Supervision of Product Quality by Factor: Satisfaction

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Abstract

Today's world is totally about satisfaction. Satisfaction of especially a customer is linked with- whatever product is used by a customer should be at top rank with all features and quality factors. In this way- we can reach at step that if want to calculate personal happiness factor of a person for a specific product then feel person's sentiments means emotions or feelings. Also organization products superiority is dependent on customer feedback of their products. Web platform provides facilities to post expressions in text for any product. A customer gives feedback when he uses a product and feedback is what customer feels after using it called sentiments/opinions. Sentiments are subjective sentences and not objective as facts. People uses natural language to express sentiments and way of expressing each customer is different. So, it's inevitable in current and future era to do track exactly sentiments so that, what customer is saying about a product whether enhancing reputation or not, will be posted on web. Mining of sentiments is required as sentiments posted for a trendy product can be in hundreds. . If these opinions not analyzed properly and have been thrown as is it is on web then it's not possible for anyone to read all opinion sentences

Inroduction

World's textual information can be classified as either facts or opinions. Facts are objective statements about entities and events in the world. Opinions are subjective statements that reflect people's sentiments or perceptions towards something. It is an assessment, judgment or evaluation of something. An opinion is not a fact, because opinions are either not falsifiable, or the opinion has not been proven or verified. Quality of a product may be defined as "its ability to fulfill the customer's needs and expectations".

Quality needs to be defined firstly in terms of parameters or characteristics, which vary from product to product. The group of features and characteristics of a saleable

product which determine its desirability and which can be controlled by a manufacturer to meet certain basic requirements. Most businesses that produce products for sale have a product quality or assurance department that monitors outgoing products for consumer acceptability.

Quality needs to be defined very firstly as parameters or characteristics, which differ from product to product. For example, for a electronic product these are performance, reliability, safety and appearance. For pharmaceutical products, parameters such as physical and chemical characteristics, medicinal effect, toxicity, taste and shelf life may be important. For a food product, they will include taste, nutritional properties, texture, and shelf life and so on.

Product quality is evidently the trade of everyone within a company, that is, the salesmen, designers, purchasing, stores and methods staff, plant engineers, tool personnel, production planning and production staff, operators, inspection and testing staff, packaging, and even dispatch should have an interest in maintaining quality. Indeed, if care is not taken, it ends up being nobody's business. Therefore, it is important to ensure that everyone is quality-conscious and that they all work together on matters related to quality.

A huge amount of opinions [9] on the web can be accessed with fast access of net. It's possible only with World Wide Web. It helps people in decision-making. Before the web, it was not possible. People have to meet their friends to make decision if want to purchase a new product. Organizations conduct surveys to find opinions of people about their product. With the web, opinion extraction [10] and generation is very fast. The web is an expanding environment where customers go to find or submit opinions that may be ripe for opinions.

Opinions on web are called user generated contents which provides an excellent scenario to apply the metaphor of mining any kind of information. User creates a huge amount of data in a social media context where by applying several search technique (information retrieval) or opinion mining techniques, we can look for valuable nuggets of knowledge. It contains usually heterogeneous data as combination of both structured information (tags, ratings, links, etc) and unstructured information (text, audio, video, etc), we apply existing techniques to take advantage of this data while extracting useful knowledge.

This opinion mining system can mine direct opinions as "This laptop is great although it's little heavy."
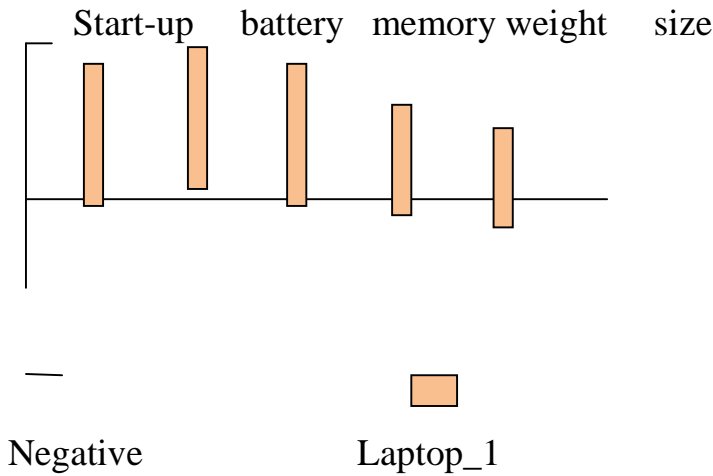
Positive

Fig. 1 Feature based summary of opinions of laptop to show its quality

Also it can perform comparative sentence [9] and relation mining as "Dell laptops are better than Toshiba", can be resolved as (better, {laptops}, {Del}, {Toshiba}) (e.g. Fig. 2).
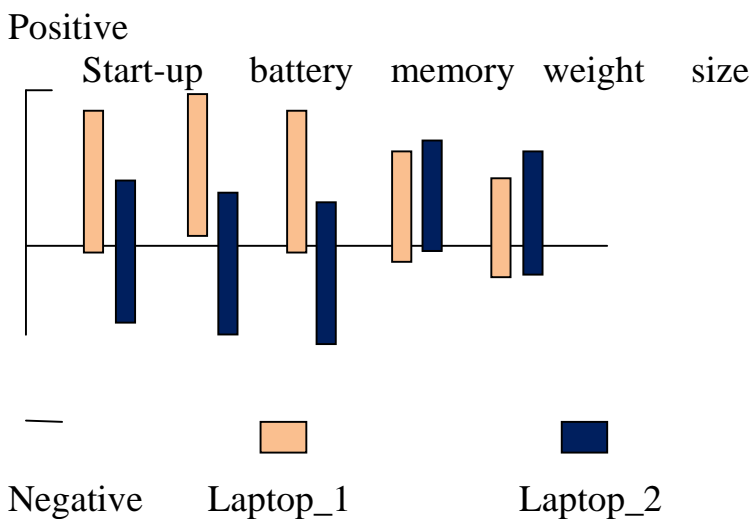

Figure 2: Comparison of opinions of two products

I. BACKGROUND

A. *Text mining and problems:*

The area of text mining is a relatively new discipline born of the knowledge discovery in databases (KDD) and data mining (DM) [1-2] community. Text mining is the discovery and extraction of interesting, non-trivial knowledge from free or unstructured text. It is the process of structuring the input text (usually parsing, along with the addition of some derived linguistic features and the removal of others), deriving patterns within the structured data, and finally evaluation and interpretation of the output to produce 'High quality' output. It relies on the fact that small difference between two pieces of text don't change the meaning very much. It can be illustrated by example as:

"Laptop quality is good". (1)
"Laptop quality is not good". (2)

It is a traditional text categorization method that classifies document by topic. It is a big problem in opinion mining as (1) is very different from (2) which is totally inverted sentence.

II. PROPOSED STUDY

The base of any quality management system is the processes (Methods). What kind of processes the company use? Are the processes effective and is the performance weak, adequate or excellent? After the processes, it is up to the staff or employees (Personnel) to perform those processes. The employees involved in doing the process are also factors in QMS. Machines and Materials are the tools given to the employees and obviously they are factors. If there is a defect in either, the quality management system suffers.

"Unmeasured things cannot be improved".

That is why the data is so crucial in developing and improving a company's quality. In other words measurements from the processes are a big factor affecting quality management system. The management is the owner of the whole quality management system and therefore responsible for any defect or factor affecting the quality management system. The last factor is the environment. Sometimes it is impossible to predict or manage the environment but it is certainly a factor that affects the quality management system. That is why a risk management system should be implemented as a supporting role in quality management system

Opinion is also a kind of data but not truth always. It's author's perception, viewpoints about a subject.

To tell about quality, Analysis [8] after extracting [3] of author's opinions is needed as ways of expressing opinion sentences and using words of different authors is different but result can be same as in the case of a movie opinions:
One's opinion "The movie was amazing",
Other's opinion "The movie was ultimate".

After analyzing both sentences:
Result is:
Movie is having good quality. So it's fine to watch.
One should not miss it as opinions expressed are positive which is result found after polarity orientation.

Mostly opinions are positive or negative when extracting [3] from web (twitters, blogs, forums...).
Analyze them in such a way that positive opinions are separate from negative opinions.
Opinions by people are usually expressed in some conventional patterns. Generally speaking, an opinion expression consists of five major components:

Quality is dependent on Opinion words (OW) which can be can be classified into three further categories:

- Context-free opinion word (CFOW)

- Context-dependent opinion word (CDOW)

- Object-dependent opinion word (ODOW)

CFOW have constant polarity irrespective of context, e.g. perfect is absolute positive and bad is negative. CDOW have context and polarity is determined by their context. For example, reality shows expresses actions can be considered as positive and movie shooting is not always true so considered as negative.
ODOW is the neutral word carrying different polarities when associated with different opinion objects. For example, high expresses positive sense when collocating with performance but brings negative sense when collocating with debt. Practically, ODOW words can be treated as CDOW.

Opinion indicators are mainly conjunctions, adverbs and adverbial phrases, including

- Negation conjunctions.

- Continual conjunctions.

Negation conjunctions such as but, however and though, indicate that the sentiment of the following clause/sentence is different from the preceding one e.g. the laptop backup is great but its little heavy.

Continual conjunctions, such as and, especially indicate that the sentiment of the following clause/sentence is the same as the preceding one e.g. HP laptop is great especially its memory.

Adverbs and adverbial phrases directly indicate the polarity of the opinionated sentence, e.g. it is regrettable and verbs directly indicate the polarity of the opinionated sentence.

Opinion Rank to describe quality factor:

For best performance goals, opinion scaling is a challenging method. One design questionnaire is the scale and scale values chosen to show complete positive and complete negative as we have chosen scale of range 1 to 5. i.e. rating scale designed to measure attitudes or reactions. Users indicate the multiple choice answer that represents their attitude or reaction. In opinion scale, six answer fields are pre-populated with the following answers:

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree
- Not Applicable

Disagree at Strongly   Agree at Strongly
High level   High Level
-2   -1   0   1   2

Let us use example of laptop to demonstrate the quality by opinion ranks.

For example, we have the review sentence *"The battery backup of this laptop is high"*. The product feature that has been commented is *"battery backup"*. The opinion expressed by the reviewer is positive. From a large number of reviews [7], we can produce the feature-based opinions for feature: battery backup in figure 3.
Laptop_1:

Feature: battery backup
Positive: 276
        <Individual review sentence>
Negative: 9
        <Individual review sentence>

The scaling [8] procedure for battery backup can be applied to individual review sentence as according to scaling rank shown below:

- Amazing (+2)
- High (+1)
- Adequate (0)
- Less (-1)
- Poor (-2)

This scaling helps to summarize opinions based on its polarity.

Conclusion

In this paper, we studied about quality of a product and concluded one main point that satisfaction is main thing which all software must possess for all kinds of users. Satisfied or unsatisfied behavior of a person for a product can be examined from his/her feelings. So, we used SentiWordNet3.0 an idea of separate blocks provided to customers to post their pros and cons opinions about the product they are reviewing. We believe that by scaling, the summarization of opinions can enhance the speed of opinion mining process.

References

1. Dave, D., Lawrence, A., and Pennock, D. Mining the Peanut Gallery: Opinion Extraction and Semantic Classification of Product Reviews. *Proceedings of International World Wide Web Conference* (*WWW'03*), 2003

2. http://www.businessdictionary.com/definition/product
   quality.html#ixzz3VC71Ora2

3.A sentimental education: Sentiment analysis using subjectivity summarization based on minimum cuts.

4.Liu, B., Hu, M., and Cheng, J. (2005). Opinion observer: analyzing and comparing opinions on the web www-05.

5.D. Downey, M. Broadhead, and O. Etzioni. Locating complex names entities in web text. In Proceeding of IJCAI'07, pages 2733-2739, 2007

R. F. Bruce and J. M. Wiebe, "Recognizing subjectivity: A case study in manual tagging," *Natural Language Engineering*, vol. 5, 1999.

6. Y. Chen and J. Xie, "Online consumer review: Word-of-mouth as a new element of marketing communication mix," *Management Science*, vol. 54, pp. 477–491, 2008.

7. Esuli, A., Sebastiani, F.: Pageranking wordnet synsets: An application to opinion mining. In: 45th Annual Meeting of the Association for Computational Linguistics, Prague, Czech Republic, The Association for Computational Linguistics (2007)

8. Tong, R.M. 2001. An operational system for detecting and tracking opinions in on-line discussions. *Working Notes of the ACM SIGIR 2001 Workshop on Operational Text Classification* (pp. 1-6). New York