A Novel Method of Brain Inspired Sentiment Analysis

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Abstract

Our day-to-day life has always been influenced by what the other people think about any topic, product, or problem. Sentiment Analysis is also called opinion mining. It is attached with the feelings (i.e., attitudes, emotions, and opinions) behind the words and in more with its clarification of data. It is the type of NLP (Natural Language processing) that is the field of computer science, artificial intelligence, and linguistic concerned with the interactions between computers and natural (human) language. An important part of our information-gathering is always been to catch out what other people opinion about particular product, topic, or problem. For a product or item, it's thinking that leads to a decision, where a product stands. An identification of sentiment is often exploited for detecting polarity; however the two fields are usually combined under the same umbrella or even used as synonyms. Both fields use data mining and natural language processing(NLP) techniques to discover, retrieve and distil information and sentiments from the World Wide Web's that is vast textual information. Thus this paper discusses about sentiment analysis the techniques and tools.

Index Terms— *Sentiment Analysis, Data Mining, NLP approach, Text Mining, Web Mining, People Opinion, Text Mining*

I. INTRODUCTION

With the rapid evolution of digital information and an automated system in every field of life tends to generate data. In the different field it produced a numerous volumes of data as a result like science, engineering, medical, marketing, finance, demographic, etc[1]. WWW-World Wide Web provides an extensive amount of information with the help of internet, but to asset relevant information is difficult. In customer relationship management (CRM), web mining is the integration of information collected by long-established data mining methodologies and approaches or techniques with information gathered over the World Wide Web [2]. According to analysis or investigation targets, web mining can be divided into three different types:
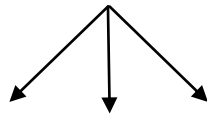
Web Usage   Web content   Web structure

Figure 1: Web Mining Types

Web usage mining is the process of finding out what users looking for on the internet. It obtains workable information from server logs. Web structure mining is the process of using graph theory to analyze or examine the node and connection structure of a web site. Web content mining is the mining, extraction, integration of usable data, information and knowledge from web page content. Contents from web as semi-structured data or an unstructured data. Text mining is an interdisciplinary mechanism worn in different fields like machine learning, information retrieval, statistics, and computational linguistics. Sentiment analysis (also known as opinion mining) point out to the use of natural language processing (NLP), text analysis and computational linguistics to identify and extract subjective information in source material. Generally speaking, tender feeling inquiry (sentiment analysis) purpose to determine the attitude of a speaker or a writer with respect to some topic or an overall contextual polarity of a document. For example, a review on a website might be broadly favorable about a digital camera, but be specifically unfavorable about how heavy it is. A thought, view or attitude based on emotion instead of reason is called sentiment [1]. Figure 2 has the hierarchy of Data Mining and the categories of how opinion mining.

Data Mining

⇩

Text Mining

⇩

Web Mining

⇩

Web Usage   Web Content   Web Structure

⇩

Sentiment Analysis
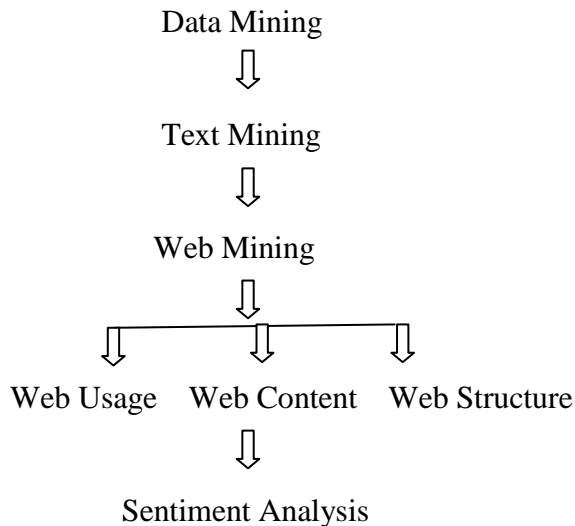
Figure 2: Data Mining Hierarchy

II. Literature Survey

Siddhi Patni1,Avinash Wadhe2 (2014), tells about the apps using in smart phones and how to improve the app performance on the basis of overall opinions and rating .Data mining and natural language processing (NLP) techniques are used to discover, retrieve, and distil information and opinions from the World Wide Web's vast textual information.

G.Angulakshmi1, Dr.R.ManickaChezian2 (2014), gives the idea about an analysis on opinion mining: techniques and tools and tell about the sentiment analysis/opinion mining workflow where preprocessing, feature extraction, etc phases are described. Different levels of Opinion mining/sentiment analysis techniques, levels, tools are discussed.

Pravesh Kumar Singh1, Mohd Shahid Husain2 (2014), provided an attempt to review and evaluate the different techniques used for opinion and sentiment analysis. It defines the different methods that are applicable in different area like SVM (Support Vector Machine) technique is applied for biological reviews and analysis, Clustering is applied for movie reviews.

Erik Cambria, Daniel Olsher, Dheeraj Rajagopal (2014), term SenticNet3 is used to extend the common and common-sense knowledge representation to one another. Basically SenticNet3 builds on the energy-based COGBASE commonsense knowledge formalism to provide semantics and sentics for 30,000 multiword expressions. It developed various novel techniques and tools to allow SenticNet3 easily merged and extract common-sense knowledge.

Richa Sharma1, Shweta Nigam2 and Rekha Jain (2013), This survey paper gives an overview of the supervised techniques that classify the sentiments as positive or negative. It proposed a method which utilizes completely prior knowledge-free supervised machine learning method.

Ayesha Rashid1, Naveed Anwer2, Dr. Muddaser Iqbal3, Dr. Muhammad Sher4 (2013), it tells about to covers the techniques, applications, research areas, Research gaps and future challenges in opinion mining. It gives the idea to future researchers for better understanding of numerous sentiment analysis models that are based on supervised, unsupervised and case based reasoning techniques.

Henrique Siqueira and Flavia Barros (2013), It presents a domain-free process for feature extraction, which is used for the construction of WhatMatter. This obtained a result satisfactory.Term Corpora is used to help the system's implementation and validation.

Ramandeep Sandhu and Rahul Mehta (2011) provided an effective system to organize opinions. Their proposed method designed a system to organize web opinions at the time when user is posting, before actually being extracted by expertise.

III. Data Source

User sentiment is a major criterion for the improvement/enhancement of the quality of services rendered of the deliverable[3]. Review sites, blogs, forums, social networks, data sets provide a good discern of the reception level of the products and services to the customers.

A. Review sites
Making a decision about any product or service conviction of others is being an important factor. A review site is a website where a huge number of user-generated ideas/opinions are available. Purpose of review is to appraise a particular product, object. Various e-commerce sites are available from where sentiment classification reviews are gathered like www.amazon.in, www.olx.com, etc.

B. Blogs
A Blog is a page. It consisting of individual or group of customer's record opinion, ideas, data and so on all the time. Sentiment analysis on blogs has been used to predict various subjects like governmental issues, travel, movie sales, and sale analysis.

C. Forums
Forum is a meeting or medium where ideas and views on particular issues can be exchanged. It is an online discussion group in which participants with common interests can exchange open messages. Using database allows us to do sentiment analysis in a single domain [3]. It is also refer to newsgroup or conference.

D. Data Set

We can take data set from many online sites like Flip kart, Amazon, that contains reviews that are posted by the customers on various appliances including Books, shoe, accessories, utensils and many more categories of product.

E. Social Networks

It is also called social networking site (SNS). An online service or site where individuals or number of peoples interact with each other to share ideas, thoughts, perceptions to expand one's business. Web sites dedicated to social networking that include Friendster, Linkedin, etc.

IV. Brain Inspired Sentiment Analysis

To enhance computing and networking power to manage the huge amount of information available, a new generation of ICT systems inspired by the operating principles of the brain has emerged with the advent of "Big data" and resulting need. Novel solutions toward improved information processing in computer networks/hardware are being addressed from a multidisciplinary approach, using knowledge from neuroscience and applying it to computer and network architecture. Stemming from the premise that the brain is an ideal model for information processing, in past decades we have witnessed multiple examples of bio-inspired systems, which have eased progress in different ICT areas [3]. To trace optimal or effective paths in communication networks, some examples are neuronal networks for learning systems or algorithms used. Neuroscientists are making game-changing perception in their understanding of the full-scale functional models of the brain, how the brain works nobody has a clear image, even less at the level of higher cognition—how we perceive or get, how we remember, how we act [3]. From the Recent advances in data treasure trove approach about the brains anatomic-functional organization and cognitive processes (for both humans and animals) have allowed the scientific community to start analyzing and understanding the brain's structure and its cognitive and transmission processes.

V. Techniques

Data mining techniques used to extract the knowledge and information are: classification, clustering, forecasting, generalization, sequence or path analysis, association rule mining, neural networks, data visualization, fuzzy logic, Naïve Bayesian (NB), maximum entropy, support vector machine (SVM). Figure 3 has the techniques of sentiment analysis.

Sentiment analysis

Supervised   Case Based Reasoning   Unsupervised
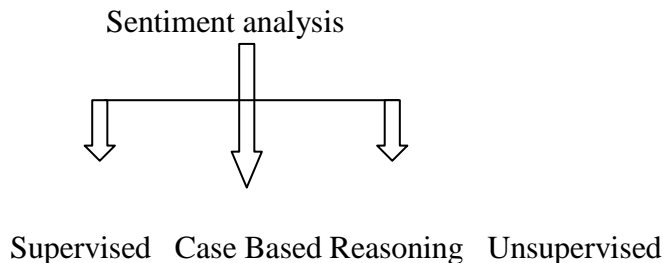
Figure3: Techniques of Sentiment Analysis

A. Supervised Machine Learning Approach

In general supervised classification technique and in particular text classification technique mostly belongs and machine learning approach applicable to sentiment analysis. Supervised learning (classification that requires supervised learning; the training data has to specify what we are trying to learn). Classification looking for a new patterns (May result in a change in the way the data is organized but that's ok). In a machine learning based classification, two sets of documents are required that are training set and test set [4]. Training set is used to learn differentiating characteristics of documents and a test set is used to check the validation of document performance.

B. Case Based Reasoning

It is the procedure of solving a recent problems that are based on the solutions of similar chronologically problems. It can be used for classification and regression. It can be used when cases are more complicated. The solutions are stored in CBR repository and accessed when need to solve a new problem called knowledge base or case base [1]. It can be used a cycle of four tasks that are Retrieve, Reuse, Revise, Retain.

C. Unsupervised Learning

Clustering technique is used in unsupervised learning i.e., the training does not specify what we are learn. Clustering group together similar type of events or objects. Objects in one cluster not similar with the objects of another cluster. In unsupervised learning there has no explicit target output associated with input [6]. For example: to learn the POS (Parts of Speech) tag in a supervised fashion we need predefined inventory of POS and an annotated corpus.

VI. Tools Used in Sentiment Analysis

Sentiment analysis involves different tools that depend on the specific problem. There is no such open-source (software) tools dedicated to sentiment analysis, there are a variety of open-source text-analytics tools- text mining, natural language processing (NLP) for information extraction and classification can be applied.

A. Python NLTK (Natural Language Toolkit)

Python is a general purpose, high level programming language. It is works with human language data (text classification). It tell the text which we have enter is positive sentiment, negative sentiment, or neutral. It provides easy to use interfaces to over 50 corpora (is a plural form) and lexical resources such as WordNet. Only if the text is not neutral, it determines neutrality first, sentiment polarity second by using hierarchical classification.

B. Review Seer Tool

This tool is used to automate the work done by aggregation sites [1]. To collect positive sentiments and negative sentiments for assigning a score to the extracted feature terms Naïve Bayesian classifier approach (Supervised learning) is used.

C. Red Opal

Red Opal: Product-feature scoring from reviews. It enables users to locate products rapidly based on features. Fully automatic system examines prior customer reviews, identifies the product features and scores each product on each feature. It uses these scores to find which products to show when a user specifies a desired product feature.

D. Opinion Observer

This tool is used for analyzing and comparing sentiments on the web/internet using user-generated contents. It uses WordNet Exploring method to give prior polarity. It shows result in a graph format [1].

VII. Conclusion

Sentiment analysis is an emerging field of data mining used to extract the knowledge from large amount of data. The important part of gathering information always seem as, what the people think. The rising accessibility of emotion rich resources such as online analysis websites and blogs means that, one can simply search and recognize the sentiments of other. One can precise his/her ideas and sentiments concerning goods and facilities. These views are subjective which signify sentiments, opinions, emotional state or evaluation of someone.

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