

# DRIVEN DATA MINING APPROACH FOR PERFORMANCE MONITORING IN VIRTUAL ORGANIZATIONS USING 360 DEGREE DATA MINING & OPINION MINING

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## Abstract

Performance evaluation in virtual organizations is one of the most important issues that have been considered due to the transition from industrial age to knowledge era. System will evaluate the performance of those employees who are outsourcing. Outsourcing sometimes involves transferring employees from one firm to another, but not always. Virtual Organization is an arrangement in which one company provides services for another company. Outsourcing is a trend that is becoming more common in information technology and other industries for services that have usually been regarded as intrinsic to managing a business. It is necessary to evaluate the performance of the outsourced employees in order to increase the productivity and profitability of the company. It is possible to evaluate the performance of the employees who work in organization by monitoring their loyalty and role related behaviors. But evaluating the performance of the outsourced employees in various places is difficult. Wrong perception of performance will be more harmful for the employees in the virtual organization.

Keywords: Firm, Virtual organization, Business.

## 1. INTRODUCTION

Opinions of others highly influence the human behavior and are central to almost all decision making activities. The major part of our information gathering process is to find out what others think. While making any online transaction the customer usually checks the comments and reviews posted by the other customers. The fast growing social web has significantly contributed to this user generated data including reviews, comments, opinions, services and events. This data is useful for the customer as well as the manufacturer. The manufacturers can get a reality check about their product strength and weaknesses based on the sentiments of the customer. How to analyze and summarize the views expressed in such large opinionated text is a new growing field for research. This new research domain is called opinion mining. The area of opinion mining, also called sentiment analysis is concerned with analyzing people's opinions, sentiments, emotions, evaluations and attitudes towards objects such as events, organizations, products, issues and their features. Natural language processing (NLP) and computational linguistics have a rich historical background but still there was minimum research in the field of opinion

mining before the year 2000 except for some earlier work on subjectivity, interpretation of metaphors, sentiment adjectives and viewpoints.

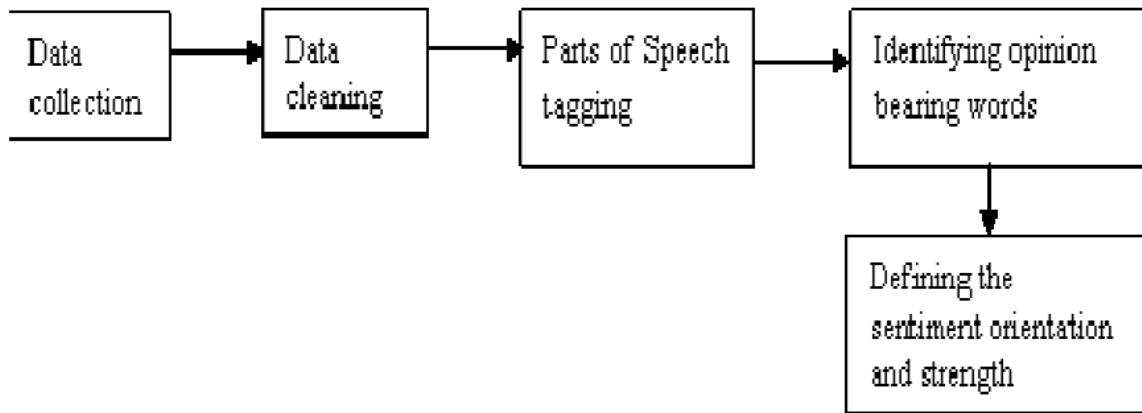
## 2. RELATED WORK

Assessing the performance of an employee during a given period of time and planning for his future. It is a powerful tool to calibrate, refine and reward the performance of the employee. Technology helps to measure and manage the employee; evaluation performs very effectively. It helps to automate the resource processes, which save time, cost and reduce the efforts. According to a survey, more than 30 percent of the respondent organizations are already using or planning to use automated software for performance management in virtual organizations. To help and automate the processes of Performance Evaluation and management, virtual organizations are increasingly taking the help of various performances management software like workforce performance management (WPM) suite systems and talent management systems, which help to systematically record all the data about the employee performance, pre-determined targets and the results achieved, compensation, succession planning and other related HR systems.

Because of the development of information technology, the types of organization and the nature of management have changed, and boundaries between organizations have disappeared. "Virtual team" is the newest type of work group. However, many managers only care about the advantages of the Internet and information technology, and ignore that the members of virtual teams might doubt and distrust with each other. Given the nature of D3M, it can bring about the effective and practical development of many challenging data mining applications in every area. Based on the collaborations with our business partners, we have the experience in developing and deploying D3M in areas such as capital markets and social security area. In capital markets, we develop actionable trading agents, actionable trading strategies, and exceptional market microstructure behavior patterns. In social security area, concept of activity mining and combined mining is being proposed.

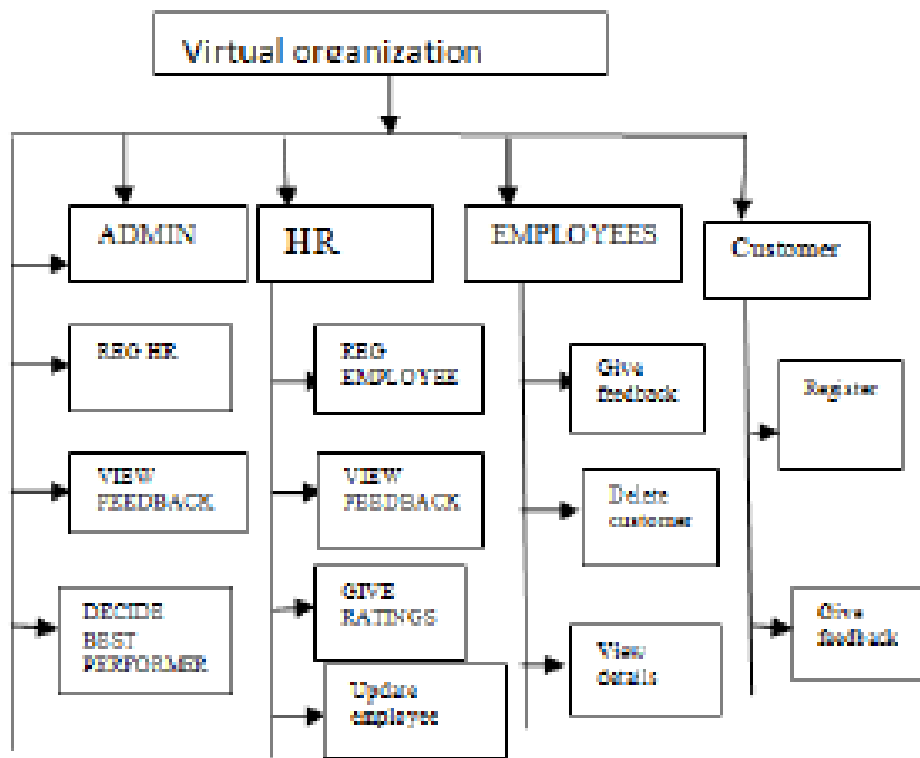
## 3. RELATED WORK

Textual data can be classified into two broad categories namely- facts and opinions. Unlike the factual information that is represented by objective statements, opinions and sentiments are characterized by the subjective nature. Opinions can be of different types- direct, indirect and comparative. Direct opinion expresses the direct views about an object. For example, "The drawing is beautiful." Indirect opinion indirectly expresses the views about the object. For example, "I had a headache after watching the movie" gives a negative review about the movie. Comparative opinions describe the likes and dislikes of the opinion holder about an object over the other. For example, "Samsung mobiles are better than Nokia." An opinion consists of two key components, object or object feature (o) and sentiment or opinion about the object(s) i.e. (o, s) where o is an entity or aspect of entity about which the opinion has been expressed and s is the positive, negative or neutral sentiment about o. Another factor defining the strength of the opinion (high, medium or low) can also be associated with it. This definition, although concise may not be appropriate for defining the online reviews of products as the complete details of the target product may be complicated. We use the following review to enlighten the problem. The sentences are numbered for easy reference.



**Fig.1. Architectural view of opinion mining**

Opinion words are words that express desirable ( ex. awesome, fantastic, great, amazing, exceptional, excellent, best, etc.) or undesirable (e.g. bad, poor, frustrating, disappointing, horrible, terrible, worst, sucks etc.) states They reflect valuable aspects of the rater experience that can complement other forms of feedback from employees.

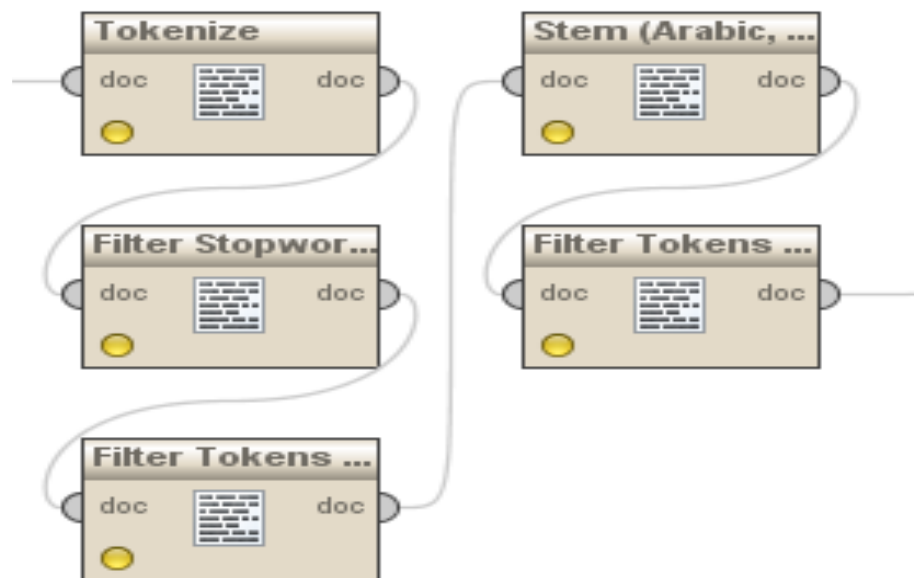


**Fig.2. Architecture Design**

As a human being, people like to express their own opinion. They are also interested to know about others opinion on anything they are interested especially whenever they need to make a decision. The technology of opinion mining thus has a tremendous scope for practical applications. The opinion regarding different element or feature of the service could be considered. Most existing techniques utilize a list of opinion bearing words, generally called opinion lexicon for this purpose. Real-world information mining is a mind boggling critical thinking framework. The fundamental target of D3M is to improve the noteworthiness of recognized examples for critical thinking. The expression "noteworthiness" measures the capacity of an example to provoke a client to take solid activities further bolstering his/her good fortune in this present reality. It chiefly measures the capacity to propose business basic leadership activities. Table 3 demonstrates an examination of real parts of Data Driven Data Mining and Domain Driven Data mining. The correlation is done by utilizing perspectives, for example, basis, objective, information, prepare, system, foundation, ease of use and so on.

#### 4. RESULT ANALYSIS

Incorporation of appropriate prior knowledge, and proper interpretation of the results of mining, ensure that useful knowledge is derived from the data. Intuitively, domain experts are the best ones to provide knowledge, interpretation and judgments for the results. Before we started the experiments, we consulted the domain experts, mentioned, about the approach.



**Fig.3. Processing token steps**

They encouraged it, and thought it would help very much in monitoring staff appraisals. In addition, during our experiments, they gave us the instructions for labeling the data set into subjective or objective, so that, the measurements of accuracy in the first and third levels would be based on their opinion. Also, in the second level of subjectivity detection, they helped us in specifying the threshold for

duplication. Then, we passed the resulted tokens to a stemming process. For stemming, we had two choices; light stemming which removes only the common affixes in Arabic language, and root stemming which returns the word to its root. We compared between the two types according to the results in order to decide which is better to use in this level. After stemming, we used filtering tokens to remove the resulted stems that is less than 3 characters.

Threshold	Subjective Class		
	Precision	Recall	F-measure
10	1	0.67	0.80
15	0.9	0.75	0.82
18	0.85	0.92	0.88
20	0.71	1	0.83
25	0.24	1	0.39

**Table.1. Measurement of Accuracy**

As the data set is not too large (rule of thumb is 5000), we decided to use the 10 fold cross validation method in splitting the data. So that, we would take the average of the evaluation measurements, and this would be more accurate. In our comparison between the classifiers, we used the measurements of precision, recall, f-measure and accuracy. In addition, we compared using light stemming versus stemming.

## CONCLUSION

In this thesis most effective factors are discussed to increase performance monitoring of employee's using Domain driven data mining(D3m) approach using 360 degree feedback and opinion mining and support vector machine(SVM)as the technical basis. Less satisfaction (although not dissatisfaction) was indicated for the virtual organization with the previous performance evaluation. When making long and short term goals, virtual organizations must carefully calculate who will champion their initiatives. Selecting the appropriate individuals for performance evaluation positions is paramount to virtual organizational success. Placing the wrong person in a performance evaluation role in virtual organizations can result in devastating problems which are subject to strong public scrutiny. These problems can range from lack of employees morale to financial destruction.

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