



## Comparative Analysis of Deep Learning Techniques for Aspect Level Opinion Mining

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**Abstract** - Customer reviews seek to determine algorithmically the product aspects and their equivalent views from a assortment of opinions. Therefore, it is very important to create methods for the e-commerce, online shopping of online going to places of interest, which are very important to analyze the good amount of social data that are present on the Web routinely. Opinion mining is defined as mining and analyzing routinely from the text, big data and talk of opinions and reviews by means of various methods, views, emotions, and opinions. In this paper, different deep learning techniques are compared and discussed for mining online reviews those are placed by customers. Our major theme is the establishment of a scheme to analyze opinions that involve judging various consumer products.

### KeyTerms:

Aspect level opinion mining, customer reviews, deep learning, sentiment analysis, opinion mining

extraction and mapping of aspects and their opinions.

Sentiment analysis is a method for tracking the customer's observations of the item or subject. The sentimental analysis, also known as opinion mining, includes a framework for compiling and examining opinions about the topic of entries in the blog, remarks, audits or tweets. Analysis of feelings could in some ways be helpful. Case by case, it helps in judging how the news is sent, which forms of an item or direction are important, and which demographics like or dislike certain characteristics are even recognized.

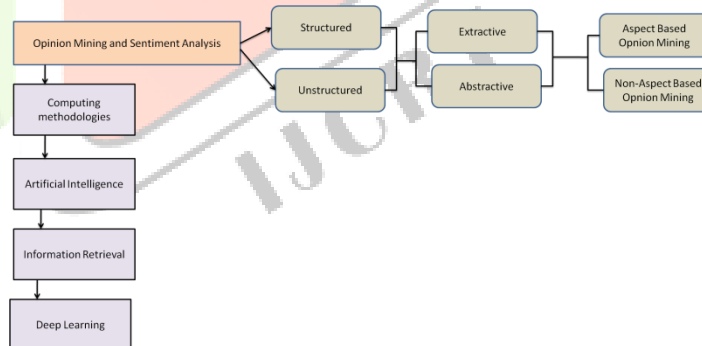


Fig1 Aspect Level Opinion Mining Framework

Opinion Mining is the science that merges computer-language techniques with data acquisition and deals with opinions expressed in the text rather than topics. Opinions on many issues are written, such as products, subjects, persons, etc. We determine the holder's focus on any subject which may be a compilation of features or mechanism or attributes. Customer review aspect-based opinion mining is a difficult issue to explore opinions and feelings.

This research contributes to comparison of different techniques, extracting product aspects and opinions through natural language processing (NLP) in supervised and unchecked knowledge techniques from customer reviews. The data is mined, machine learned, linguistic and statistical techniques and Association Rule Mining are carried out through, in which a number of rules based on NLP techniques are produced [1]. This study also proposed the conditional random field to include a series of feature functions that improved the

Based on the type of participation data, the framework is divided into two classes. The primary category is a structured summary opinion categorized according to the methods of summary extractive or abstractive as shown in Figure 1. The aspect or non-aspect extraction is further categorized. In unstructured summarization of opinions, the same division is used [2]. The intend of this research is to discover the aspect of abstract summaries, such as customer reviews, of unstructured data.

Summarizing views on aspects is a systems process consisting of three basic tasks illustrated in the Figure 2.

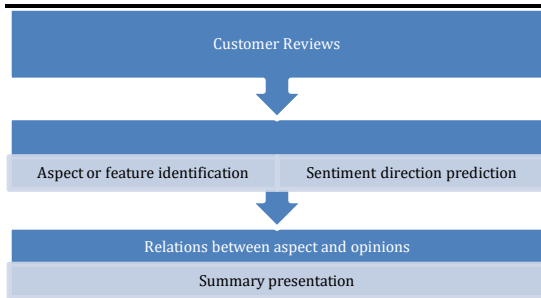


Fig 2 Aspect Level Opinion Mining Overview

## LITERATURE SURVEY

In the analysis of the problem feeling, Liu states that his view is "a fivefold article, Aspect, Orientation, Opinion Holder and Time" [Liu, 2010]. The name of the entity is an entity that may refer to a product. The feature may be an entity function, module or feature. The guidance is the view on the entity and/or the feature that the estimation holder gave at a particular instance.

Opinion from other parties can greatly influence and provide guidance in decision-making through [Tuzhilin, 2012] to governments; social communities, individuals and organisations. Opinions enable humans to combine various experiences, approaches, knowledge and wisdom in decision-making. It is natural for people to participate and express their views [Moghaddam, 2013].

For identification tasks of the category, the best performing restaurant systems were NRC-Canada (Kiritchenko, Zhu, Cherry, and Mohammad, 2014) and UNITOR (Castellucci, Filice, Croce, & Basili, 2014). Five categories were used for the restaurant domain for describing the review phrase (food, price, service, atmosphere and different anecdotes). This task has thus been indulged by NRC Canada as an multi-label classification problem in which five SVM classifiers have been trained (one-vs.-all).

The effort of Jiménez-Zafra, Martín-Valdivia, Ureña-López and Martínez-Cámara is a follow-up study that used the identical dataset of SemEval2014-ABSA (2015). A continuation of the 2014 work is SemEval2015-ABSA (Pontiki, Galanis, Papageorgiou, Manandhar & and Androutsopoulos, 2015). Specific categories with entities be used in this task area for the annotation of reviews.

The work accessible in SemEval2016-ABSA based on Task5 is quite recent research (Pontiki et al., 2016). A mentioned Arabic dataset of hotel reviews was interpreted for the assignment needs and basic research using SVM with N-gram functionalities was provided (AL-Smadi, Qawasmeh et al., 2016)

Most investigations so far focus on the extraction of functionalities and the classification of feelings of features.

There has been little work on item removal, classifying feelings for reviews, classifying sentiment on items and comparing items and functions.

In our assessment of online consumer assessment to the assistance of consumers, product distributors and artifact manufacturers, we consider that comparison of products and

features of facts is significant and imperative [3]. It is very useful to have a visual chart or table that shows on a glance the benefits and drawbacks of competing products and services. Instead of passing enormous time through infinite reviews on various websites, the advantages and disadvantages of a product to its direct competition products are quickly known [5,6].

We also identified that in the current literature on opinion mining and the classification of feelings the "Comparison of objects and features" field is the least studied academic data base. We therefore hope that both for ourselves and for other researchers, this can be the future direction of research.

## PROPOSED METHOD

In this section, we converse about proposed module for performing opinion mining comparison and what methods and algorithms we are available to use to execute Opinion Mining as well as Sentiment Analysis for getting functional information from online client reviews.

Aspects may, in the presence of aspect terms, be implicit or explicit. Implicit aspects of statements do not include terms of direct aspect. Rather, we need the words or expressions expressed in user reviews to acknowledge it. The next two phrases are mobile phone reviews.

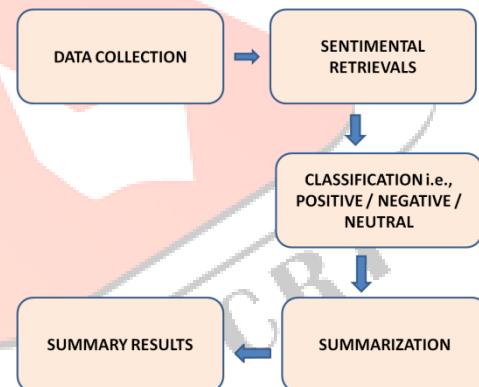


Fig 3 Proposed Method: Aspect Level Opinion Mining

To assess the performances of the proposed approach, we conducted sequence of experiments which aims to answers the subsequent questions:

- (1) What are then performances of the proposed approach in terms of aspects extractions and rating prediction?
- (2) In the cold start issue, what are the performances of the form?
- (3) What are the effects of the difference in parameter value?

Unsupervised learning: Embossed and unlabeled documents can simply be collected using unsupervised learning. Examples of unsupervised learning are LDA and PLSA, which means that unsupervised learning benefits from large volumes of evidence for accurate training.

Supervised learning: our main key to successful learning in the traditional topical classification is supervised learning and a satisfactory result has been adopted and investigated for opinion detection.

Semi-Supervised learning: It has been learned from examples of label data that learn labeling and un-labeling data, and new methods of machine learning in opinion mining. SSL is one of the most famous algorithms for self-training, modeling, co-training and multi-view learning.

Sentiment Model: A bag-of-words model is no longer enough for sentiment analysis, since the interaction and placement of words matter. Negative feelings for example are often not expressed through negative words, but through negative words. The recursive neural extensor network is an excellent model for this task.

### COMPARISION OF DIFFERENT ASPECT BASED OPINION MINING TECHNIQUES

Three major approaches of sentiment analysis for aspect level opinion mining are compared and analyzed. We know that the sentencing opinion mining technique consists of a unique opinion by a single public opinion holder, which in complex and composite sentences is unsuited to multiple opinions. This technique mainly consists of the evaluation of the subjected and thought-out properties, the positive, negative and neutral levels of sentences.

When the document is considered, it consists of a single opinion holder who is also posted, but is not suitable for the blog and the forum poster because it is not easy to deal with the whole task on a single basis with multiple opinions at different levels. It is also positive, negative and neutral. The focus is on single opinion holder, which is posted by a single object, when evaluating feature level data.

It can only be applied on one forum and blog and not for several blogs and posts because there are different opinions about different objects, so it is tedious to handle them. It determines whether the feature of the opinion of the subject is positive, negative and neutral in the group feature. Finally, it also extracted the views and features of objects based on commentary by the viewer.

Context Sensitive Lexicon Features and Hybrid CNN LSTM for Aspect based Sentiment Analysis is better among all three models with the f-measure 4-8%.

TABLE I

COMPARISION OF DEEP LEARNING APPROACHES

Author	Domain	Assessment task	Performance
M.Ramesh et al. (2020) [7]	Laptop, Restaurant reviews	Aspect recognition	Prediction = 61.8% aspect connectivity = 97.89%.
M.Ramesh et al. (2020) [8]	SemEval-2016 Laptop reviews	Aspect Category Recognition	accuracies for Training = 98.56% testing set = 99.2%.
M.Ramesh et al. (2020) [9]	SemEval 2016 dataset	aspect polarity	enhances the f-measure up to 4-8%
AminuDa'u et al. (2020) [10]	Amazon reviews	aspects extractions task.	F1 score performance = 83.86%

### CONCLUSION

In this paper we have highlighted the importance of sentiment analysis and opinion mining for the recovery in our day, based on their opinions, feedback from customers and various techniques to achieve this, for collecting relevant information from various sites. We have compared deep learning techniques and analyzed the results so that in future, by providing opinions and different rules and results from opinions mining techniques, we will improve the percentage of customers' feedback.

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