Modeling Conflicts in Multi-part Dialogue

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Abstract

We will propose a model to predict conflicts for multi-part dialogue. Conflicts are disagreements between two or more people. It includes task, process, and relationship conflicts.

1 Introduction

A conflict is defined as disagreement between two or more people (Paletz et al., 2011). In this paper, only short-term conflicts are considered. In other words, conflicts happen only in minutes but not last a couple of days and not even longer.

Conflicts can be categorized by task, process, and relationship types (Jehn, 1995; Jehn, 1997). Linguistic researchers have argued that task conflict, under certain circumstances, can be beneficial, particularly for innovation (Jehn, 1997; West, 2002), whereas relationship and process conflict should hurt performance (Jehn, 1997).

Modeling conflicts in dialogues can be benefit to team development, dialog understanding and management, etc. Conflicts in general can also help credibility-based summarization (Kaneko et al., 2009).

2 Related Work

Bracewell et al. (2012) classified 11 social acts including agreement and disagreement on social medial based on gappy patterns with 50.4% f-measure. A gappy pattern consists of one or more words in between which there can exist gaps, or wildcards, which match any word. Actually, the disagreement act in that paper is not exactly the same as conflict in our paper. The disagreement act is defined as "statements a group member makes to indicate that he/she does not share the same view about something another member has said or done". Conflicts here should also include the relationship conflict act defined as "personal, heated disagreement between individuals".

Classifying agree/disagree opinions in conversational debates using Bayesian networks was presented in (Galley et al., 2004) based on adjacency pairs features. Agree/disagree classification is formulized as a max cut problem in (Murakami and Raymond, 2010) for online debates.

Recently, Paletz et al. (2011) presented an extensive work on coding conflicts in natural multi-part dialogues.

3 The Corpus

We are going to use the Eng data (Jang and Schunn, 2012; Friedberg et al., 2012), collected in University of Pittsburgh. It is a collection of natural dialogues among teams of college undergraduates working on their semester-long product design projects. The conversations involve 2-6 individuals. Most of the students were engineering majors (e.g., electrical, mechanical, and industrial), but some teams also had marketing students as members.

Among 45,687 utterances, 1,401 of them are annotated as conflicts. The conflict levels are also annotated, like "low" and "high". Their counts are shown in Table 1.

The distribution of types of conflicts is shown in Table 2.

type	Task	Process	Relationship	Off task	Off topic	Unknown
#	755	462	98	66	18	2

Table 2: Distribution of types of conflict in the Eng corpus

Speaker	Utterance	Conflict?	Level	Type
1	You never know, they are-	1	hi	Task
4	They are catching up,	1	hi	Task
4	But I doubt it.	1	hi	Task
4	Can you crank out a couple things tonight?	0		
1	No	0		
4	Homework?	0		
1	No	1	low	Process
4	Ok well the answer to the question is this is connected to that	0		
4	and I'm not holding that	0		
4	and that's another person who's [?]	0		
1	For what	0		
4	You're insane -	1	hi	Relationship

Table 3: Three examples of conflicts

Hi	Low	Unknown
1149	197	55

Table 1: number of conflicts and conflict level in the Eng corpus

Examples of conflicts are shown in Table 3.

4 Data Preprocessing

The distribution of conflict and non-conflict is highly skewed (3%). Thus, it might be better do re-sampling in order to balance it. One method could be is blocking introduced in (Paletz et al., 2011). The idea is to divide the conversations into blocks. If a conflict happens, a block includes the conflict utterances, and also includes 25 utterances before it and 25 utterances after it[1]. We can then randomly sample the rest to get blocks that have no conflict.

In this way, we can have half blocks that contain conflict and half blocks that not.

[1]25 utterances are chosen because they are roughly one-minute.

5 Methodology

5.1 Classification Model

Even we treate the conversations as blocks, we can treat each utterance independent with each other. Therefore, the task to identify conflict utterances is a binary-classification problem.

Features I will use include:

- Ngram
- Word length
- POS
- Whether contains negative/positive words
- LIWC features
- Whether is the same speaker as the previous one

There are some other hand-made features in this corpus that can be used:

- Whether this utterance is related to the project
- Uncertainty?
- Analogy occur?

5.2 Sequence Labeling Model

Usually, when a conflict happens, it takes a while to be resolved. Thus, it can also be treated as a sequence labeling problem. The task is to identify when a conflict begins and when it is over. We can use "BIO" tags, where "B" indicates the beginning of a conflict; "I" means the inside of a conflict; "O" means the ending of a conflict.

CRF (Lafferty et al., 2001) can be used for this model.

Besides the regular features, other features could be tried such as

- The previous tag
- Whether this utterance has same words as the previous one

5.3 Event-Graph Model

In this model, the assumption is that a conflict between two people should happen with an event. Let e is an event, and there are two speakers A and B. If A agrees with e but B disagrees with e, then a conflict happens. In other words, speakers are connected by events and a speaker can either agree with an event or disagree it.

If we can construct this event graph, identify a conflict between two people will be pretty straightforward.

6 Future Work

Relying only on transcriptions might not be prefect for this problem. Firstly, sometimes, you cannot tell a conflict by the transcription but you can tell by their facial expression, body gestures, vocal changes, tone, etc. Secondly, conflicts dependent on the culture, which might be very hard to model.

7 Timeline

Sep 13 - Sep 22

- survey the related work regarding conflict/disagreement/agreement prediction
- resampling the data into blocks

Sep 23 - Oct 20

- extract basic features
- implement the classification Model

Oct 21 - Nov 9

- implement CRF model

Nov 10 - Dec 12

- Implment the graph model

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