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EMPLOYEE PROMOTION PREDICTION USING DECISION TREE ALGORITHM

NIHARIKA M , VIVEKANANDA GN , ASHOK K

Abstract — Human resource management(HRM) study focuses on promotion. Cause of there are some studies on the mining of promotion attributes, this work analyze the data from a business to build a set of attributes and apply ML algorithms to speculate employee promotion(EP). A correlation analysis is used to investigate the relationships between certain characteristics and promotion. After that, model learning and testing takes place. The decision tree(DT) model performs the best in experiments, demonstrating the validity of attrition. Ultimately, we conclude each attributes to further investigate its impact on staff advancement. When compared to personal basic attributes, post attributes have a greater impact on appraisal. On going years, the number of several positions held, and the inflated department position are all factors that influence employee advancement. Every corporation in our daily lives uses an employment promotion prediction system. Every company that uses this promotion prediction system provides a salary scale and advancement opportunities. Promotion is a continual process that occurs once a year as a formal exercise before the end of the fiscal year. Promotion has a huge motivational impact on people since it provides them with valuable feedback and is a great way to recognize them. This project outlines the performance prediction method and attempts to determine how efficiently it is carried out. In our project, we are attempting to forecast the various stages of employee performance.

Keywords : prediction algorithm; ML ; adaptive boosting; logistic regression(LR); DT classifier; random forest classifier(RFC);

I. INTRODUCTION

People are highly motivated by promotion since it provides them with valuable feedback and allows them to be recognized. This project explains the performance prediction method and tries to figure out how effective it is. The goal of this project is to generate a ML model that can estimate employee performance levels at various phases utilizing an EP prediction system.

The project is divided into three sections:

1) Analyzing the employee performance level
2) Comparing with all employee level
3) Speculate the different stages of performance level

To do this project, Python interface and model installed. ML Initially, the available data is read and analyzed staff performance. After the analysis find the opportunity for staff promotion based on critical performance. This ML model is the best creative employee is based on five levels of quality. Most corporation or companies have a formal performance appraisal system where work performance is integrated regularly, usually once or twice a year. Performance testing system testing can greatly benefit the corporation.

It will help staff behavior about organizational goals and letting employees know what is expected to them, and reveals the knowledge of making employment decisions, such as in respect of promotions, salary increases or dismissals. Develop and effectively implement the testing process is not an easy task. Work can improve its performance to monitor the progress of their work. ML algorithms the combination and the DT of the data mining method can be used to find the key features of the corporation future forecasts. Blending is a method of merging data into classes with similar features where intraclass similarities exist increased or decreased. This method is widely used in the future forecast.

II. LITERATURE REVIEW

In [1], authors have proposed HRM approach will be changed. As the role of talent grows, businesses need to pay more attention to people's finances. At the same time, smart production also appeals to smarter HRM. Based on data collection, businesses should use big data and smart technologies to analyze employees, speculate the future, and

Niharika M , Dept. of CSE , Madanapalle Institute of Technology & Science , Madanapalle , A.P ., INDIA.
Vivekananda GN, Associate Professor, Dept of CSE, Madanapalle Institute of Technology & Science, A.P., INDIA. (Email:drvivekanandagn@mits.ac.in)
Ashok K , Dept. of CSE , Madanapalle Institute of Technology & Science , Madanapalle , A.P., INDIA.

support businesses. Therefore, the paper seeks to prioritize ideas for a data-driven solution to the issue of promotions in HRM and focuses on the influence that emerges on behalf of the corporation. The information comes from a state-owned company in China. Here organizational features are selected to analyze staff growth and job prediction. From analysis based on statistics and networks, as well as predictions based on ML, we find that structural design plays a more important role than geographical position. Alternatively, employees can benefit from working in an area where specialized information is available, where travel is stable, or where resources are plentiful.

In [2], authors have proposed that in paper, the issue of staff change, and key ML algorithms used to solve it . The narrative contribution of this paper to survey it gradient enhancement usage as improved on these traditional algorithms, especially in them the ability to automate data that is very common this domain. This is done using data from HRM for a global retailer and diminishing problem management as the task

of sorting and comparing it using surveillance techniques. The conclusion is reached by comparing high accuracy of XGBoost classifier opposite to other strategies as well as explaining the reason for its high performance. This paper is structured as follows: It provides a brief summary of the problem of staff change, importance to solve it and historical work done in practice of ML methods to solve this problem.

In [3], authors have proposed that, in paper we are trying to orginate a model that will speculate the churn level of employees based on the HRM statistics database found on the Kaggle website. To show the connection between attributes, a connection matrix and temperature map is generated. In the test section, a histogram is generated, showing the differences between left-handed employees against salary, department, satisfaction level, etc. For predictive purposes, we use five different ML algorithms such as the vector line, C 5.0 DT section, Random Forest, nearby k and the Naïve Bayes section. In this narrative raises the reasons why it is better to withdraw employees from any corporation.

In [4], authors have proposed in this paper seeks to prioritize ideas for a data-driven solution to the issue of promotions in HRM and focuses on the influence that emerges from the corporation. The information comes from a state-owned company in China. Here organizational features are selected to analyze staff growth and job prediction. From analysis based on statistics and networks, as well as predictions based on ML, we find that structural design plays a more important role than geographical position. Alternatively, employees can benefit from working in an area where specialized information is available, where travel is stable, or where resources are plentiful. But corporation should be concerned about staff development in the right way. The test results also confirm that the prediction model is effective and efficient.

In [5], authors have proposed in this paper loss of staff (profit) causes great expense to any corporation that may later use all of its efficiency. According to a CompData study, over the past five years, revenues have increased from 15.1 percent to 18.5 percent. In any corporation, finding a well-trained and experienced worker is a daunting task, but it is even more challenging to replace it. This not only increases the significance cost of H, but also contributes to market value of the corporation. Despite these facts and basic facts, there is a little attention in the literature,which has been embedded in many misconceptions between HR and staff. Therefore, the purpose of this paper is to provide a framework for predicting employee harassment by analyzing the employee's correct behavior and qualifications using classification strategies.

In [6], authors have proposed in this paper staff turnover has been recognized as a major industry problem due to its negative impact on workplace results and long-term development strategies. To address this issue, authorities use ML methods to estimate employee benefits. Accurate forecasts should prompt management to take action against employees. However, data on this type of problem comes from HR Information Systems. This leads to higher noise levels in data that produce speculative models that are discarded in excessive proportions

and therefore inaccurate. This is a major problem that is the promotion of this research, and one that has never been addressed before. The youth contribution of this study is to re-evaluate the use of the Gradient Boosting method which is more robust due to its general design. Global trader data is used to compare Gradient Boosting against three commonly used surveillance categories such as LR, Vector Support Machine, Informal Forest and show its high suggested predictability of employee profits. In this research I also used the Artificial Neural Network to learn how the neural network helps to differentiate between different classes. This paper aims to develop models that can speculate the number of employees and can help an corporation to take the necessary steps to retain these employees.

In [7], authors have proposed in this paper the current study used meta-analytic measurements and an analysis method to assess whether staff engagement (EE) constructs a growing relevance to predicting employee success (a broad measure of work-related behavior) in addition to other work attitudes such as job satisfaction, job. involvement, and organizational commitment. Meta-analytic estimates between EE and various employee success indicators were calculated from 49 published interactions representing a total of 22,090 people. We combined these published meta-analytic estimates between employee performance and work attitudes to produce a meta-matrix representing 1,161 unique connections. Using this meta-matrix, a series of method model comparisons yielded two results: (1) EE incorporates lower and middle increasing stiffness than the individual work attitude (change R2 of 0.02 to 0.06), and (2) EE incorporates low rise qualifications in addition to a high-level attitude that represents a combination of other work attitudes in predicting successful construction of a high-level employee (R2 change of 0.01). Considering the brevity of popular EE measures, the results suggest that EE is better considered as a high measure of work attitudes that is an effective and concise predictor of employee success.

III. PROPOSED SYSTEM

The promotion of an employee is predicted by using EP prediction system. And the system consists of :

- Using data collection, data mining and staff performance are available source for forecasting staff promotions.
- The DT offers more accuracy than other models.
- Compared to the existing Mechanical Learning model it provides more accurate prices and cost effectiveness.

A. Performance Appraisal System

Performance appraisal is a process of evaluating an employee performance in terms of it's requirements. Performance Appraisal can also be defined as the process of evaluating the performance and qualifications of the Employee in terms of the requirements of the job for which he is employed, for purposes of administration including placement, selection for promotions, providing financial rewards and other actions which requires differential treatment among the members of a group as distinguished from actions all members equally.

In fig 1 the performance of an employee has been shown:

Figure. 1: EP prediction system

IV. RESULTS AND DISCUSSIONS

The analysis of employee's data and results of an particular data of an employee as shown in below figures.

The age of an employee graph as shown in above graph i.e., fig 2.

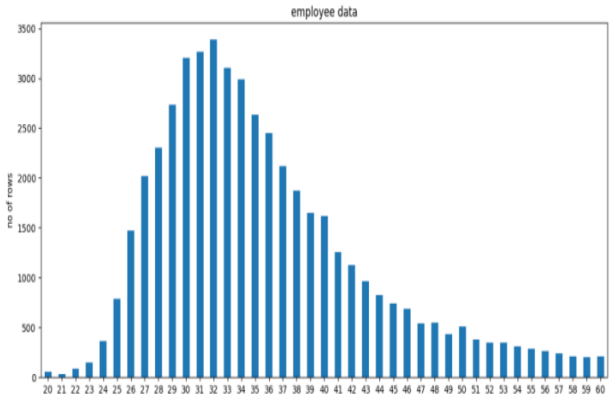

Figure 2: Age of Employee Graph

The Education graph of an employee is as shown in below graph i.e., fig 3. This graph explains the difference between bachelors, below secondary , masters and above.

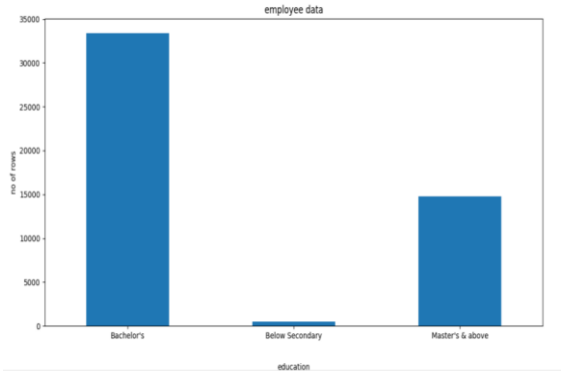

Figure 3: Education Graph

Based on employee data gender bias graph has plot on this paper and shown as fig 4.This graph shows the based on difference between female and male.

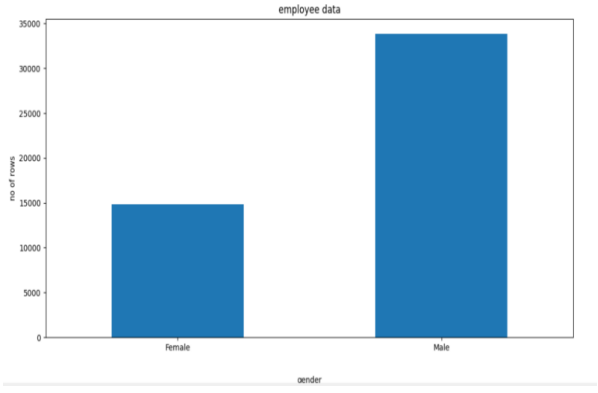

Figure 4: Gender details

The below fig 5 explains that number of training's of an employee to promote an employee based on employee data.

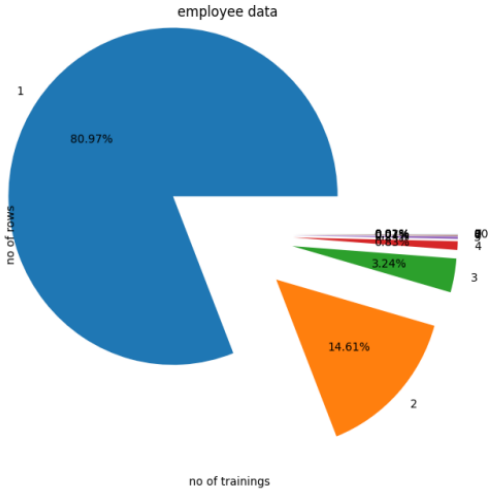

Figure 5: N.O of Trainings

The fig 6 shows the average training score graph based on employee data

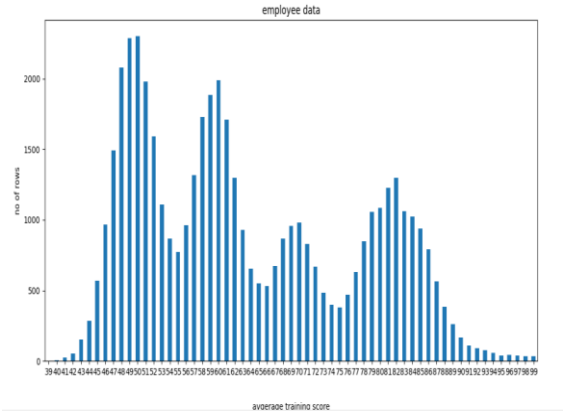

Figure 6: Average training score graph

The fig 7 is one of the result of an EP prediction system and it explains how an employee will get promotion based on his Experience.

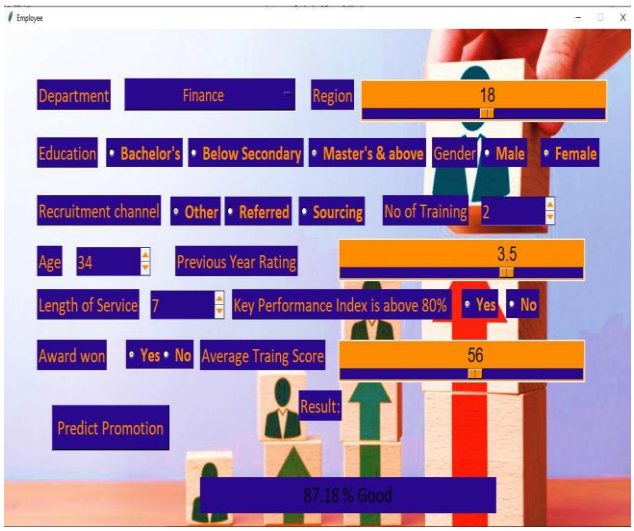

Figure 7: Stage of level 1

The fig 8 is one of the result of an EP prediction system and it explains how an employee will get promotion based on his experience.

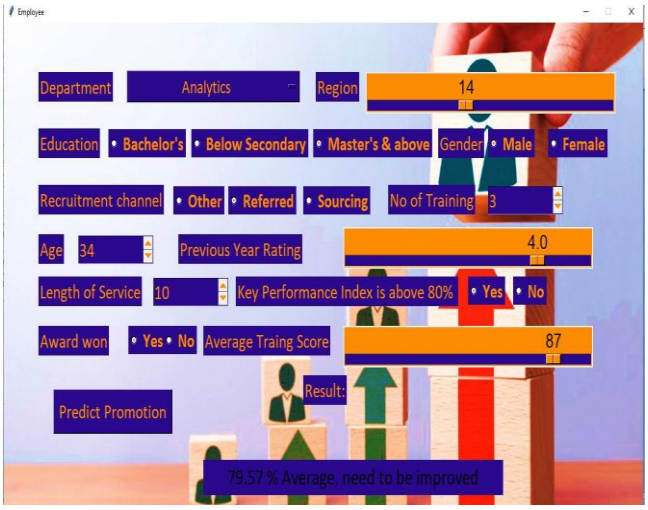

Figure 8: Stage of level 2

V. CONCLUSION AND FUTURE WORK

After having analyzed the data, the machine learningmodel of k-means clustering algorithm and DTA K means clustering algorithm is a common way to define classes of jobs. Here we apply K-means clustering algorithm for partitioning Employee into different cluster based on their quality of Performance. We use DTA for classify Employee easily and take appropriate decision quickly. Several actions can be taken in this circumstance to avoid any danger related to hiring poorly performed employee.

Future work includes highly relevant data from a few companies. When producing a suitable model, these algorithms can be developed to speculate the performance of employees in any type of corporation. In a future study, we used to recommend the capture of data about organizational risk-taking interventions for employees and their outcome.

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