



## Opinion Mining: A Tool for Market Intelligence

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**Abstract:** For a long period of time marketers were exclusively dependent on the traditional marketing campaigns, including TV commercials, newspaper ads, posters and even radio commercials. These methods have served reasonably well in the past. As businesses expanded into new marketing categories, new technologies were adopted. During the past years social media has grown. Now days it is being used extensively by many businesses to promote their products and services through online advertisements. Companies are using social media tools such as Face book, Twitter etc to provide various services and interact with customers. Marketers are focusing on Voice of Customers strategy to better understand customer's wants and needs. Online communities, chat rooms, discussion groups, e- commerce sites, forums, product rating sites, web logs etc. have brought a tremendous change. These are being used by people to express their views and opinions on almost anything in discussion.[1] However it is tedious task for marketers to find the opinion sites on the web and to monitor them. The reason is there are large numbers of such diverse sites. These sites have voluminous text that expresses sentiments and opinions. In addition to this information is in unstructured form, disorganized and is buried in lengthy forum blogs. Therefore it becomes complicated for a person to find appropriate sites, dig out related sentences expressing opinions, read them, summarize them and arrange them into utilizable forms [2]". Thus we need automated mechanisms for opinion detection and summarization systems.

Opinion Mining can be defined as a computational study of emotions, opinions and sentiments uttered in text. In the past few years, this technique has attracted an immense amount of attentions due to many challenging research problems and an extensive range of applications. Many opinion mining tools are in market today that can be used to mine emotions from the text. This research opts at exploring how Opinion Mining technology can be used as a tool to achieve market intelligence.

**Keywords:** Opinions, Opinion Mining, Sentiment Analysis, Marketers, Market Intelligence

### I. INTRODUCTION

Market Intelligence is the process of obtaining and analyzing information to understand the market (i.e. existing and potential customers), to determine the present and future needs and preferences of the consumers and to judge changes in the business environment that may influence the size and nature of the marketplace in the future.[3] In other words Market Intelligence is the information relevant to a company's markets, collected and investigated exclusively for the purpose of correct and confident decision-making to determine market opportunities, market penetration strategies, and market development metrics[4].

Through social media, consumer engagement takes place in a real time. They have a huge resource of social media content available that can assist them in purchase decision making. They are not only the consumers of such information but in turn, actively annotate this content and generate new pieces of information. This type of interaction offers a great opportunity for market intelligence. But, Volume, Variety, Velocity & Veracity are the inherent challenges in such data; marketers find difficulty in harnessing, analyzing and interpreting it.

Opinion mining is a technique for extracting and analyzing textual data on the internet. For marketing purpose opinion mining presents an efficient and effective evaluations of customers opinions in real-time. It allows for data collection and data analysis from a very large number without hindrances, obstructions and time delays. Marketers can also collect feedback on feelings and opinions in the real time without having to invest in long and expensive market research activities. All that the strategy is to monitor what people are saying online, their opinions, their praises, their complaints, their questions, and basically everything else that goes on about the business, industry, and competitors. Recently, many researchers have focused on this area.

This research paper focuses to help companies and marketers in particular to understand implications of opinion mining in their marketing strategies.

### II. BACKGROUND

Textual information can be broadly classified into two major types: factual and opinionated. Factual information is objective expressions regarding entity, their components and their properties. Opinionated information is typically subjective expressions that explain people's feeling and emotions towards entities, their components and their properties.

**Definition of Opinion:**

An Opinion is a belief, judgment or what a person thinks about a particular thing. It is not necessary that it should be based on fact or knowledge.

**Basic Terminologies:**

**Object and Features:**

Opinions are always expressed on target entity. This target entity can be an individual, product/service, an organization etc. An entity / object have a set of components and attributes. E.g. A laptop is an entity /object. Keyboard and speakers are its components and size, processing speed and voice quality are its features. Opinions can be expressed on an entire object or on any of its component or features.

The attributes / components of an object on which opinions are uttered can be explicit or implicit. Explicit attributes are the attributes whose names openly appear in the opinion expressed. E.g. the processing speed of this laptop is very slow. In contrast implicit attributes does not appear in the opinion expressed. E.g. this laptop is too heavy. This opinion is expressed on feature “weight”.

**Opinion Holder:**

Opinion holder is the one who expresses the opinions. It can be a person or an organization.

**Opinion and Orientation:**

Positive, Negative or Neutral opinion on Object or feature from an opinion holder is called as opinion orientation. It can be either direct or comparative.

**Opinion strength:**

It is intensity of opinion suggesting how strong it is.

**Model of an Opinion:**

An opinion on a feature F (or object O) is a positive, negative or neutral view on F (or O) from an opinion holder.

An opinion is a quintuple (Oj, Fjk, OOijkl, hi, t) where:

Oj: is a target object (a product, person, event, organization or topic)

Fjk: is a feature (aspect) of the object Oj (a component, part or attribute of an object).

OOijkl: is the sentiment value of the opinion (Positive, Negative, Neutral).

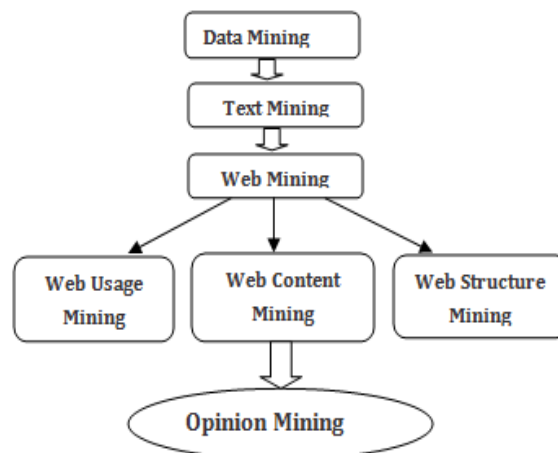
Hi: is an opinion holder (person /organization that expresses the opinion).

T1: is the time when an opinion is expressed.[5]

**Opinion Mining:**

Opinion Mining is a growing field that has its roots in natural language processing, text mining and computational linguistics. It is a mechanism to extract opinions from unstructured documents and discover its polarity whether it is positive, negative or neutral. But with the passage of time more challenging applications and expansions came into existence. Today it’s most central aim is to make computer able to intelligently identify and generate emotions like human.

**Evolution of Opinion Mining:**



**Levels of Opinion Mining:**

Opinion Mining can be done on:

**1. Document Level:**

At document level entire document (e.g. blogs, emails) is analyzed to identify whether it expresses any opinions (subjectivity detection) and polarity of the opinion.

## **2. Sentence Level:**

At a sentence level individual sentence is identify if it is opinionated and its polarity.

## **3. Attribute Level:**

Extract the attributes of the object (e.g. image quality, zoom size) and identify its opinion orientations i.e. whether it is positive, negative or neutral.

### **Challenges in Opinion Mining:**

According to G.Vinodhini and RM.Chandrasekaran, [6], following are challenges that make the task of opinion mining complex.

1. Opinion words are domain dependent i.e. in one case / domain they are considered positive whereas in other case it might represent negative valence.
2. People always express opinions in different ways.
3. People can be of contradictory views while giving opinions.
4. Reviews can have both positive as well as negative comments.
5. Due to lack of context and short text, it becomes difficult to understand what someone is thinking.

### **Existing Techniques for Opinion Mining:**

There are two methods to perform Opinion Mining. They are Supervised (Machine Learning) or Unsupervised (Natural language Processing).

#### **1. Machine Learning:**

In machine learning approach, using training data predictive models (e.g. decision trees) are built. This model is then used to predict the polarity of other documents outside the training set.

The main advantage of this approach is that it is based on learning patterns. Algorithms are talented enough to discover unimagined and complex patterns. Its drawback is that it requires a huge amount of training data to build the model. Validating the model is also consumes more time and is challenging. Every document and each attribute of a document is required to be rated which requires more time. An additional hurdle and unexpected errors arises if different reviewers allot two different opinion ratings to the same document. This affects on the accuracy of the model built.

#### **2. Natural language Processing Approach:**

Natural language processing has its roots in artificial intelligence. It deals with extracting meaning from natural language text automatically. It uses entity recognitions, syntactic patterns and semantic analysis to understand its meaning. In addition it makes use of language dictionaries and linguistic constructs like parts of speech, noun phrases and language operators.

The advantage of this method is that it provides independence for the rule developers to design their own rules for analysis purpose. These rules may vary from domain to domain. This method is completely unsupervised hence it does not require any training data. To adjust the models it provides the ability to improve the rules eventually based on the comments from analysts or subject-matter experts. The drawback of this approach is that they need a lot of human involvement and participation to develop the rules and it fully relies on the domain knowledge of rule developers.

### **Applications of Opinion Mining:**

Application of opinion mining can be in online advertising, competitive intelligence, summarizing and analyzing reviews of customers, detection of hotspots in forums, filtering sentiments in online messages, classifying mail sentiments, determining the attitude of web blog's author, detection of flames etc. [6]. It is a powerful technology that can be applied to a number of problems in domains like Security, Business Intelligence, Market intelligence, Crime Prevention etc [7].

### **Opinion Mining Tools**

There is a plethora of practical tools and applications available that translate user-generated content into a clear structure. A wide range of programs and tools allows screening this content for opinions, issues and general comments with respect to a brand or product. The majority of these tools offers a full-service package, which consists of general monitoring applications to measure the number of fans or count the number of likes, but also provides a more detailed analysis to gauge, for example, sentiment. This information is then often displayed in charts and tables so that companies receive an immediate overview of their current online reputation. Most of these tools come with a cost, but free tools are available as well.

The market of opinion mining tools is crowded with solution providers. Most of these applications are geared towards analyzing customers' feedback about products and services, and therefore skewed towards sentiment analysis that detects positive/negative feelings by interpreting natural language. The main feature of sentiment analysis tools is to convert unstructured text into structured data. By using combined approach of statistics and linguistics it provides for more accurate sentiment analysis results. It determines the context of the conversation and find out whether it is positive or negative. Thus it makes possible to look for trends, send alerts and perform predictive analysis. It not only evaluates sentiments but also monitor its changes over time. It provides for easy to use interface for model development to directly upload sentiment analysis models.

### III. CONCEPTUAL FRAMEWORK OF OPINION MINING FOR MARKET INTELLIGENCE

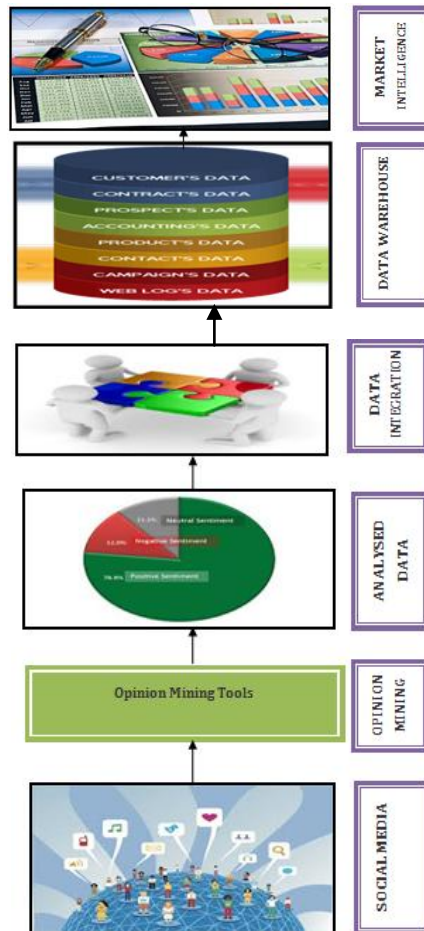


Fig1: Conceptual Framework of Opinion Mining for Market Intelligence

Social Media data i.e. from Social Networking Sites, Micro blogging, Multimedia Sharing, Reviews & Opinions, Social Bookmarking, Blogging, Forums etc, which is in qualitative form, are extracted and passed as an input to opinion mining tools. Opinion mining tool will work on the text provided to determine the polarity of the text and deeper sentiments and this result will be stored in a database for future reference. This analyzed data after preprocessing is integrated into a data warehouse environment, where it is used with quantitative data to generate market intelligence reports.

### IV. IMPLICATIONS FOR MARKETERS

Opinion mining technique will facilitate marketers in the following areas:



Fig. 3: Implications for Marketers

1. **Market Description:** To understand who the customers are? What are they saying about your products/services? What kind of profile do they have? Where are they?
2. **Market Profiling and Segmentation:** It will assist in identifying customers and non-customers of your products/services. It also helps understand of how these customers are interacting. (E.g. How repeatedly do they purchase, how much they purchase, and when do they purchase).
3. **Purchase Process Tracking:** By monitoring the opinions, suggestions and queries on social media, marketers can determine where the customer is in product adoption process.
4. **Customer Intention and Purchase analysis:** Intent to purchase is the conversation that happens online indicating intent to purchase a product/service. Opinion mining can be helpful to understand what the customer is looking for.
5. **Customer Attitudes and Expectations:** It helps to determine, does the product meet customer expectations? This will help marketers in Improve ads, customer conversion, commitment and loyalty.
6. **New Product Concept Analysis:** This analysis is done to test the success of a new product idea before it is marketed. Opinion mining will guide marketers to gain feedback from customers on new product specific implementations such as packaging, advertising, sales approaches, product information, distribution, and pricing. It can help to identify the perceptions, wants, and needs of the product and service. It can also provide necessary information for developing the product and its promotion, distribution, and pricing.
7. **New Product Acceptance and Demand:** By monitoring the opinions, marketers can gain an understanding on whether their new product is being accepted, and what is the likely demand for the same.
8. **Customer Trust, Loyalty – Retention Analysis Survey:** A customer loyalty is a measure of how committed your customers are in continuing to do business with you.
9. **Habit and Usage Surveys:** Opinion mining can help in understanding habit situations, including where, when and how the product is used.
10. **Product Fulfillment Analysis:** Whether our product is fulfilling customers' needs and what are the promised attributes and features (tangible / intangible) of products.
11. **Competitive product and market positioning:** It refers to what sets your product, service and company apart from your competitors. Opinion mining can be helpful to obtain this data.
12. **Brand Equity Analysis:** Opinion mining can be useful to find out what is emotional value of customers towards your brands in the marketplace?
13. **Advertising value identification and message effectiveness:** It can be used to identify the impact of advertising on moving the customers to a final purchase decision stage.
14. **Sales Force Effectiveness:** To understand the effectiveness of sales force performance.
15. **Sales lead Generation:** Sales leads are not clients; they are the possible clients. A sales lead is any person who has expressed intent to purchase in product / service. Opinion mining can be used to keep a track of customers who are enquiring and willing to purchase product.
16. **Customer service Survey:** Opinion mining can be helpful to focus on the actual customer service that was received, the process involved in receiving that service.
17. **Sales forecasting and Market tracking:** Estimating sales and customer choice preference based on current voice of customers.
18. **Price setting:** It can be helpful to estimate demand elasticity and optimal price settings

## V. CONCLUSION

Opinion mining technologies can be used as a support tool to get firsthand knowledge on market reception of its products and services, those of competitors to enable analysts to develop insights on consumer opinions. It can assist in diverse market intelligence tasks such as sales prediction, reputation management, threats analysis from competitors and enterprise risks, support decision making and risk management, design new products, and marketing strategies. This ultimately increase returns on business investments.

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