Response Generation for Grounding in Communication at NTCIR-13 STC Japanese Subtask

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ABSTRACT

The AITOK team participated in NTCIR-13 STC Japanese Subtask. This report describes our approach to generating responses to comment texts of Yahoo! News comments data, and discusses our results of formal-run. Our approach intends to make sure of grounding in communication, thereby integrates three strategies and five rules. The strategies are on the presupposition that there is not enough information regarding the first comment text in our auto-responder system. Then, the method of auto-responder consists of three steps, labeling, finding, and generating. Although the approach is very simple, the formal-run result was really good in Rule-1. However, the result was not enough in Rule-2 due to short of information in the responses.

Team Name

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Keywords

Dialogue, Common Ground, Support Vector Machine

1. INTRODUCTION

The AITOK team participated in NTCIR-13 STC Japanese Subtask [7]. Our approach intends to make sure of grounding in communication (grounding, common ground) [6] of comment texts of Yahoo! News comments data. Grounding in communication is basically based on the idea that the collection of "mutual knowledge, mutual beliefs, and mutual assumptions" is essential for communication between two people. Whereas, Our strategy is on the presupposition that there is not enough information regarding the first comment text in our auto-responder system. Hence, to increase common ground to the comment text, about 100 templates were conducted based on three strategies and five rules.

The method of auto-responder consists of three steps. The first step is labeling to the comment text with *who*, *opinion*, *impression*, *positive* and *negative* using Support Vector Machine [4]. The second step is finding a lack of information for grounding. Then, the third step is generating responses with keywords in the comment text and response patterns.

Then, this report describes our approach to generating responses to comment texts of Yahoo! News comments data, and discusses our results of formal-run are really good at Rule-1 but not good at Rule-2.

2. APPROACH

Our approach intends to make sure of grounding in communication [3] with an initiator in Yahoo! News comments data. The method of auto-responder consists of three steps, labeling, finding, and generating. Step 1: Labeling six intent types to a comment text. Step 2: Finding associated information. Step 3: Generating responses based on rules.

2.1 Grounding in Communication

Our strategies are on the presupposition that there is not enough information regarding the first comment text in the auto-responder. The following cases need to ground by an appropriate response.

Case 1 Comment text has ambiguity of vocabulary.
Case 2 Comment text has ambiguity of domain knowledge.
Case 3 Intent types of the comment text are untrusted.
Case 4 Lack of knowledge in the responder.

The case 1 is an ambiguity problem in syntax. The case 2 is an ambiguity problem in semantics. The case 3 is an accuracy problem in prediction. The case 4 is an information amount problem in database of the auto-responder system. The system is assumed to be knowledge-based such as search engine, and the knowledge to the comment text is not included in in the database.

2.2 Labeling with Support Vector Machine

At the first step, every comment text of the target training data is parsed to segmented terms by MeCab [5] with the ipadic [1], and filtered by the part of speech shown in Table 1.

Table 1: Part Of Speech (POS) list for filtering.

Type	Subtype
名詞 (Noun)	一般 (General), サ変 (Verbal), 固有名詞 (Proper),
形容動詞語幹 (Adjective-base),	副詞可能 (Adverbial), 数 (Number), 接尾 (Suffix)
動詞 (Verb)	自立 (Independent)
形容詞 (Adjective)	自立 (Independent)
副詞 (Adverb)	一般 (General)
助動詞 (Auxiliary)	特殊・ナイ (Aux special-nai)
接頭詞 (Prefix)	名詞接続 (Nominal)
形容詞 (Adjective)	非自立 (Auxiliary)
フィラー (Filler)	*
感動詞 (Interjection)	*

Support Vector Machine approach is applied for labeling to the comment text with six types of intent labels. For instance, If a comment text contains an intent about people, *who* is labeled. If the text contains optimistic or pessimistic thoughts, *positive* or *negative* is labeled respectively. If the text contains initiator's own opinion or expressing emotion, *opinion* or *impression* is labeled respectively. The part of comment texts of train data are labeled by hand, and learned the labeled comment texts by libsvm [2].

Table 2: Extracted keywords and predicted labels from original text. Here are Genre, Theme, Topic (Title in Yahoo! Topics), and Comment text which are translated from Japanese into English.

	Genre	Theme	Topic (Title in Yahoo! Topics)	Comment text	Label
Original text	スポーツ Sports	柴崎岳|鹿島アントラーズ|サッカー選手の移籍・退団|土居聖真 Shibasaki Gaku | Kashima Antlers | Foot ball player transff-Pered and left | Shoma Doi	柴崎岳 スペイン語で会場沸く Gaku Shibasaki excites audience in Spanish	柴崎って誰？ 知りませんが…。 Who is Shibasaki? I don't know…	
Persed keywords	スポーツ Sports	柴崎, 岳, |, 鹿島アントラーズ, |, サッカー, 選手, の, 移籍, 退団, |, 土居, 聖, 真 Shibasaki, Gaku, |, Kashima Antlers, |, Foot ball, player, transfer, leave, |, Doi, Sho, Ma	柴崎, 岳, スペイン, 会場, 沸く Shibasaki, Gaku, Spain, audience, excite	柴崎, 誰, 知り Shibasaki, who, know	who, positive

Table 3: Three types of grounding strategy and five response rules. Here are five example responses which are translated from Japanese into English.

Strategy	Rule	Response (English)
A: Explicit confirmation	[1] Yes/No question for confirmation.	柴崎が誰か知らないの？ (Don't you know who Shibasaki is?)
B: Implicit confirmation	[2] Repeating an affirmative sentence with alternative keywords.	柴崎は青森県出身ですね。 (Shibasaki is from Aomori, you know.)
	[3] Repeating an affirmative sentence repeated verbatim. (Parroting)	柴崎が誰か知らないよね。 (You don't know who Shibasaki is, right?)
C: Continuation	[4] Responding a question with alternative keywords.	鹿島アントラーズは知ってる？ (Do you know Kashima Antlers?)
	[5] Responding a question with extracted and alternative keywords.	柴崎はサッカー選手ですか？ (Shibasaki is a foot ball player, right?)

Table 4: Top five of Mean $Acc_{L1,L2}$@1 in Rule-1 including AITOK-J-R1.

Run ID	Mean nG@1	Mean nERR @2	Mean Acc_{L2} @1	Mean Acc_{L2} @2	Mean $Acc_{L1,L2}$ @1	Mean $Acc_{L1,L2}$ @2
AITOK-J-R1	0.4468	0.4838	0.0280	0.0660	**0.9840**	**0.9710**
GOLD-J-R1	**0.7753**	**0.7757**	**0.4720**	**0.4430**	0.8980	0.8840
KIT16-J-R1	0.5014	0.5580	0.1800	0.1690	0.8240	0.7980
KIT16-J-R4	0.4804	0.5372	0.1660	0.1610	0.8000	0.7700
YJTI-J-R2	0.4893	0.5468	0.2040	0.2030	0.7620	0.7310

2.3 Finding More Information

At the second step, to find associated information to the comment text, the system searches information on *Google Search* by the extracted keywords in Topic shown in Table 2. Then, keywords in top three results are randomly selected as alternative keywords for Rule[2], [4] and [5] in Table 3.

2.4 Generating Responses

At the third step, generating sentences based on three strategies and five rules, shown in Table 3. Explicit confirmation strategy generates an interrogative sentence, "a yes-no question" with Rule[1]. Implicit confirmation strategy repeats the first comment text by replacing with two types of sentences, "an affirmative sentence with alternative keywords" with Rule[2] and "an affirmative sentence repeated verbatim" with Rule[3]. Continuation strategy responses two types of sentences, "a question with alternative keywords" with Rule[4] and "a question with extracted and alternative keywords" with Rule[5]. The following are examples which are templates of five rules for *who* and *positive*.

```
def R_1(w1,w2): return "Don't␣you"+w2+"who"+w1+"is?"
def R_2(w1,a1): return w1+"is"+a1+",␣you␣know."
def R_3(w1,w2,w3): return "You"+w3+w2+w1+"is,␣right?"
def R_4(a2): return "Do␣you␣know"+a2+"?"
def R_5(w1,a3): return w1+"is"+a3+",␣right?"
```

Here, w1...w3 are extracted keywords and a1...a3 are alternative keywords. Auto-responder has about 100 templates. Every sentence was generated to each comment text of formal-run, using templates chosen by predicted labels.

3. RESULT

Although our approach is very simple, Rule-1, *AITOK-J-R1* was great in Mean $Acc_{L1,L2}$@1 and Mean $Acc_{L1,L2}$@2 of Rule-1. A remarkable fact is that *AITOK-J-R1* was evaluated better than original comment texts *GOLD-J-R1*, because of higher scores in Fluent and Coherent. Nevertheless, The result was not enough in Rule-2. Because Rule-2 penalizes context-independent or uninformative responses. Therefore, *AITOK-J-R1* was not highly evaluated. This is a logical result because the aim of strategies is not to extend the dialogue, but to increase common ground.

Table 5: Top five of Mean $Acc_{L1,L2}$@1 in Rule-2 and AITOK-J-R1.

Run ID	Mean nG@1	Mean nERR @2	Mean Acc_{L2} @1	Mean Acc_{L2} @2	Mean $Acc_{L1,L2}$ @1	Mean $Acc_{L1,L2}$ @2
GOLD-J-R1	**0.7646**	**0.7639**	**0.4720**	**0.4430**	**0.8660**	**0.8430**
YJTI-J-R2	0.4726	0.5288	0.2040	0.2030	0.7200	0.6900
KIT16-J-R1	0.4173	0.4676	0.1800	0.1690	0.6320	0.6050
KIT16-J-R4	0.4014	0.4549	0.1660	0.1610	0.6200	0.5900
YJTI-J-R1	0.4171	0.4544	0.1860	0.1490	0.6100	0.5750
AITOK-J-R1	0.0816	0.1758	0.0280	0.0660	0.1400	0.3100

4. CONCLUSIONS

Our approach intends to make sure of grounding in communication with an initiator in Yahoo! News comments data. The method of auto-responder consists of three steps, labeling, finding, and generating. The grounding rule is based on ungrounded assumption between initiators and responders. At the results, although our approach is very simple, the formal-run result was extremely good in Rule-1. Thus, our communication grounding strategies were very effective. Because simple strategies contributed Fluent and Coherent of responses. Besides, the result was not enough in Rule-2 due to not to extend the dialogue. Hence, we have found out that the continuation strategy should be extended more with associated information.

5. REFERENCES

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