A Taxonomy of Real-Life Questions and Answers in Dialogue

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Abstract

We present a taxonomy of questions and answers based on real-life data extracted from spontaneous dialogue corpora. This classification allowed us to build a fine-grained annotation schema, which we applied to several languages: English, French, Italian and Chinese.

1 Introduction

Nowadays, most spoken dialogue systems focus on task-based communication (making reservations, getting information, *etc.*). Annotations are often limited to domain-specific purposes. Many dialogues, especially task-oriented ones, are annotated with speech acts, which are a powerful tool to detect questions' and answers' intentions. A tradition of question and answers modelling inspired by logic approaches has been introduced by (Asher and Lascarides, 2003). From a more linguistic point of view, (Ginzburg and Sag, 2000) presents a detailed study of questions coupled with insights on their answers.

As most annotations are highly specific to a task, they fail to account for the complexity of spontaneous dialogues. Our schema is designed to handle phenomena encountered in real-life conversations. We worked on corpora of transcriptions of spontaneous dialogues, mainly in English (Norrick, 2017). We produced an annotation schema that we tested on French (ATILF, 2018), Italian (Sciubba et al., 2014) and Chinese (University, 2015). In this short paper, we focus on questions and answers classification (sect. 2) and on their combinations (sect. 3).

2 Questions and answers classification

We classify the questions and the answers according to their *form* and their *function*, following (Freed, 1994; Blandón et al., 2019). We do not pretend to be exhaustive here as answers can take arbitrary forms following the non-verbal context of the dialogue. This taxonomy presents the main types of answers one can encounter in real-life corpora of transcribed oral conversations. The form of an utterance is defined by its syntactic form – such as syntactic inversions – and the lexical items that it contains (*wh*-words, 'yes', 'no', *etc.*). The function of an utterance is close to the concept of Austin's illocutionary force (Austin, 1975): it is defined by the intention of the speaker. Our taxonomy takes root in a previous classification schema where questions and answers were classified according to a mixture of form and function (Blandón et al., 2019). In this annotation schema we want to keep the form and the function of questions and answers separate.

In Table 1, we sum up the possible forms and functions for questions and answers. We assume that the interpretation of answers' forms (upper-right) and questions' functions (lower-left) do not need to be developed here. If we look at question forms, `disjunctive` questions can be `inclusive` or `exclusive` (resp.), depending on the interpretation of 'or' : 'Do you want sugar or **milk** in your coffee?' vs 'Do you want sugar or **stevia** in your coffee?'. Here, the interpretation of 'or' depends on its arguments. Questions can be `auxiliary-deontic` ('Can you hand me the salt?') or `auxiliary-epistemic` ('Can you swim?') depending on the auxiliary they contain.

Finally, answers functions can vary a lot. Some are lexical, such as `give feature`, proposed in Boritchev (2017) (adapted from Jurafsky and Martin 2000), which corresponds to an answer to a *wh*-question ('Where do you live?'/'In Paris.'). Others correspond to an action, such as `perform` ('Can you hand me the salt?'/'...'/'Thank you.').

	Questions	Answers
Form	Yes/No, Wh, Disjunctive-Inclusive, Disjunctive-Exclusive, Auxiliary-Deontic, Auxiliary-Epistemic	Yes/No, Wh, Uncertain, Unknown
Function	Completion Suggestion, Phatic, Ask_Confirmation, Ask_Feature, Ask_Performance, Reported Speech (RS)	Refuse, Accept, Phatic, Give_Confirmation, Give_Uncertainty, Give_Unknown, Reported Speech (RS), Give_Feature, Perform, NONE

Table 1: Forms ans Functions of Questions and Answers

3 Combining questions and answers

Questions and answers interact with each other. After an analysis of them in isolation, we consider how their association works and how it can result in comprehension. To do so, we introduce the notions of *symmetry* and *mismatch*. An answer is symmetric (see ex. 1) to its question when the semantic or syntactic requirements imposed by the question are fulfilled by the answer. If it is not the case, it is asymmetric (see ex. 2).

Example 1 ***Symmetry of form and function***
A: Why are you crying?
B: Because I hurt myself.

In this example, the question is of `Wh`-form and its function is `Ask_Feature`. As the answer starts by 'Because', it is classified as of `Wh`-form and its function `Give_Feature`. Therefore, the semantic requirement imposed by the question is fulfilled by the answer.

Example 2 ***Asymmetry of form and function***
A: so- wh- where can you move to?
B: Well...you know...I don't even know where I'm living next year.

In ex. 2, the question is of `Wh`-form and its function is `Ask_Feature`. Yet, the answer is fuzzy and is classified as of `Uncertain` form and `Give_Uncertainty` function. Therefore, the syntactic requirement is not fulfilled.

Next, we define the notions of *mismatch of form (resp. function)*: when there is an asymmetry of form (resp. function) between a question and its answer, a mismatch of form (resp. function) occurs if and only if the form (resp. function) of the given answer doesn't fall under one of the forms (resp. functions) accepted by the question. The identification of compatible questions and answers goes through tables of compatibility. They map the forms and functions that can combine with each other (in both cases of symmetry and asymmetry). In Table 2, question forms are associated with a set of answer forms that do not trigger a mismatch. Table 3 presents compatibilities of functions.

Q_Forms	**Expected answer forms**
Yes-no	{Yes/No, Uncertain, Unknown}
Wh	{Wh, Uncertain, Unknown}
Disj._Inclusive	{Yes/No, Uncertain, Unknown}
Disj._Exclusive	{Wh, Uncertain, Unknown}
Aux._Deontic	{Yes/No, NONE, Performance}
Aux._Epistemic	{Yes/No, Uncertain, Unknown}

Table 2: Compatibility form

Q_Function	**Expected answer function**
Completion Suggestion	{Refuse, Accept, Phatic, Give_Confirmation}
Phatic	{Refuse, Phatic, Give_Confirmation, Report, NONE}
Ask_Confirmation	{Refuse, Accept, Give_Uncertainty, Give_Unknown, Give_Confirmation}
Ask_Feature	{Give_Feature, Give_Uncertainty, Give_Unknown}
Ask_Performance	{Perform, NONE, Give_Unknown, Give_Uncertainty, Accept}
RS	{Phatic, Reported, NONE}

Table 3: Compatibility function

4 Conclusion

This taxonomy of questions and answers allowed us to produce an annotation schema. We tested it on English, French, Italian and Chinese corpora. [1] We were able to tag a wide range of questions and their possible answers. The notion of mismatch allowed us to detect cases of indirect answers and distinguish them from cases where no answers were given. Following this process, we

[1] See our poster for results.

are also able to combine sequences of questions and answers in coherent blocs that constitute negotiation phases (Boritchev and Amblard, 2018).

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