sections we give a brief overview over all those types. However our main focus will be on the dialogue context and the most common ways used to track it.

There are different approaches used for dialogue context:

- Rule-based approaches
- Probabilistic approaches
- Data driven approaches

Depending on which domain we are in, different approaches are more suited. There are two domains:

- Open domain
- Closed domain

II. Types of context

A. World knowledge

B. User knowledge

C. Dialogue context

Dialogue context, also called dialogue state, represents the challenge of keeping track of the knowledge learned during the conversation. For example:

U1: Person: foo
U2: Bot: bar

---

[1] http://dataset.cs.mcgill.ca/ubuntu-corpus-1.0/

Knowledge learned during the conversation User Intent, Revealed Information Hard to track and can be changed or corrected

III. Closed vs. open domain

There are two domains [1] in which a chatbot can operate in.

- **Closed domain**: The bot has one specific task it has to operate in e.g. music player, restaurant finder. The advantage here is, that all the possible actions are finite and known in advance [2] (e.g. there is a finite number of Italian restaurants in a certain area).
- **Open domain**: The bot has no specific task. In the most extreme case it is completely open, which means that it has to converse with anyone about anything. This makes it impossible to model a set of possible answers beforehand.

IV. Related work/ state of the art

A. statistical algorithms

B. machine learning

V. Analysis of existing approaches

VI. Neural network with ubuntu dataset

A. Idea

B. analysis

Subsection text here.

VII. Conclusion

The conclusion goes here. [3]

Acknowledgment

The authors would like to thank...

REFERENCES

[1] R. Yan, Y. Song, X. Zhou, and H. Wu, "Shall i be your chat companion?: Towards an online human-computer conversation system," in *Proceedings of the 25th ACM International on Conference on Information and Knowledge Management*. ACM, 2016, pp. 649–658.

[2] F. Radlinski and N. Craswell, "A theoretical framework for conversational search," in *Proceedings of the 2017 Conference on Conference Human Information Interaction and Retrieval*. ACM, 2017, pp. 117–126.

[3] S. Chopra and S. Chivukula, "My phone assistant should know i am an indian: influencing factors for adoption of assistive agents," in *Proceedings of the 19th International Conference on Human-Computer Interaction with Mobile Devices and Services*. ACM, 2017, p. 94.