



Specification of communicative acts of utterances based on dialogue corpus analysis

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Abstract

The aim of this paper is to present a specification of speaker's communicative acts of utterances to be carried out gradually by using contextual and cotextual informations.

Communicative act is defined as a communicative goal or aim which can be expressed in language L by a distinctive set of conventional cue patterns in specified discourse contexts. In our case, the communicative acts are classified into 28 sorts.

The approach based on speech act theory to discourse analysis is considered generally as an efficacious method for topic tracking, ellipsis recovery, anaphora solution, etc. in machine translation of oral dialogues or analysis/generation of utterances on man-machine systems. However, the method requires that speaker's communicative act is interpreted and determined in the process of the analysis. Here is produced an ambiguity problem ; for example, the utterance A could be analysed as either an *instruct*, or an *action-request* in automatic analysis, while it is interpreted as an *instruct* according to human reading in a context given.

A : Prenez le bus 3 et descendez à l'arrêt
Gustave Rivet,...(you wanna take the bus 3 and
get out at bus stop Gustave Rivet)

Aiming at a solution of the ambiguity, we observed task-oriented dialogue corpus, to clarify elements which are presumed to realise the speaker's communicative act of the utterance.

There are two different types of elements involved in the communicative act ; contextual elements and cotextual elements. The contextual elements contain surface cue patterns, grammatical and linguistic aspects of utterances, precedent or/and next utterance, connectors, etc.

The cotextual elements contain the speaker and hearer, turn taking, conversation stages (open

conversation, starting of main topic, close conversation), the relation between speaker's knowledge in the domain and vocabularies used in the conversation.

So, we formalised these elements to use as disambiguation informations of the specification of the communicative acts. Finally, we make experiments on the disambiguation using the contextual and cotextual informations.

In this paper, we pick up the ambiguity between "Yes" and "Acknowledge", "Action-request" and "Instruction", and "Yn-question" and "wh-question", and show an evaluation concerning them.

0. Introduction

Speech act theory is often applied to discourse analysis, when handling anaphoric reference, ellipsis interpretation of sentences, the topic tracking, etc. in the field of machine translation or man-machine systems. Our automatic discourse analysis consists, at first, in segmenting dialogues in unit of communicative acts, then to specify communicative goal of each unit, and finally to contain the units obtained in groupe having same topic. However, the discourse analysis based on this theory or the analysis method using the units obtained as input units at any step asks to determine the communicative goal which an utterance realises in a given context. For example, in the fragment (1), the communicative act of H2 can be either an utterance of *instruct*, *request* or *inform* ; while, in the fragment (2), H1 can be interpreted as an *instruct* or a *request*, but not as *inform* : that is that, as far as automatic processing, ambiguity problem is produced here. However, this ambiguity can be decreased by using syntactic, semantic and pragmatic information. The more these informations are relevant, the more the ambiguity eases. According to the human

interpretation, H2 in (1) is the utterance type of *instruct*, H1 in (2) is one of *request*.

(1)

H1: Do you wish information to go to the hotel?

C1: Please. from the station.

H2: Take the bus 3 and get out at the stop Gustave Rivet, the hotel is 50 metres from the stop.

C2: thank you. Goodbye. (gan1.1)

(2)

H1: Well, I reserve it, but send me a fax for confirmation, please.

C1: It is OK, I send you a fax at once. (Jfs8.1)

1. Elements involved in the specification of communicative acts

The communicative act depends on grammatical elements of utterances, dialogue context, pragmatic conditions of the utterance, and the lexicon, notably formulas or performative verbs (cf. Dijk, on 1972; Searle, on 1979).

1.1. Grammatical elements

The grammatical elements contain grammatical subject of the utterance, the modality and the tense of the predicate. At first, the grammatical subject can influence communicative act of the utterance, as shown in (3). When the speaker coincides with the grammatical subject, the utterance in the present is interpreted as a *promise*, and the utterance in the past as a *inform*. When the grammatical subject is the second person, the utterance is interpreted as a *request*, when prosodic information isn't taken into consideration.

(3)

I come tomorrow. (*promise*)

You come tomorrow. (*request*)

He comes tomorrow. (*inform*)

I came yesterday. (*inform*)

Second, about the modality of the utterances, there are at least following grammatical marks (cf. Armangaud, 85) :

- the inquiring mode for the type 巖ot巖que (eg. *question*)
- the imperative mode for the directive type (eg. *request*)
- the declarative mode for the representative type (eg. *promise*)

1.2. Dialogue context

1.2.1. Utterance of previous turn

In the dialogues by two speakers, the speakers take, in principle, alternately their turn. It is possible that the previous turn determines the communicative act of the current utterance. In (4), "Yes" expresses a positive reply to the vericonditionnelle question of the previous turn, whereas in (5), "Yes" expresses a reaction to the *request* in the previous turn. Their communicative act is interpreted so differently as labels put in brackets show it.

(4)

H: I reserve a room for 2 persons, with bath and WC for 420 Francs, and two single rooms with shower and WC for 280 Francs. (*inform*) Is it convenient for you? (*confirmation-question*)

C: Yes, (Yes) that is convenient for me. (jfs4.1)

(5)

C: Hello, hello Madam. I would like to reserve a room. (*request*)

H: Yes, (*acknowledge*), very well, for which period? (jfs1.1)

Utterance of next turn

There are cases where the utterance of next turn can influence the specification of communicative acts of current utterance. The utterance C in (6) looks like a vericonditionnelle question, who calls an reply by "yes" or "no". However, the actual reply is "yes" nor "no" in H2. Consequently, the utterance C is interpreted as a multi-conditional question.

(6)

H1: You want a room with bathroom on the landing or in the room?

C: Is there a big difference in price? (*wh-question*)
H2: 50 francs. (Nc4.1)

1.3. Pragmatic conditions of the utterance

The pragmatic conditions contain the interactive environment, speakers, the interactive modality, etc. In our corpus, the interactive environment is not defined, and the interactive modality is phone conversations between two speakers. The speakers are a receptionist of a hotel and a customer who wants to reserve a room. The characteristics of the speaker, notably his social status or his profession influence interpretations of the communicative act. If we replace their role in (7) the one by the other, with the minimal change of the content of the utterances according to their role, the interpretation changes as shown in (8) : it is about the interpretation of "it is expensive". When the customer says that "it is expensive " in this context, the utterance can be interpreted as *emotional expression*, whereas, when the receptionist says it, the utterance is interpreted as a *question* or *inform*, when there is no prosodic information.

(7)
H: Breakfasts are in more, 45 Francs for person.
C: Oh ! It is expensive!
H: No, sir, it is not expensive because our breakfasts are very substantial, you will see. (ggs1.1)

(8)
C: Breakfasts are in more, 45 Francs for person!
H: Yes, it is expensive.
C: No, it is not expensive because your breakfasts are very substantial, you know.

1.4. Lexicons

The lexicons used in the dialogues play, naturally, a role very important for the specification of the communicative act.

1.4.1. Specific formula

On one hand, in every case, the conversation imposes a linear organisation taking place in the time. Indeed, the dialogue develops generally by beginning

with the stage of its opening, followed by the release of a subject, and end by its close in the time: there are specific formulae in each stage of the conversation. If one can know in which stage of conversation which formulae are used, the specification becomes less difficult. For example, in (9) "Hello Sir" 藪 expresses the opening of the conversation, and the verb phrase "would like to" can be a utterance of *request* in most of the cases.

(9)
C: Hello Sir, I would like to know if you have still available rooms for the 15?
H: Yes, hello Sir, which type of room would you want? (jfs2.1)

On the other hand, there are specific expressions in task-oriented dialogues : for example, short utterances as "yes, I agree" and "no, it 調 not possible" are specified a priori as *yes* or *no*, as well as, "it is noted " as *acknowledge*, by which the receptionist often declares the booking done in the domain of hotel room booking.

(10)
C:... I 誰 take the room for 700 Francs.
H: by what name?
C: Jean DUPONT.
H: It is noted. (Jpg3.1)

1.4.2. Performative verbs

Certain utterances contain explicitly a verb phrase which expresses a priori its communicative act.

1.4.3. Lexicons of the 巔ist嶺ique point of view

The lexicons can be also analysed from the 巔ist嶺ique point of view (Hollard & Caelen, 98). In task-oriented dialogues, elements which maintain thematic continuance of the conversation are customer-type information, receptionist-type information and room-type information. The customer has information about him : his name, his age, the number of his credit card, the purpose of his phone call, etc. The receptionist possesses information about the hotel :

name of the hotel, its location, possibility of booking, the check-in and check-out times, services that he can propose to customers, possibility of "Internet" connection, ironing, etc. The room type information is shared and built between customer and receptionist to fix booking modality. The constituent elements of the dialogues are so classified according to the information type which engenders the thematic continuance of the conversation.

(12)

H: You want a room with bath or shower?

C: Euh, bath. Not rather shower. Yes, with shower and WC. (nc2.1)

1.4.4. Connectors

Certain connectors contribute to the specification of the communicative act of utterances. For example, the coordinating conjunction links generally two utterances which have the same act as we observe it in A in the introduction of this paper. In A, if the act of the first utterance realises an *instruct*, that of the second which is connected by "then" can be similar.

Thus, there are many factors that are implied for the specification of the acts of utterances. On one hand, they are contextual factors, and on the other hand, they are cotextual factors.

We formalise these elements and gramaticalise them for the purpose of a discourse analysis. Finally, we verify that, since no only the contextual elements are expected to cover specification of all utterances, the cotextual elements of utterances should be taken account of as the protagonist of the ambiguity solution.

2. Evaluations of the specification of the communicative act

We tested the segmentation of the dialogues in French in transcription. They are adequately segmented in 100 %. The corpus used for this test is 50 French dialogues which contain 14.42 turns and 9636 words. The table 1 shows the result of the automatic specification which was tested separately

with the contextual and cotextual information. Having applied the cotextual rules, the performance increased in 25 %, and consequently, the total performance is 85 % in the means (Tomokiyo & Goyet, 99).

communicative act between	performance according to the information	
	contextual	cotextual
"Yes" et "acknowledge"	40%	+ 47%
"Yn-question" et "wh-question"	70%	+ 18%
"Action-request" et "inform"	70%	+ 10%

(table 1)

8. Conclusion

We examined the necessary information for the specification of the communicative acts of utterances in the task-oriented dialogues and showed that the information about the previous or following utterance allows to increase the average performance of 25 %. However, on one hand, the use of the information about the following utterance is not realistic, because the analysis of dialogues should be conducted in "real time" in the practice. On the other hand, our analysis shows that, in certain cases, the act of utterances should be interpreted retroactively according to the conversation as Brassac and Vernant mention it (1994). There is a specification of speech acts by using a set of the models of sequence of two acts (Nagata, 95) as approach similar to our method. This way risks producing the never-ending analysis, when the models of sequence increase.

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