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Employee Appraisal Evaluation

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Abstract: Performance evaluations are often used for pay, promotional and retention decisions. Such an important function should be dealt in a fair and objective manner. By performing different types of algorithms like appraisal algorithm, natural language processing algorithm over the dataset, the system will be able to generate a fair decision, to whom appraisals must be given. The system will generate a list of employees to whom the appraisal must be given by using the algorithms mentioned above. In order to build a healthy environment in the organization, the system will give suggestions or the area of improvement to that particular employee after the use of sentiment analysis on comments given by manager of that organization.

Keywords: Appraisal, sentiment analysis, appraisal evaluation system.

I. INTRODUCTION

Performance appraisal is a systematic assessment of employees by supervisors or those habituated with their performance. In other words, performance appraisal is a systematic and objective way of judging an employee's facility to perform his / her task.

Performance appraisal can stimulate employee ebullience, amend employee productivity, ascertain organization achieves strategic objectives, engender a harmonious organizational environment, promote organizational culture, and ultimately achieve competitive preponderation. During performance evaluation, it is imperative to cull a scientific performance evaluation method.

The lack of a scientific evaluation method and performance feedback betokens a paramount quandary in performance appraisal. Currently, the employee performance assessment method is customarily a single angle assessment from top to bottom; Many people evaluate objective outcomes with objective factors, and there are consequential deviations in assessment results due to the influence of wards, median tendencies, proximal outcomes, and so on.

This system evaluates employees by the number of factors that describe their performance throughout the year. Withal, an evaluation algorithm is designed to calculate the evaluation of a concrete employee. Sentiment analysis is withal applied to the notes given to the employees by the manager.

II. LITERATURE REVIEW

Prashanth Prabaharan, Indika Pererain this paper they discussed about the existing appraisal system and the tools used to calculate the appraisal for the employee.[1]

Fahad Razaque, Nareena Soomro, Shoaib Ahmed Shaikh, Safeeullah Soomro, Javed Ahmed Samo, Natesh Kumar and Huma Dhare , this paper give us an information about how different machine algorithms works to evaluate students' performance.[2]

Jahanzeb Jabbar, Iqra Urooj, Wu JunSheng, Naqash Azeemin, in this paper they have provided information about sentiment analysis on product review. What approaches are there to perform sentiment analysis and how does it work. [5]

III. PROPOSED WORK

After studying different appraisal system, we came to the conclusion there are some or the other drawbacks. We came with the solution to design a model which can give a efficient appraisal calculation by creating our own algorithm.

The dataset consist of factors such as Communication, Work Product, Adaptability etc . There is a comment section where manager has given remarks predicated on

Employee's performance. There are two forms one for

employee and one for manager. By considering all the factors defined in the form, WEKA tool is used to develop rule based approach. A decision J48 algorithm is used to generate rule based approach.

As there is a comment section, we have utilized sentiment analysis on that field. By implementing sentiment analysis, we can presage whether the comment is positive or negative. The result is merged with appraisal algorithm and final decision is made on range of appraisal that should be given to an employee.

At last a list is engendered where details of each employee and its corresponding range of appraisal is exhibited. After performing sentiment analysis on comments given by manager, we perform keyword extraction and if it is a positive comment appreciation message will be notified to employee and if it is a negative comment amelioration message will be notified to that particular employee.

IV. ALGORITHM

The implementation of the system is divided into two parts:

(1) Appraisal Evaluation Algorithm

(2) Sentiment Analysis

1. Appraisal Evaluation Algorithm

This algorithm is designed by considering all the factors present in the dataset using WEKA tool. A Rule based approach is designed using decision J48 algorithm . The Accuracy is 80.5%.

2. Sentiment Analysis

Sentiment analysis is a field devoted to subjective feelings and emotions from the text. A common use of sentiment analysis is to figure out whether a text expresses negative or positive emotions. Written feedbacks are great datasets for doing sentiment analysis because they often come with a score that can be used to train an algorithm.

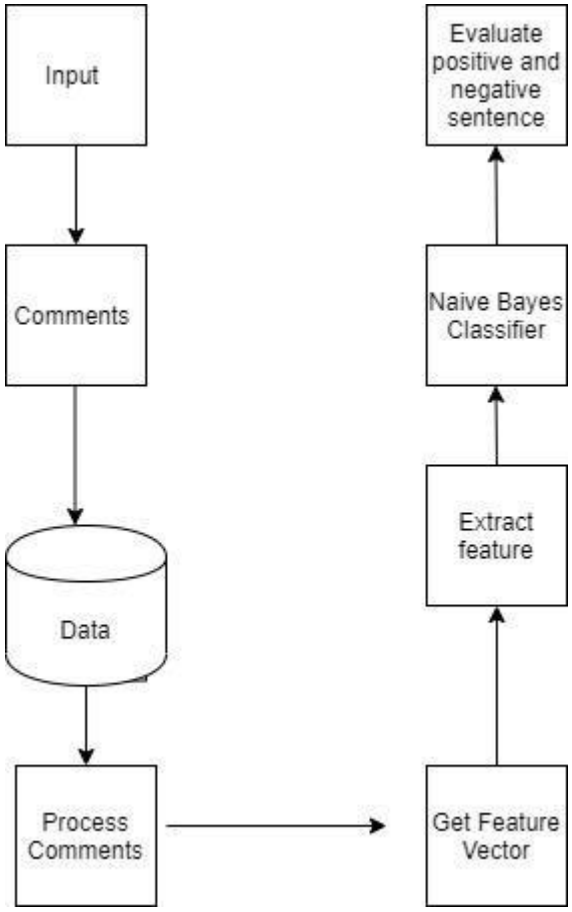


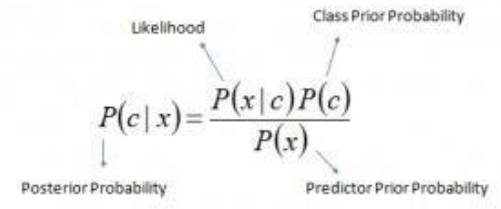
Fig. 4.1 Flow diagram of sentiment analysis

Naïve Bayes Algorithm

It is a classification technique based on the theorems of the bases of independence in predictors. Simply put, a naive base classifier assumes that the presence of a particular feature in a class is not related to the presence of another feature.

For example, an apple can be considered red, round, and about 3 inches in diameter. Albeit these characteristics depend on each other or on the subsistence of other characteristics, all these properties independently increase the chances of this fruit being an apple and hence it is kenned as ‘naive’.

The Verdant Bayes model is facile to build and is especially subsidiary for prodigiously and sizably voluminous data sets. Along with simplicity, naïve bayes is the most sophisticated relegation methods. The bayes theorem provides a way to quantify the answer probability p (c | x) from p (c), p (x) and p (x | c).



$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

above,

- P(c|x) is the posterior probability of class (c, target) given predictor (x, attributes).
- P(c) is the prior probability of the class.
- P(x|c) is the likelihood which is the probability of the predictor given class.
- P(x) is the prior probability of the predictor.

V. IMPLEMENTATION

To predict the accurate appraisal for the employee, there are different steps must be implemented on the dataset.

1. Data Preparation:

- Data is parted into training and test sets.
- Data is being loaded and cleaned to remove punctuation and numbers.

2. Split into Train and Test Sets

We will require to make predictions on new textual reviews. This will require all of the same data preparation to be performed on those new comments as is performed on the training data for the model.

3. Loading and Cleaning Comments

- Tokens are being splited on the basis of white space.
- Punctuations have been removed from the words.
- Words have been removed which are not entirely composed of alphabetical letters.
- Stop words have been removed .

Remove all words that have a length <= 1 character.

4. "Bag of Words" Model:

This model focuses entirely on words or sometimes a string of words, but customarily does not fixate on the verbalizer's "context". The bag of model words customarily has an immensely colossal inventory, perhaps a “dictionary” would be thought of as a type that is considered words expressing emotion. Each of these words has its own "value" if found in the text. Values in particular are all connected and the result is an evaluation of emotions. The equation of integrating and obtaining a number may be different, but this model focuses primarily on words and does not endeavor to understand the fundamentals of language.

5.Django

To exhibit the results, Django utilizes a web framework. Django is an open-source framework for backend web for applications predicated on Python - one of the top web development languages. Its main objectives are simplicity, flexibility, reliability and scalability.

Flowchart:

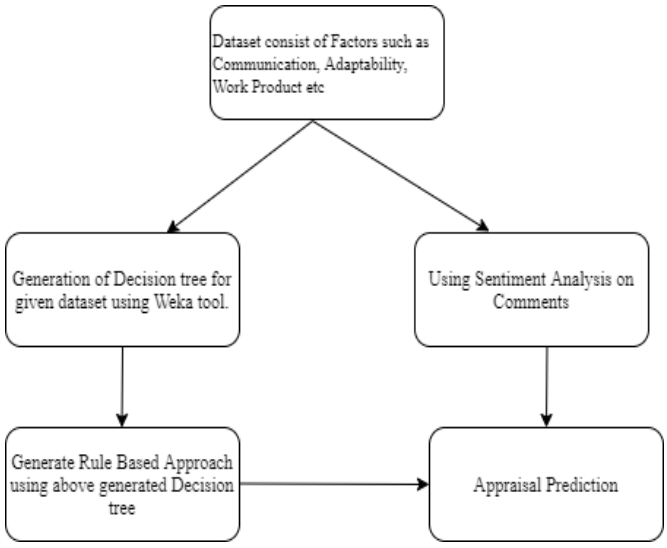
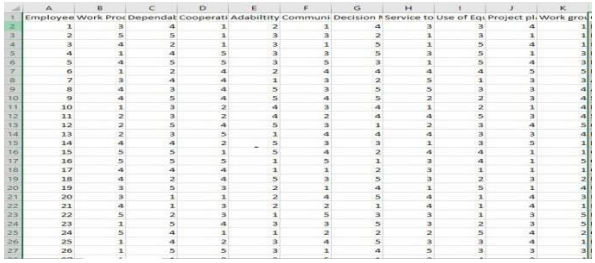


Fig. 5.1 Flowchart of Appraisal Algorithm

Dataset:



Employee	Work Pro	Dependat	Cooperati	Adabiltity	Communi	Decision	Service to	Use of Equ	Project pl	Work gro
1	3	4	1	2	1	4	3	3	4	1
2	5	5	1	3	3	2	1	3	1	1
3	4	2	1	3	1	5	1	5	4	1
4	1	4	5	3	3	5	3	5	1	3
5	4	5	5	3	5	3	1	5	4	3
6	1	2	4	2	4	4	4	4	5	5
7	3	4	4	1	3	2	5	1	3	3
8	4	3	4	5	3	5	5	3	3	4
9	4	5	4	5	4	5	2	2	3	4
10	1	3	2	4	3	4	1	2	1	4
11	2	3	2	4	2	4	4	5	3	4
12	2	5	4	5	3	1	2	3	4	5
13	2	3	5	1	4	4	4	3	3	4
14	4	4	2	5	3	3	1	3	5	1
15	5	5	1	5	4	2	4	4	1	1
16	5	5	5	1	5	1	3	4	1	5
17	4	4	4	1	1	2	3	1	1	1
18	4	2	4	5	3	5	3	2	3	2
19	3	5	3	2	1	4	1	5	1	4
20	3	1	1	2	4	5	4	1	4	3
21	4	1	3	2	2	1	4	1	4	3
22	5	2	3	1	5	3	3	1	3	5
23	1	5	4	3	3	5	3	2	3	5
24	5	4	1	1	2	2	2	5	4	2
25	1	4	2	3	4	5	3	3	4	1
26	1	5	5	3	1	4	5	3	3	3

Fig. 5.2.1 Dataset of Appraisal Algorithm

Comments
You always come in on time, follow your schedule and adhere to your designated lunch break time.
You communicate your ideas and vision clearly so others can understand it easily and quickly.
You always maintain good customer service relations, even under stress.
Very supportive of coworkers and subordinates attempts at improvement.
Yells and screams at subordinates.
Spends too much time focusing on less important aspects of daily job.
Maintains good working relationships with coworkers.
Uses a condescending tone when talking to others in the office.
Spends too much time focusing on less important aspects of daily job.
Sets priorities and adjusts them as needed when unexpected situations arise.
Important documentation for projects has been lost or destroyed erroneously.
Gets annoyed with clients who ask too many questions.
Reports, forms, memos and correspondence are often completed late or not at all.
Frequently comes to the wrong conclusions and assumes things.
Frequently forgets to follow through on customer requests.
Conducts research or seeks counsel of experts to gather information needed in making actual decisions.

Fig. 5.2.2 Dataset of Appraisal Algorithm

VI. CONCLUSION

By analysis of different papers, we can summarize some of the problems which are faced and to bring solutions to that particular problem, an algorithm has being designed to calculate fair appraisal. This appraisal system consists of appraisal algorithm which is designed by considering all factors mentioned in dataset. A sentiment analysis is used on the comment section of the database which plays an paramount role on calculating appraisal. We had implemented this algorithm on data of the reputated startup company.

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