

1. Introduction

- **Symbol Grounding × Chatting**
- Research on language acquisition and symbol grounding (focus on the acquisition of physically grounded knowledge through utterances that express physical things, such as objects and motions)
- Most of the previous studies have focused on learning without any prior symbolic knowledge
- The problem of how to acquire physically grounded knowledge based on grounded utterances through natural interaction has yet to be explored
- We focus on object-teaching utterances as grounded utterances

2. Experimental Environment

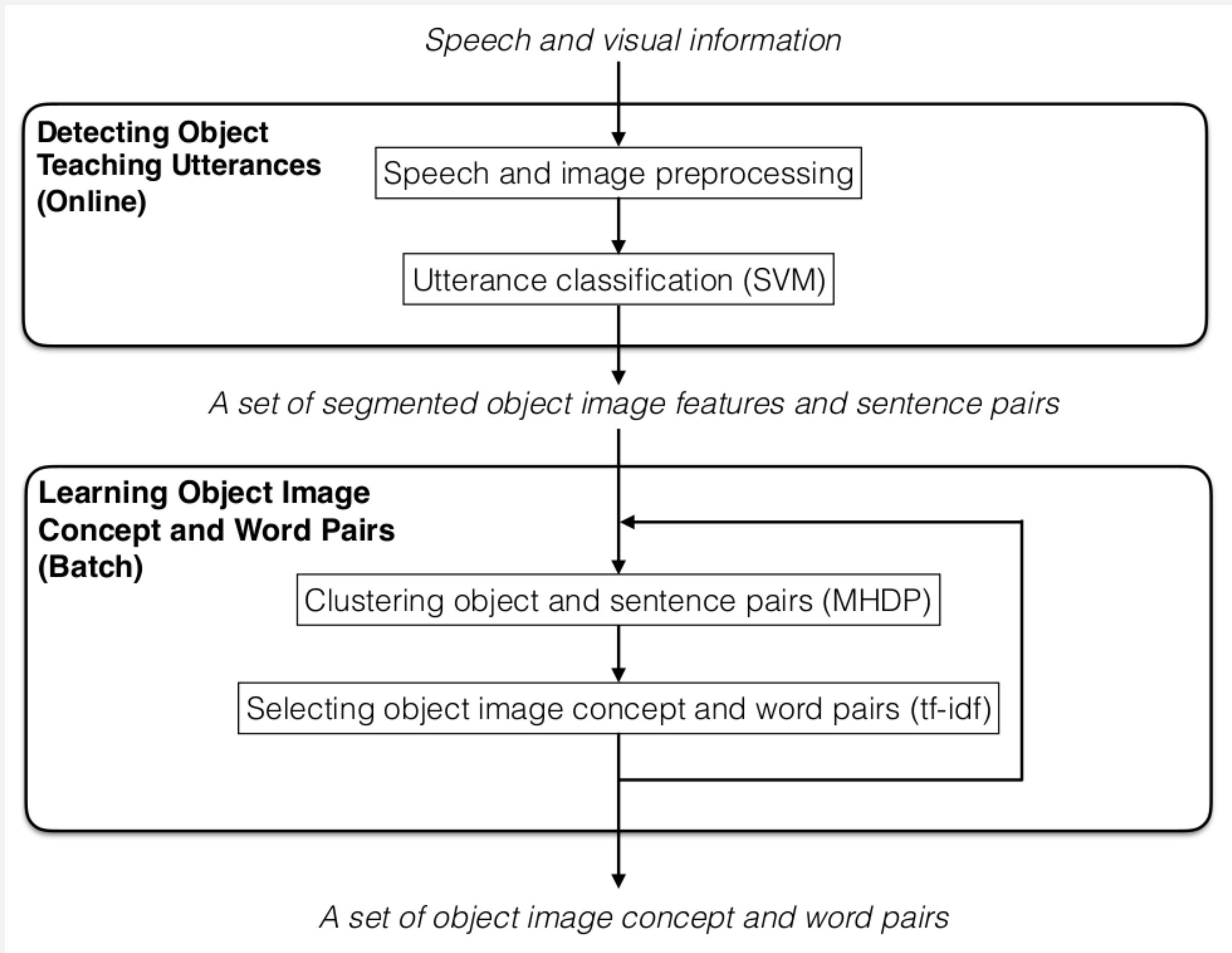


3. Example Dialogue

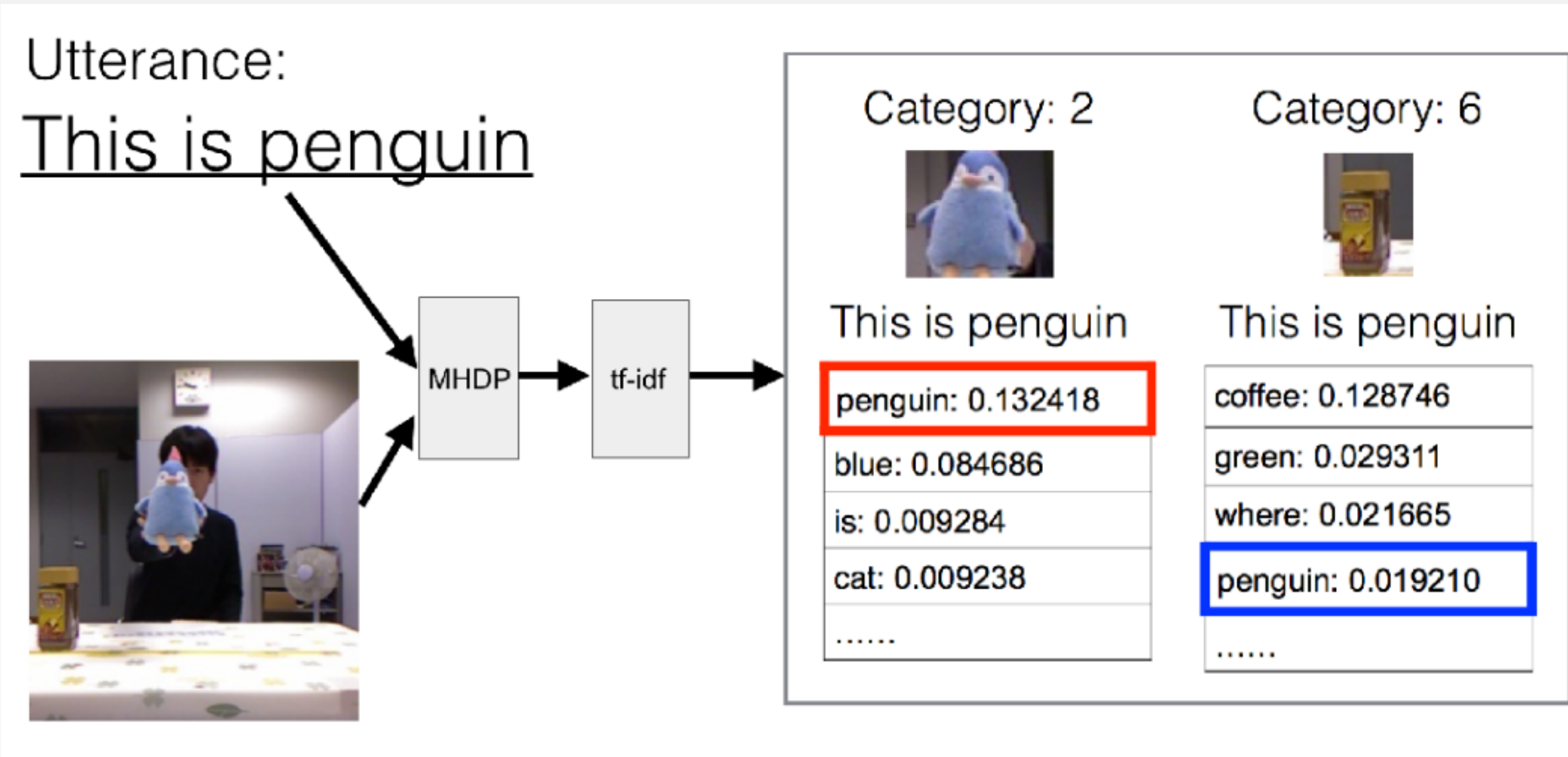
- Some examples of dialogue between human and robot:

| | |
|--------------------------|-----------------------------|
| Do you know any toys? | I am not familiar with toy. |
| Here is the stuffed toy. | Oh, I see. |
| Do you like animals? | I like dogs. |
| I like this penguin. | I got it. |

4. Propose Method



5. Learning Method (MHDP+tf-idf)



6. Experimental Setup

The ten objects used in the experiment are: two black stuffed toy cats (small & big), two stuffed toy fishes (red & yellow), and two cups (red & yellow)



7. Results

Results...

Table 1: Results of learning accuracy of object and words (%)

| | | | |
|--------------|--------------|---------------|--------------|
| without loop | 31% (61/196) | 30% (59/196) | 10% (19/196) |
| with loop | 35% (69/196) | 57% (112/196) | 28% (54/196) |

Here,

- P_w : probability of selecting correct word in each sentence
- P_c : probability of selecting object image concept for each sentence
- P_{wc} : probability of selecting both correct word and object image concept for each sentence
- Result: **without loop < with loop**

Acknowledgments

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References

- [1] Ye Kyaw Thu, Takuya Ishida, Naoto Iwahashi, Tomoaki Nakamura, and Takayuki Nagai. Symbol grounding from natural conversation for human-robot communication. In Britta Wrede, Yukie Nagai, Takanori Komatsu, Marc Hanheide, and Lorenzo Natale, editors, *Proceedings of the 5th International Conference on Human Agent Interaction, HAI 2017, Bielefeld, Germany, October 17 - 20, 2017*, pages 415–419. ACM, 2017.
- [2] Ye Kyaw Thu, Takuya Ishida, Naoto Iwahashi, Tomoaki Nakamura, and Takayuki Nagai. Original poster for CADT Beamer Poster Template. <https://github.com/ye-kyaw-thu/papers/blob/master/HAI2017/hai2017-poster.pdf>, 2017. [Online; accessed 28-June-2022].