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360 Degree Feedback Analysis System using Sentiment Analysis

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Abstract: Due to the transformation from an industrial age to knowledge era, performance evaluation in virtual organizations has been considered as one of the most important issues. Virtual Organization being geographically diffused, evaluating the performance of the employees working in it is a major challenge. The idea proposed in this system is to perform an analysis considering a number of performance measures for the derivation of performance prediction indicators needed for employee performance assessment, monitoring and evaluation using sentiment analysis. The aim is to predict the quality, productivity and potentiality of the employees across various disciplines through an unbiased system which will enable higher-level authorities to take decisions and understand certain patterns of employee motivation, satisfaction, growth and decline in a virtual organization.

Keywords: Transformation, Performance Prediction Indicators, Virtual Organization, Sentiment Analysis

I. INTRODUCTION

360-degree feedback is a process through which feedback from an employee's subordinates, colleagues and superior(s). These feedbacks are taken from external sources who interact with the employees, such as customers, subordinates, superiors, peers or other interested stakeholders.360-degree feedback solicits feedback regarding an employee's behaviour from different perspectives of subordinates, peers, and supervisors. It, therefore, may be contrasted with a traditional way where feedbacks are delivered to supervisory or management employees by subordinates only.

The objective of the process is to reflect how the employee functions in the team and to help members of the team working better together. Following the 360-feedback process from different in perspective helps a more rounded view of individual performance, improves relevant competencies, enhances understanding of the strength of staff members for career development and obtains better awareness for managerial issues to be developed.

The systems that are used right now are the ones which are analysed by humans and analysis is done. In our system, the entire analysis will be automated so that human bias will not be involved. Also, it is difficult to give feedback anonymously since the person can be guessed from the given feedback. Hence, in our system, all the human involvement is bypassed and the system analyses and generates the report on its own. This report is then provided to the employer and HR manager to help improve the company.

II. PROPOSED METHODOLOGY

A. *Sentiment Analysis*

Sentiment analysis will be used as an NLP task for is covering opinions about users and because there is some ambiguity about the difference between opinion, sentiment and emotion, it defined opinion as a transitional concept that reflects an attitude towards an entity. The sentiment reflects feeling or emotion while emotion reflects attitude.

Emotions Detection (ED) can be considered a SA task. SA is concerned mainly in specifying positive or negative opinions, but ED is concerned with detecting various emotions from the text. As a Sentiment Analysis task, ED can be implemented using the ML approach or Lexicon-based approach, but Lexicon-based approach is more frequently used. In our system Sentiment Analysis is the main component which will be used to remove the human bias which is right now present in the analysis of the feedback done in HR. Sentiment Analysis will be used to judge the emotions using algorithms which will grade the feedback in negative and positive integers. A negative number will be used for bad feedback while positive feedback will be graded with a positive number. Based on the grade which is given, a report will be generated which will give a score to the manager. Due to this, a proper non-biased report will be generated.

B. *Naive Bayes Classification*

Naive Bayes classifiers are linear classifiers that are known for being simple yet very efficient. The probabilistic model of naive Bayes classifiers is based on Bayes' theorem and the adjective naïve comes from the assumption that the features in a dataset are mutually independent. In practice, the independence assumption is often violated, but naïve

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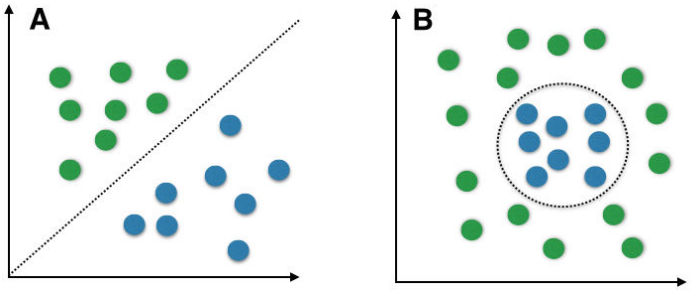
Bayes classifiers still tend to perform very well under this unrealistic assumption [1]. Especially for small sample sizes, naïve Bayes classifiers can outperform the more powerful alternatives [2].

Being relatively robust, easy to implement, fast and accurate, naive Bayes classifiers are used in many different fields. Some examples include the diagnosis of diseases and making decisions about treatment processes [3], the classification of RNA sequences in taxonomic studies [4], and spam filtering in e-mail clients [5]. However, strong violations of the independence assumptions and non-linear classification problems can lead to very poor performances of naive Bayes classifiers. We have to keep in mind that the type of data and the type problem to be solved dictate which classification model we want to choose. In practice, it is always recommended to compare different classification models on the particular dataset and consider the prediction performances as well as computational efficiency.



Graph 1: Linear(A)vs. non-linear problems(B).

Random samples for two different classes are shown as coloured spheres, and the dotted lines indicate the class boundaries that classifiers try to approximate by computing the decision boundaries. A non-linear problem (B) would be a case where linear classifiers, such as naive Bayes, would not be suitable since the classes are not linearly separable. In such a scenario, non-linear classifiers (e.g., instance-based nearest neighbour classifiers) should be preferred.

C. *360 Degree Feedback System*

The evaluation process will take feedback from peers, subordinates, colleagues to perform feedback analysis. The importance given to the feedback of the employee will be different for different categories. The importance of a superior's feedback will be more than the peer's feedback. The importance of the feedback given by the subordinate and the superior will be the same.

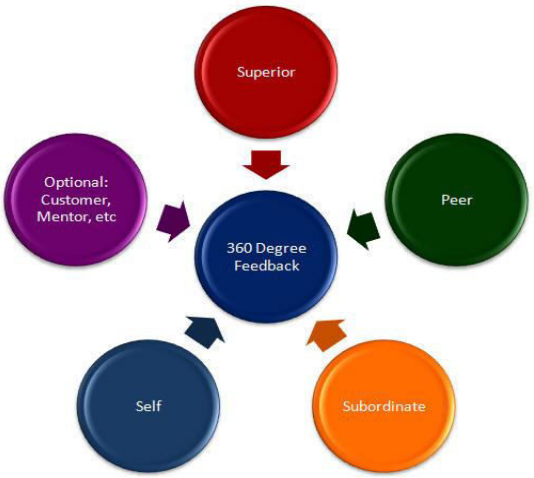


Fig 1: Block Diagram

III. RESULTS

For a particular feedback group where feedbacks are given to an employee from the subordinates, peers and superiors, the given feedbacks are then analysed and the report is generated. The analysis is done based on the performance parameters that have been decided. Fig. 1 shows the feedback analysis generated through the feedbacks given to an employee by his subordinates, peers and superiors. Each group is given a score which is calculated through the sentiment analysis which is done.

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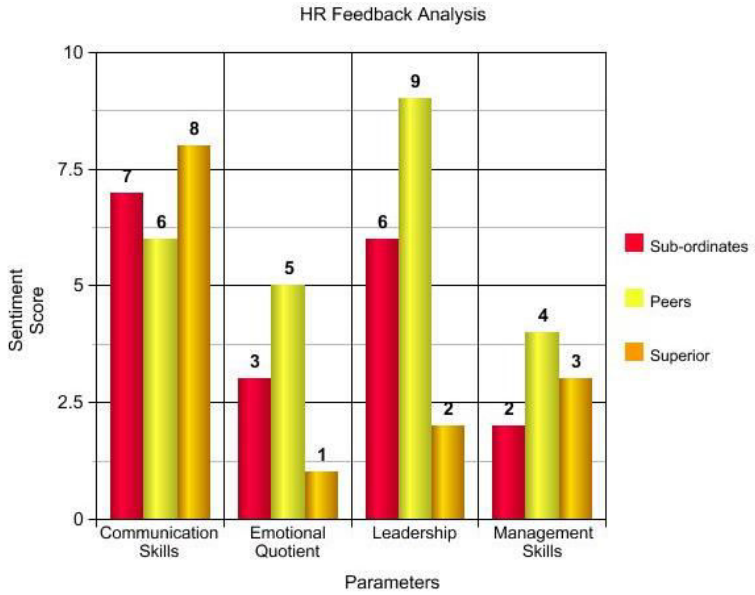
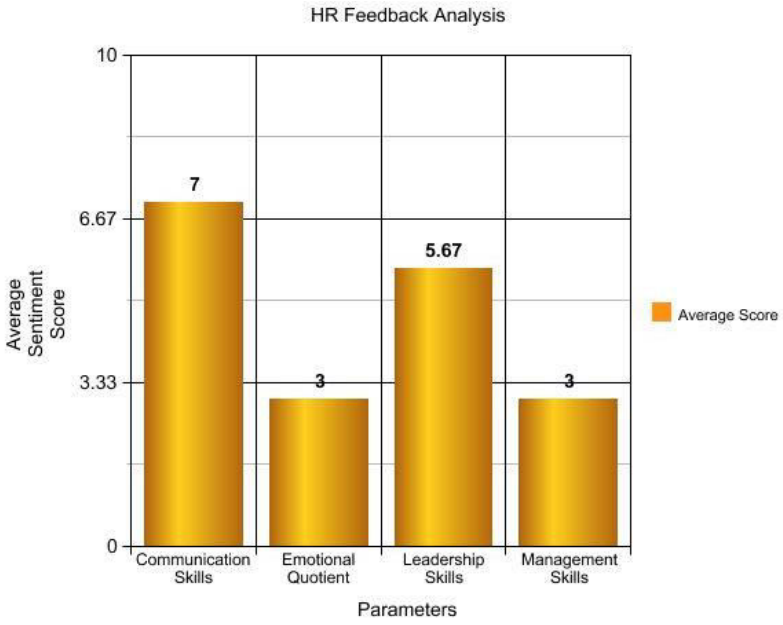


Graph 2: Feedback analysis graph of an employee

The performance parameters through which the analysis of an employee's performance are Communication skills, emotional quotient, leadership skills and management skills. The ratings given to each employee range from 0 to 10 where a score between 0-3 is considered as below average, 4-7 is considered as average and 8-10 is considered as above average.



Graph 3: Overall report analysis

IV. CONCLUSION

Since 360-degree feedback can be interpreted in a variety of ways, it is important to establish a framework for the consistent delivery of results. The HR manager can get real-time updates of different feedback processes that are ongoing simultaneously as well as the ones that have been completed in the past. The developed 360-degree feedback system will be able to take feedbacks anonymously from all perspectives and without involving human bias will be able to analyze employee feedback. The analyzed data will be converted into a report which will be given the performance analysis of the employee. The consistency will enable the team to achieve the benefits of 360-degree feedback that will increase their performance. The Detailed Analysis report generated from feedbacks will help the employees to grow individually as well as improve the growth of the company.

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BIOGRAPHIES

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