Employee Performance Evaluation & Appraisal Calculation using Data Mining

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Abstract: Employee performance reporting provides a simple visual way to compare performance and engagement individually and across the entire company. Employee performance reporting provides a simple visual way to compare performance and engagement individually and across the entire company. When you can see which teams, managers, and employees are working well, you gain insights into how to help the areas and people who need extra attention. Data Mining techniques allows us to discover an hidden patterns, relationship form huge amount of data. Information extracted from large database is helpful in decision making. 360 degree feedback approach is a feedback taken from various sources. Generate an overall report by clustering the employees based on their performance. Our system will consider some factor to evaluate the performance and appraisal of the employees of the company. The system would be using k-means clustering for evaluating the performance of the employees. However, ranking would be assigned, and this algorithm will definitely identify the potential candidates.

Index Terms - Data Mining; K-means Clustering; 360 degree feedback

I. INTRODUCTION

The paper-based assessment system causes a lot of manual work in the traditional assessment system, is time-consuming, not secure, not flexible, difficult to analyze employee performance and performance improvement trend. We have developed a web-based performance assessment system that provides a secure and easy way to conduct the assessment. The skills in our system are flexible and can be tailored to the specific responsibilities of the job. Our system is goal-oriented as the objective scores are calculated. The system connects to the easily accessible database.

Employee performance metrics are critical to tracking the performance of employees. It's tricky to implement them the right way. However, employee performance metrics benefit the organization as well as the employee when done correctly. Employee performance assessment is often a process combining both written and oral elements through which management evaluates and provides feedback on the performance of employees, including steps to improve or redirect activities as needed. Performance documentation provides a basis for pay increases and promotions. Assessments are also important to help members of staff improve their performance and as an avenue through which they can be rewarded or recognized for a job well done.

Clustering is one of the most popular methods used to obtain an intuition of the data structure by investigating data analysis. It is possible to define the job of defining subgroups in the information as such that information points in the same subset (cluster) are very comparable while information points in distinct clusters are very distinct. We just want to attempt to investigate the data structure by grouping the data points into separate subgroups .Another tool for measuring employee performance is 360-degree feedback. To assess the score of an employee, he is asked to provide feedback on specific topics to his peers, subordinates, customers and managers. This feedback is often an accurate and multi-perspective view of the performance, skill level and improvement points of an employee.

II. LITERATURE REVIEW

Employee performance assessment in quality assurance paper says there are many existing performance assessment software that help managers write job profiles, manage employee performance reviews, and make performance plans, but none of them evaluate the optimum performance of employees. The objective of this research project is to improve the current process of evaluating performance. [1]

Performance Evaluation of K-means Clustering Algorithm with Various Distance Metrics papers tells that researchers in the field of computer science and particularly the database community have also widely adopted clustering. K-means are the most famous algorithms for clustering.
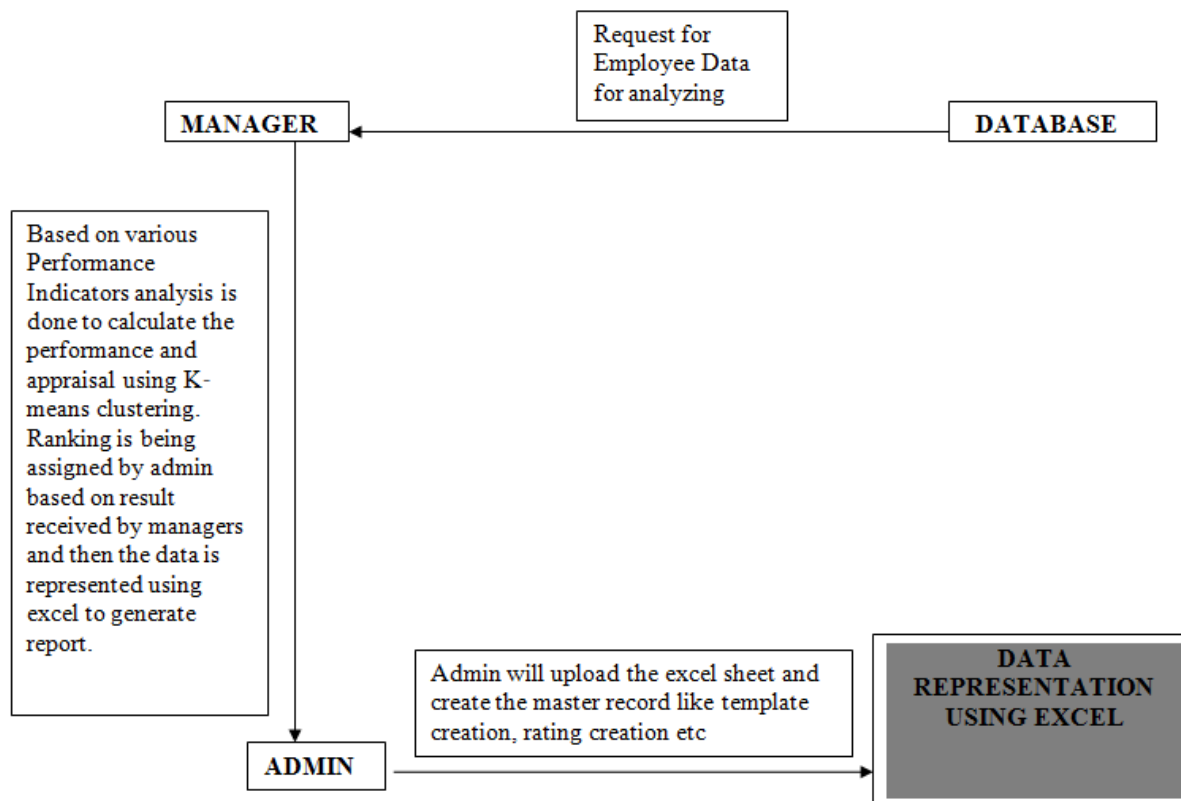In this paper, basic k means algorithm performance is evaluated using different distance metrics for iris dataset, wine dataset, vowel dataset, ionosphere dataset and crude oil dataset by varying cluster number.[2]

Improving Employee Performance Appraisal Method through Web-Based Appraisal paper tells that a web-based performance assessment system that provides a secure and easy way to conduct the assessment. The skills in our system are flexible and can be tailored to the specific responsibilities of the job. Our system is goal-oriented as the objective scores are calculated. The system connects to the easily accessible database. [3]

Faculty Performance Evaluation Using Data Mining paper tells that assessment as a dynamic process produces data that acts as an individual's performance indicator and subsequently affects both stakeholder and individual decision-making. The goal is to predict the quality, productivity and potential of the faculty across different disciplines, enabling higher-level authorities to make decisions and understand certain patterns of motivation, satisfaction, growth and decline in the faculty. [4]

Performance Evaluation-methods and techniques survey paper presents a comprehensive survey of traditional performance methods such as method of ranking and graphical rating scale, as well as modern methods such as 360 degree assessment and Objective Management (MBO).[5]

III. METHODOLOGY

System Architecture comprises of Database, Manager, Admin and Microsoft Excel

Database: A database is an organized collection of structured information, or data, typically stored electronically in a computer system. So here employee data is being stored in the database so that based on that data various performance indicators would be applied and accordingly data would be analyzed.

Manager: It is a popular performance appraisal technique that includes evaluation inputs from a number of managers.360 Degree provides people with information about the influence of their action on others. Based on various Performance Indicators analysis is done to calculate the performance and appraisal using K-means clustering.

Admin: Admin will upload the excel sheet and create the master record like template creation, rating creation etc . Admin goes through the report and then upload the excel sheet so that the result would be displayed based on their ranking in percentage.

Microsoft Excel: Here the result is being displayed using excel about employee performance and appraisal in percentage.

III.I. MODULES

III.I.I. Data Collection: Data collection is the method of collecting and measuring data in an established systematic fashion on targeted factors, which allows one to answer appropriate questions and assess results. We gathered information via google forms from the internet and some information. All data will be stored in a file of. CSV.

III.I.II.DataPreprocessing: Data preprocessing defines any sort of raw information processing to prepare it for another processing process. The information we get is not always the information that is helpful. We need to take the useful data and scrap the useless data. Data pre-processing transforms the data into a format that will be more easily and effectively processed for the purpose of the analysis. Data is being organized in a proper format for further analysis using algorithm.

III.I.III. Analysis using k-mean clustering: K-means clustering is one of the popular unsupervised learning algorithm used for analyzing data to get the desired result. K-mean algorithm is an iterative algorithm that tries to partition the dataset into K pre-defined distinct non-overlapping subgroups (clusters) where each data point belongs to only one group. Using k means clustering employee's performance is calculated using 360 – degree appraisal. Under 360 degree assessment, performance data such as certain variables is gathered "all around" an worker, i.e. from his / her managers, admin etc.In other term, in 360-degree feedback appraisal system, an employee is appraised by his managers, admin with whom he interacts in the course of his job performance. All information so gathered is then compiled through the computerized system to prepare individualized reports.

III.I.IV. Data Representation: All the analysis work is nothing if we cannot represent it. Here the result of the performance appraisal is represented using excel. The result is calculated and store as a .csv file . In that file the result is being displayed by assigning ranking to the employees.

IV.RESULT

FIG 1: INPUT DATA

FIG 2.1: FACTORS ON WHICH PERFORMANCE AND APPRAISAL IS CALCULATED

Profile :   [lavanya ▼]   [Search]

4	Organizational Initiatives		04-06-2019	30-06-2019	C ▼
5	Goals and Metrics		04-06-2019	30-06-2019	D ▼
6	Leadership Buy-in		04-06-2019	30-06-2019	C ▼
7	Relevancy		04-06-2019	30-06-2019	A ▼
8	Creativity		04-06-2019	30-06-2019	B ▼
9	Marketing and Communication		04-06-2019	30-06-2019	C ▼
10	Post-Training Reinforcement		04-06-2019	30-06-2019	A ▼

FIG 2.2 : FACTORS ON WHICH PERFORMANCE AND APPRAISAL IS CALCULATED

Searh Report

[Hiren Yadav ▼]   [Search] [Export To Excel]

Report

SrNo	Name	Address	MobileNo	EmailId	Gender	DOB	Manager Code	Percentage
1	lavanya	MALAD	8562587458	lavanya@gmail.com	female	25-08-1995 00:00:00	MGR002	29%
2	shreya	KANDIVALI	9769188952	shreya@gmail.com	female	26-08-1995 00:00:00	MGR002	26%
3	siddhi	ANDHERI	9920144766	siddhi@gmail.com	female	27-08-1995 00:00:00	MGR002	22%
4	yusra	JOGESHWARI	9856322145	yusra@gmail.com	female	28-08-1995 00:00:00	MGR002	23%
5	sonali	COLABA	7784515233	sonali@gmail.com	female	29-08-1995 00:00:00	MGR002	25%
6	darpan	MIRA ROAD	9689741233	darpan@gmail.com	male	30-08-1995 00:00:00	MGR002	20%
7	femenca	DOMBIVALI	8863259744	femenca@gmail.com	female	31-08-1995 00:00:00	MGR002	33%
8	vedant	MALAD	9969852144	vedant@yahoo.com	male	02-03-1986 00:00:00	MGR002	25%

FIG 3: AFTER ANALYSIS BASED ON FACTORS

Searh Report

| Hiren Yadav ▾ | | Search | Export To Excel |

Report

9	priyanka	KANDIVALI	9963254177	priyanka@gmail.com	female	04-08-1997 00:00:00	MGR002	24%
10	leena	GOREGAON	7852146362	leena@gmail.com	female	07-05-1995 00:00:00	MGR002	24%
11	kavita	BANDRA	9985214766	kavita@gmail.com	female	07-05-1998 00:00:00	MGR002	27%
12	john	DADAR	9988547214	john@gmail.com	male	08-06-1994 00:00:00	MGR002	26%
13	rehman	CHARNI ROAD	8856324711	rehman@yahoo.com	male	15-05-1998 00:00:00	MGR002	25%
14	suraj	MALAD	7528941369	suraj@gmail.com	male	26-12-1994 00:00:00	MGR002	23%
15	sunil	PALGHAR	8546791277	sunil@gmali.com	male	25-11-1993 00:00:00	MGR002	27%
16	gavin	RAM MANDIR	9968524711	gavin@gmali.com	male	24-10-1998 00:00:00	MGR002	24%
17	chaitali	BORIVALI	9969851244	chaitali@gmali.com	female	02-07-1993 00:00:00	MGR002	25%
18	reena	KANDIVALI	9258746911	reena@gmali.com	female	04-09-1990 00:00:00	MGR002	25%

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SrNo	Name	Address	MobileNo	EmailId	Gender	DOB	Manager Code	Percentage
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5	sonali	COLABA	7784515233	sonali@gmail.com	female	29-08-1995 00:00	MGR002	25%
6	darpan	MIRA ROAD	9689741233	darpan@gmail.com	male	30-08-1995 00:00	MGR002	20%
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14	suraj	MALAD	7528941369	suraj@gmail.com	male	26-12-1994 00:00	MGR002	23%
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18	reena	KANDIVALI	9258746911	reena@gmali.com	female	04-09-1990 00:00	MGR002	25%
19	radhika	BORIVALI	9987546322	radhika@gmali.com	female	25-02-1992 00:00	MGR002	27%
20	radha	MALAD	8865321477	radha@yahoo.com	female	12-12-1992 00:00	MGR002	27%
21	nauman	GOREGAON	9985647122	nauman@gmali.com	male	13-10-1996 00:00	MGR002	26%
22	ilma	DADAR	9965874122	ilma@gmali.com	female	12-12-1994 00:00	MGR002	24%
23	rakhshi	COLABA	9669854711	rakhshi@yahoo.com	female	11-11-1991 00:00	MGR002	26%
24	vandana	GRANT ROAD	9966558877	vandana@yahoo.com	female	10-10-1990 00:00	MGR002	22%

FIG 4: FINAL REPORT GENERATED USING EXCEL

V.CONCLUSION

The Result was calculated on the basis of grade ie A,B,C,D and percentage 4%,3%,2%,1% respectively. The above mentioned is present in Rating section where the Manager gives rating to the employee on the basis of his/her performance taking specified factors into consideration.

On the basis of grade percentage given a result out of 10% is calculated taking average of the grades given which is because addition of above percentages sums up to 10% Applying K-mean algorithm to the process, Result is represented in the excel sheet.

VI. FUTURE ENHANCEMENT

In future experimenting with different algorithms can be done to get more efficient result. On working on performance, many attributes have been tested, and some of them are found effective on the performance prediction.   As future work, it is recommended to collect more proper data from several companies. Databases for current employees and even previous ones can be used, to have a correct performance rate for each one of them.

VII. REFERENCES

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