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OPINION BASED WORD EXTRACTION OF SUPERVISED & UNSUPERVISED MODELS FOR ALIGNMENT

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Abstract: Extracting opinion targets and opinion words from online reviews are two fundamental tasks in opinion mining. this paper proposes a novel approach based on the partially-supervised alignment model, which regards identifying opinion relations as an alignment process. Then, a graph-based co-ranking algorithm is exploited to estimate the confidence of each candidate. Finally, candidates with higher confidence are extracted as opinion targets or opinion words. The proposed model captures opinion relations more precisely, especially for long-span relations. It effectively alleviates the negative effects of parsing errors when dealing with informal online texts. In particular, compared to the traditional unsupervised alignment model, the proposed model obtains better precision because of the usage of partial supervision. In addition, when estimating candidate confidence, it penalizes higher-degree vertices in graph-based co-ranking algorithm to decrease the probability of error generation.

Keywords: Opinion targets, opinion words, alignment models**.**

I. INTRODUCTION

In opinion mining, extracting opinion targets and opinion words are two fundamental subtasks. Opinion targets are objects about which users' opinions are expressed, and opinion words are words which indicate opinions' polarities. extracting them can provide essential information for obtaining fine-grained analysis on customers' opinions. To this end, previous work usually employed a collective extraction strategy. Their intuition is: opinion words usually co-occur with opinion targets in sentences, and there is strong modification relationship between them. If a word is an opinion word other words with which that word having opinion relations will have highly probability to be opinion targets, and vice versa. In this way, extraction is alternatively performed and mutual reinforced between opinion targets and opinion words. Although this strategy has been widely employed by previous approaches, it still has several limitations such as:

1. In previous methods, mining the opinion relation between opinion targets and opinion words was the key to collective extraction. To this end, the most adopted techniques have been nearest-neighbour rules and syntactic patterns. Clearly, this strategy cannot obtain precise results because there exist long-span modified relations and diverse opinion expressions. To address this problem, several methods exploited syntactic information, in which the opinion relations among words are decided according to their dependency relations in the parsing tree.
2. The collective extraction adopted by most previous methods was usually based on a bootstrapping framework, which has the problem of error propagation. If some errors are extracted by iteration, they would not be filtered out in subsequent iterations. As a result, more errors are accumulated iteratively.

To resolve these two challenges, this paper presents an alignment-based approach with graph co-ranking to collectively extract opinion targets and opinion words. Our main contributions can be summarized as follows:

1. To precisely mine the opinion relations among words, a method based on a monolingual word alignment model (WAM) can be used. An opinion target can find its corresponding modifier through word alignment.

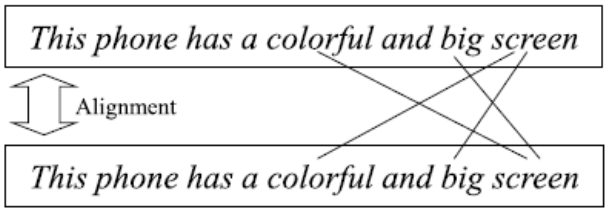

Fig1

For example in Fig. 1, the opinion words "colourful" and "big" are aligned with the target word "screen". Compared to previous nearest-neighbour rules, the WAM does not constrain identifying modified relations to a limited window; therefore, it can capture more complex relations.

2. Standard Word Alignment model (WAM) is often trained in a completely unsupervised manner, which results in alignment quality that may be unsatisfactory. However, alignment quality can be improved by using supervision.

Thus, a technique called Partially Supervised Alignment Model (PSWAM) is employed. For example, in Fig. 2, "kindly" and "courteous" are incorrectly identified as modifiers for "foods" if the WAM is performed in a wholly unsupervised manner. However, by using some syntactic patterns, we can assert that "courteous" should be aligned to "services". Through the PSWAM, "kindly" and "courteous" are correctly linked to "services" This model not only inherits the advantages of the word alignment model for opinion relation identification, but it also has a more precise performance because of the use of partial supervision.

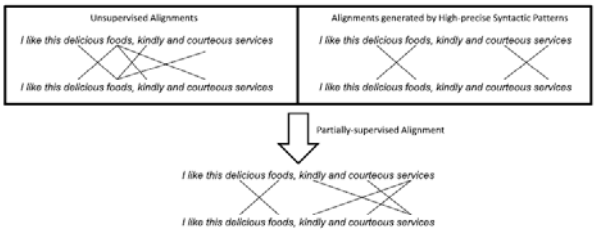

Fig2

3. To alleviate the problem of error propagation, we resort to graph co-ranking. Extracting opinion targets/ words is regarded as a co-ranking process. Specifically, a graph, named as Opinion Relation Graph, is constructed to model all opinion target/word candidates and the opinion relations among them. A random walk based co-ranking algorithm is then proposed to estimate each candidate's confidence on the graph. Then penalize high-degree vertices to weaken their impacts and decrease the probability of a random walk running into unrelated regions on the graph. Meanwhile, calculate the prior knowledge of candidates for indicating some noises and incorporating them into our ranking algorithm to make collaborated operations on candidate confidence estimations. Finally, candidates with higher confidence than a threshold are extracted.

II. METHODOLOGY

A noun/noun phrase can find its modifier through word alignment. Partially-supervised word alignment model performs word alignment in a partially supervised framework. After that, obtain a large number of word pairs, each of which is composed of a noun/noun phrase and its modifier. Then calculate associations between opinion target candidates and opinion word candidates as the weights on the edges.

For the second problem, exploit a random walking with restart algorithm to propagate confidence among candidates and estimate the confidence of each candidate on Opinion Relation Graph. More specifically, penalize the high-degree vertices according to the vertices' entropies and incorporate the candidates' prior knowledge. In this way, extraction precision can be improved.

The proposed method can be implemented as follows:

1. First extract Opinion targets and opinion words from given dataset.
2. Capture opinion relations between opinion targets and opinion words
   - Word alignment Model(WAM)
   - Partially Supervised WAM (PSWAM)
   - Calculating opinion association among words
3. Estimating candidate confidence with graph co ranking
   -Random walking
   -Penalizing on high degree vertices
   -Calculating candidates prior knowledge

INPUT: Online customer reviews

PROCESSING:

1. Extract opinion targets and words
2. Construction of bipartite graph (opinion relation graph).
3. Apply graph based co-ranking algorithm to estimate confidence.
4. Assign confidence to each candidate.
5. Apply WAM and PSWAM.
6. Calculate opinion associations.

OUTPUT: Opinion relations and associations among words and targets.

III. LITERATURE SURVEY

In the existing system partially supervised alignment model (PSWAM) is used to capture opinion relations and calculate the opinion associations between opinion targets and opinion words. Extraction of opinion words and targets [3] is the key concept for relevance. Reviews that are given online can be domain specific or independent, so for extraction of opinion features IEDR method is used [2] which spots the difference in opinion feature statistics across two corpora, one domain-specific corpus and one domain-independent corpus. Monolingual model is used to capture opinion relations and calculate the opinion associations between opinion targets and opinion words [4]. There are many significant research efforts on opinion targets/words extraction (sentence level and corpus level). Mining Hu and Bing Liu [2] Proposed a system that performs the summarization in two main steps: feature extraction and opinion orientation identification. The inputs to the system are a product name and an entry page for all the reviews of the product. The output is the summary of the reviews. Ana-Maria Popescu and Oren Etzioni [3] This paper introduces OPINE, an unsupervised information extraction system which mines reviews in order to build a model of important product features, their evaluation by reviewers, and their relative quality across products. F. Li, C. Han ET AL [4] published a paper In which, they focused on object feature based review summarization. Different from most of previous work with linguistic rules or statistical methods formulated the review mining task as a joint structure tagging problem and proposed a new machine learning framework based on Conditional Random Fields (CRFs). Kang Liu, Liheng Xu, Jun Zhao[3] published a paper that proposed a novel approach to extract opinion targets based on word based translation model (WTM). At first, they applied WTM in a monolingual scenario to mine the associations between opinion targets and opinion words. Then, a graph based algorithm is exploited to extract opinion targets.

IV. CONCLUSION

This project proposes a novel method for co-extracting opinion targets and opinion words by using a word alignment model. Our main contribution is focused on detecting opinion relations between opinion targets and opinion words. Compared to previous methods based on nearest neighbor rules and syntactic patterns, in using a word alignment model, our method captures opinion relations more precisely and therefore is more effective for

opinion target and opinion word extraction. Next, we construct an Opinion Relation Graph to model all candidates and the detected opinion relations among them, along with a graph co-ranking algorithm to estimate the confidence of each candidate. The items with higher ranks are extracted out. The experimental results for three datasets with different languages and different sizes prove the effectiveness of the proposed method.

V. ACKNOWLEDGMENT

The heading of the Acknowledgment section and the References section must not be numbered.

Causal Productions wishes to acknowledge Michael Shell and other contributors for developing and maintaining the IEEE LaTeX style files which have been used in the preparation of this template. To see the list of contributors, please refer to the top of file IEEETran.cls in the IEEE LaTeX distribution.

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