ISSN: 2321-7782 (Online)
Volume 3, Issue 3, March 2015
International Journal of Advance Research in Computer Science and Management Studies
Research Article / Survey Paper / Case Study
Available online at: www.ijarcsms.com

Review on Identifying Features in Opinion Mining via Intrinsic and Extrinsic Domain Relevance

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Abstract: This paper presents a method for identifying an opinion topic, given a sentence from online news media texts. We introduce an approach of exploiting the semantic structure of a sentence, anchored to an opinion bearing verb or adjective. This method uses semantic role labeling as an intermediate step to label an opinion holder and topic using data from Frame Net. Posting comments on social networks using second screen

The simplicity of microblogs makes Twitter among the preferred social services used by the TV audience to share messages about TV shows and movies. We decompose our task into three phases: identifying an opinion-bearing word, labeling semantic roles related to the word in the sentence, and then finding the holder and the topic of the opinion word among the Labeled semantic roles.

Keywords: Opinion mining, Semantic;

I. INTRODUCTION

OPINION mining (also known as sentiment analysis) aims to analyze people's opinions, sentiments, and attitudes toward entities such as products, services, and their attribute Sentiments or opinions expressed in textual reviews are typically analyzed at various resolutions. For example, document-level opinion mining identifies the overall subjectivity or sentiment expressed on an entity (e.g., cellphone or hotel) in a review document, but it does not associate opinions with specific aspects (e.g., display, battery) of the entity. This problem also happens, though to a lesser extent, in sentence-level opinion mining, as shown in Example 1.1. Example:- "The exterior is very beautiful, also not expensive, though the battery is not very durable; I still firmly recommend this cellphone." Although Example 1.1 expresses an overall positive opinion on the cellphone, it also contains conflicting opinions associated with different attributes or aspects of the cellphone.

The opinion orientations for the "cellphone" itself and its "exterior" are positive, but the opinion polarity for the aspect of "battery" is negative. Such fine-grained opinions may very well tip the balance in purchase decisions. Savvy consumers nowadays are no longer satisfied with just the overall opinion rating of a product. They want to understand why it receives the rating, that is, which positive or negative attributes or aspects contribute to the final rating of the product. It is, thus, important to extract the specific opinionated features from text reviews and associate them to opinions. In opinion mining, an opinion feature, or feature in short, indicates an entity or an attribute of an entity on which users express their opinions. In this paper, we propose a novel approach to the identification of such features from unstructured textual reviews.

Identifying opinion holders is important especially in news articles. Unlike product reviews in which most opinions expressed in a review are likely to be opinions of the author of the review, news articles contain different opinions of different opinion holders (e.g. people, organizations, and countries). By grouping opinion holders of different stance on diverse social

and political issues, we can have a better understanding of the relationships among countries or among organizations. Our method is summarized as follows: First, several syntactic dependence rules are used to generate a list of candidate features from the given domain review corpus, for example, cellphone or hotel reviews. Next, for each recognized feature candidate, its domain relevance score with respect to the domain-specific and domain independent corpora is computed, which we termed the intrinsic-domain relevance (IDR) score, and the extrinsic domain relevance (EDR) score, respectively. In the final step, candidate features with low IDR scores and high EDR scores are pruned. We, thus, call this interval thresholding the intrinsic and extrinsic domain relevance (IEDR) criterion. Evaluations conducted on two real-world review domains demonstrate the effectiveness of our proposed IEDR approach in identifying opinion features.

II. LITERATURE REVIEWS

a) Opinion Mining

Opinion Mining Opinions and sentiments expressed in text reviews can be generally analyzed at the document, sentence, or even phrase (word) levels. The purpose of document-level (sentence-level) opinion mining is to classify the overall subjectivity or sentiment expressed in an individual review document (sentence).

As for opinion topic identification, little research has been conducted, and only in a very limited domain, product reviews. (Hu and Liu, 2004; Popescu and Etzioni, 2005) present product mining algorithms with extracting certain product features given specific product types. Our paper aims at extracting topics of opinion in general news media text. An attempt to detect earthquakes using Twitter users as social sensors was carried out by in (Sakaki, Okazaki, and Matsuo 2010). The temporal aspect of an event was modeled as an exponential distribution, and the probability of the event was determined based on the likelihood of each sensor being incorrect. (Becker, Naaman, and Gravano 2010) tackled event detection in Flicker. Opinion feature extraction is a sub problem of opinion mining, with the vast majority of existing work done in the product review domain.Allen et al. (Allan, Papka, and Lavrenko 1998) used a modified version of TF/IDF and also penalized the threshold by the time distance between the document and the event. Since future document features are not known, such online clustering algorithms need to estimate IDF. While Allen et al. (Allan, Papka, and Lavrenko 1998) use an auxiliary dataset to estimate IDF, Yang et al. (Yang, Pierce, and Carbonell 1998) propose an incremental IDF factor. Yang et al. consider a time window and also a decay factor for the similarity between documents and events based on the time difference. Yang et. al (Yang, Pierce, and Carbonell 1998) proposed an agglomerative clustering, GAC (augmented Group Average Clustering) to extract retrospective events in the corpus. They also applied an iterative bucketing and re-clustering model proposed by Cutting et al. (buc) to compromise between cluster quality and computational efficiency. Li et al. (Li et al. 2005) proposed a probabilistic model for RED. And use Expectation Maximization (EM) algorithm to maximize log-likelihood of the distributions and learn the model parameters. Such algorithm requires the number of events to be given which is difficult in practice. Li et al. computed an estimation of event counts from the article count-time distribution. While most of event detection models use similar algorithms, many variations of the document representation, distance or similarity metrics, and clustering algorithm are proposed in the literature (Kumaran and Allan 2004; Brants, Chen, and Farahat 2003; Yang et al. 2002; Lam et al. 2001). Mory et al. (Mori, Miura, and Shioya 2004; 2006) used features extracted from the KeyGraph (Ohsawa, Benson, and Yachida 1998) in which each maximally connected component, which is called a foundation or basic concept, is chosen as a document feature.

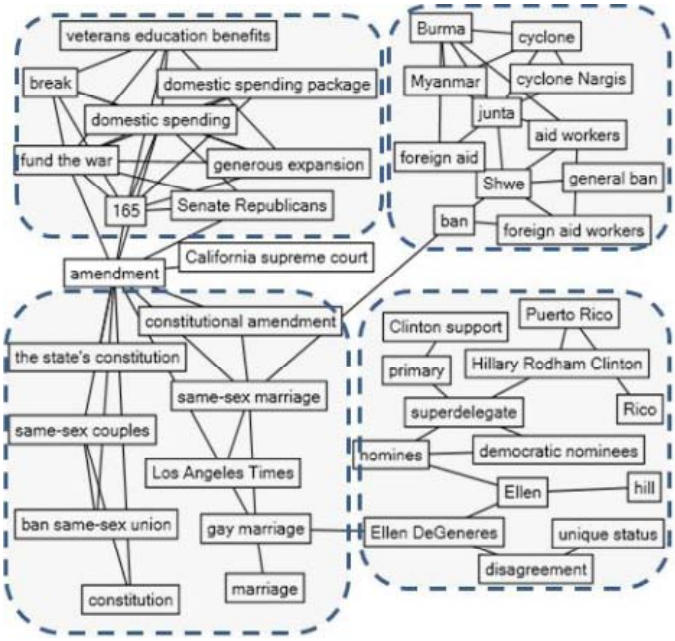

Figure 1: A sample of the KeyGraph and communities of Keywords

Documents represented with basic concepts, were clustered by a single-link clustering algorithm. Toda et al. (Toda and Kataoka 2005) and Sayyadi et al. (Sayyadi, Salehi, and Abolhassani 2006) have also proposed Label-Based clustering algorithms for search result clustering of news engines to overcome the performance issue of ordinary Cluster-based clustering models.

b) Semantic Role Labeling

Semantic role labeling is the task of identifying semantic roles such as Agent, Patient, Speaker, or Topic, in a sentence. A statistical approach for semantic role labeling was introduced by (Gildea and Jurafsky, 2002). Their system learned semantic relationship among constituents in a sentence from FrameNet, a large corpus of semantically hand-annotated data.

c) Finding Opinions and Their Holders and Topics

For the goal of this study, extracting opinions from news media texts with their holders and topics, we utilize FrameNet data. The basic idea of our approach is to explore how an opinion holder and a topic are semantically related to an opinion bearing word in a sentence. Opinion Feature Extraction Opinion feature extraction is a sub problem of opinion mining, with the vast majority of existing work done in the product review domain. we consider an opinion-bearing (positive/negative) word is a key indicator of an opinion. Therefore, we first identify opinion bearing word from a given sentence and extract its holder and topic. The goal of our experiment is first, to see how our holder and topic labeling system works on the FrameNet data, and second, to examine how it performs on online news media text.

III. Conclusions And Future Direction

This paper presented a methodology to identify an opinion with its holder and topic given a sentence in texts. The system is based on a battery of one-class classier for the matching between tweets and TV programs.

We introduced an approach of exploiting semantic structure of a sentence, anchored to an opinion bearing verb or adjective. we presented a novel approach to detect events in informal and high volume Twitter streams. The results demonstrate that the proposed approach can handle the informality of language in Twitter streams, through the use of compression distance.

For future work, we will employ fine-grained topic modeling approach to jointly identify opinion features, including non-noun features, infrequent features, as well as implicit features. Event detection has several potential applications, which we intend to investigate as part of our future work.

ACKNOWLEDGMENT

We would like to thank all the authors of different research papers referred during writing this paper. It was very knowledge gaining and helpful for the further research to be done in future.

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