

Prediction of Employee Attrition

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Abstract: *The attrition of employees is the problem faced by many organizations, where valuable and experienced employees leave the organization on a daily basis. The higher wages coupled with shortage of experienced professionals started leading to higher attrition rates. Shortage of qualified personnel and employee attrition were two main problems expressed by many of the firms. The main objective of this research work is to develop a model that can help to predict whether an employee will leave the company or not. The essential idea is to measure the effectiveness of employee appraisal and satisfaction rates within the company, which can help to reduce the attrition rate of employees. Implementing this principle will help management in employee appraisal and in the decision-making process to recognize valuable employees who will leave the company. Using this application, hidden reasons for employees' attrition can be identified, and management can take preventive actions regarding attrition of each employee individually.*

Keywords: Human Resource Management, Machine Learning, Prediction, Classification, Employees Attrition.

I. INTRODUCTION

Human resources are considered as the most coveted resources of any organization. A replacement for a human resource is not as easy as replacement of any other resource. An organization can perform well only with right number of people with right skills to perform the right task. Stating the same reason, the attrition of employees is considered as a great menace for organizations. Machine learning is one of the driving technologies implemented in fourth Industrial Revolution. Machine Learning can develop technology to help smart industries. It leads to an effective functioning of organizations with optimal usage of all resources including human resource. Machine learning can be utilised for developing models that can predict the retention or attrition of employees. Reducing the attrition rate is very important because losing an employee can be very costly for the organization as it is difficult to get an exact replacement. Selection and training of newly recruited employee can also cost heavy for the organization. The study is using machine learning algorithms like classification and clustering for preparing the prediction models.

The objective of this survey is to provide insight into each process by gathering data and then using it to make relevant decisions about how to improve these processes by training the model based on previous attrition data available and predicting it in future for better company HR management.

II. RELATED WORK

1. Ibrahim, to solve a big problem of customer churn related to a business, especially telecommunications by building models with different techniques such as Classification for prediction, Clustering for detection and Association for detection
2. K. Dejaeger, a profit centric performance by calculating the maximum profit using optimal fraction with the highest predicted probabilities of customers to attrition in a retention campaign.
3. Sepideh, even if we consider an optimum low churn rate of 5%, when an employee leaves the firm the cost involved is approximately 1.5 times the annual income of an employee.
4. IBM Watson team M. Singh, a brilliant analysis of employee's attrition process and proposed a framework which finds out the reasons behind attrition and identifying potential attrition.

III. LITERATURE REVIEW

Every organisation has attrition of employees. People either resign or retire. This issue can have severe implications for the viability of an organisation if this does not happen in an orderly fashion and if employees leave unexpectedly. Employee resignation causes the company loss of productivity. There are other economic costs related to employee attrition, such as the company must pay the workers who are handling the leaving employee's work until the organisation hires new ones. Companies need to spend money on job advertising, interviewing potential substitutes, in addition to the fees related to the actual recruiting and hiring an employee. These papers are close to the objectives of this system and the observations of these research papers are analyzed in the proposed work. Various existing techniques and algorithms are described in following table.

Sr No.	Paper Title	Mechanism	Advantages	Disadvantages
1	Explaining and predicting employees attrition: a machine learning approach	Machine Learning	Light on different factors influencing the attrition rate of workers and their possible solutions.	Organization has to invest an abundance of time and money for their training as per the organization's requirement.
2	Prediction of employee attrition using workplace related variables	Classification of regression trees, Chi-square automatic interaction detection and ANN	Classification models such as Artificial Neural Network are easy to implement due to considering only work related variables	Behavioural aspects are yet to be studied in detail
3	Employee Attrition Prediction	Machine Learning Random Forest, Naive Bayes, Extreme Gradient Boosting, Decision Trees	Survey will help the human resource managers to identify the employees that are likely to leave the organization and predict the possible reasons for their decision,	Scope of this study is very limited
4	A comparative study on ML algorithms for employee attrition prediction	The performance is measured in accuracy, precision, recall and time taken to build the model.	Machine Learning: classification and clustering	Dataset used are small with less number of attribute
5	Analyzing Employee Attrition using Decision Tree Algorithm	Decision tree algorithm	Compared to other algorithms, decision trees require less effort for data preparation during preprocessing.	A small change in the data can cause a large change in the structure causing instability.
6	Early Prediction of Employee Attrition.	Random forests	It is flexible to both classification and regression problems.	Longer Training Period
7	IBM Employees Attrition Analysis	logistic regression	Logistic regression is easier to implement.	It can only be used to predict discrete functions
8	Employee churn rate prediction and performance using machine learning	Decision tree, logistic regression	This algorithm allows us to make a decision i.e. either true/false	It does not work well with clusters of Different size and Different density

9	An Improved Machine Learning Based Employees Attrition Prediction	Max-Out Feature Selection Algorithm	A comparison of the results with the existing method reveals that the proposed feature selection increases the performance.	There is no deterministic analytical relation between employee attrition
10	From Big Data to Deep Data to Support People Analytics for Employee Attrition Prediction	Recursive Feature Elimination (RFE) method	The main goal of this research is to help HR managers to detect as soon as possible an employee's intention to leave company	Unbalanced data is a real challenge especially for organizations and companies with high turnover rates.
11	Employee Attrition Prediction Using Classification Models	k-Nearest Neighbor algorithm	On evaluating performance of five classification models	A small change in the data can cause a large change in probabilistic estimation.
12	Machine Learning Based Attrition	k-Nearest Neighbor algorithm	The adaptive probabilistic estimation model gives good prediction results.	Dataset used are small with less number of attribute
13	Evaluation of Machine Learning Models for Employee Churn Prediction	Machine Learning K-Nearest Neighbour Naive Bayes Classifier Random Forest	This machine learning algorithm find out which algorithm is performing well	Further exploration need to minimize error prediction rate
14	Comparison of Machine Learning Techniques to Predict the Attrition Rate of the Employees.	Machine Learning Logistic Regression	using EDA (Exploratory Data Analysis) the main characteristics of the employee data can be analyzed through visual representation	If the number of observations is lesser than the number of features Logistic Regressions is cannot be used
15	Towards Understanding Employee Attrition using a Decision Tree Approach	Machine learning with decision tree approach	Decision Trees are one of the most popular predictive models	A small change in the data can cause a large change tree causing instability.
16	Early Prediction of Employee Attrition using Data Mining	Machine Learning	The predictive attrition model helps in making better hiring decisions	It is slightly slower

Table 1: Literature Review

IV. CONCLUSION

In employee attrition problem, an estimation can be framed for either the employee will leave the company or not. With this analysis, the organization can choose the employees with the utmost chances of leaving the organization and then assign them confined incentives. There could also be some cases of false positives where human resource thinks that employee will leave the company in a short span of time, but actually, the employee does not. These mistakes could be affluent and troublesome for both employees and human resource but is a better deal for relational growth. On the other hand, there could be a false negative, too, when a human resource does not give encouragement/hike to the employees, and they do leave the organization.

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