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Determining the intention of new recruits to quit or stay in the organisation: An empirical study on private sector bank employees of India

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Abstract – The article is aimed to identify the candidates whose intention to leave is strong in near future thus trying to bridge the gap between the research and practical application in the problem area of private banks of India. The candidates that are spoken about are those who would be selected afresh to join the organization. Here, a framework is defined to predict the candidates who would be retainable by the banks. By predicting the intention to leave the organization, the organization would be able to plan the turnover and reduce the cost to the organization to make them profitable. The article uses three supervised machine learning techniques to undertake the prediction of candidates by classifying the dataset into two classes i.e. those who as "intention to quit" and "intention to stay". The three algorithms are Logistic regression, Support Vector Machine and Random Forest Algorithm, Logistic regression giving the highest accuracy of 88.9%.

Key Words: *intention, quit, personality traits, perceived job characteristics.*

1.INTRODUCTION *(Size 11, Times New roman)*

"Retention" is a term used to describe the ability of the organisation to keep its employees for a longer tenure. Interchangeably it can be described as the percentage of employees an organisation is capable of holding. The term "retention" is however in various reviews have been used in lieu of "attrition" and "turnover". Turnover is the rate at which an employer gains and losses employees. The simple way to describe it is "how long employees tend to stay" or "flow rate through the revolving door." (Roya Anvaria*, 2014)Attrition refers to reduction in strength of employees by not replacing the ones who have already left. It can be summarised that frequency of leaving an organisation is turnover, inability to reduce this frequency is attrition and ability to reduce the frequency is retention. The ability to retain employees in any organisation can thus be graded as one of the strengths of an organisation. Inability to attain retention of employees can give rise to costs involving advertising for the vacancy, headhunting fees, resource management fees, time, productivity cost, imbalance of the work environment among the working employees, training and development of the new entrants (Roya,2014), decrease in employee morale and satisfaction leading to more turnover. This retention capability is said to be posing a great threat for the banking sector in India. As indicated in report of the Economic Times of 2010, retention of bank employees will be a great concern in recent times as indicated by the then RBI Governor, K.C Bhattacharyya. It is mentioned in the reports of 2020 of the Economic Times that the banking and financial service institutions recorded the highest turnover rate. Therefore, more innovations, creative models, ideas and strategies are to be designed to tackle these concerns of employee turnover. There are no proven ways of eliminating this HR phenomenon from any organisations , however , ways to diminish turnover can be figured out by researchers.

The paper contemplates various field as to understanding about employee retention, the various factors and causes, the challenges that would rise up and also the ways that have been used to presume it. The researcher hence tries to bring out the researches that have been done to understand employee retention, their causes, impact of various causes on predicting their intention to leave or stay in the organisation and also their personality traits on the intention. The quality of human capital is crucial for organisations to maintain competitive advantages in knowledge economy era. However, organisations suffering from high turnover rates often find it hard to recruit the right talents. In addition to conventional human resource management approaches, there is an urgent need to develop effective personnel selection mechanism to find the talents who are the most suitable to their own organizations (Chien &Chen, 2008). In the

same year (2008), Alao et.al. explored the relationship of withdrawal behaviours like lateness and absenteeism, job content, tenure and demographics on employee turnover in a rapidly growing sector like the Indian software industry. The unique aspect of this research was the use of five predictive data mining techniques (artificial neural networks, logistic regression, classification and regression trees, classification trees (C5.0), and discriminant analysis on employees of a large software organization where he saw relationship between withdrawal behaviours and employee turnover. Moreover, employee attrition prediction also depend on salary and tenure of service in the organisation (Nagadevara,2008) internalized identifications of supervisors, business support, leadership, management, growth and self-realization and the influence of supervisor commitment (or loyalty)(Fan, 2012).The employee churn is a term used for employee turnover and its prediction is based on various reasons related to intrinsic motivation and also external influences. Therefore, a network probabilistic model was developed considering intrinsic motivational factors and external influences. (Guannan Liu, 2015). Literatures also revealed association between intention to leave an organisation with the personality traits and demographic factors. Judeh in his research studied the effect of only two selected personality traits, out of the Big 5 personality traits on the intention to leave. The selected traits were conscientiousness and extraversion for the insurance company's employees of Jordan. Even, Winters found significant relationship between emotionality, honesty, openness, agreeableness with the tenure and intention to leave an organisation among emergency nurses. Zimmerman in the meta analysis reveals that emotionality is the best predictor of any individual's intention to quit an organisation (Zimmerman, 2008). Job characteristics are considered a contributing factor for the retention of employees at work, but the mechanism behind this relationship remains unclear. (Vui-Yee, 2020). Perceived job characteristics like enriching job demands, self-expression, promotions and other benefits, supervision, role strain etc. have impact on job satisfaction of both male and female. it is also commented that Women are increasingly entering the labour force and are beginning to enter jobs previously held by men. Many of these traditionally male jobs have been considered unsuitable for women on the basis of assumed sex differences in job capabilities and interests. The similarity in job characteristics related to job satisfaction among men and women suggests that sex differences regarding satisfying work roles have been exaggerated. (Voydanoff, 1980)

Within an organisation, when any kind of data is very high in number, it becomes difficult for the analysts and the managers to manage them and build strategies for that. The potential hires and aspiring candidates to join banking sector is large in number, so to classify and churn out the probable successful hires would be a tedious task. Here, the successful hires are those who stick to the organisation for a period of one or more years. The retrieval of such data, extracting valuable knowledge form such data and using it for prediction with greater accuracy would help the organisation and ease the work of the managers. Literatures have revealed that machine learning and data mining techniques have been used for efficient prediction of various human resource functions in various sectors. The algorithms like logistic regression, SVM and random forest classifier are used in the research paper for designing the proposed model. SVM enables the classification of the input variables into expected classes, by creating a hyper plane in between and then maximizing the margin between the points from the different classes and the hyper plane acts as a constraint the misclassification (Tatiana A. Cardonaa, 2019). The algorithm can be used in linear and nonlinear models. Logistic Regression is a statistical approach for assessing a dataset in which there are one or more autonomous variables that establish an outcome. Logistic regression is a regression model that fits the values to the logistic function. It is useful when the dependent variable is categorical . Logistic regression is often used with regularization techniques to prevent over fitting. Random forest classification is a commonly-used machine learning algorithm trademarked by Leo Breiman and Adele Cutler, which combines the output of multiple decision trees to reach a single result. Its ease of use and flexibility has increased its adoption in all fields of prediction and classification. Random forest algorithm deals with the problem of variance. Random forest algorithm has a high prediction accuracy with good tolerance for abnormal value and noise.((Xiang Gao, 2019)

This paper discusses a predictive model which will assist employers to identify the employees who intends to leave within a short span of time of joining the organisation and who does not. This classification for identifying the same was done on the basis of various factors including personal information, personal traits and perceived job characteristics. The personal traits or the personality traits was specifically identified by the Big 5 traits. Big 5 model

described the five broad dimensions of individual's personal traits acronymed as "OCEAN" or "CANOE". The traits are Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism.

Perceived set of job characteristics is defined as an individual's subjective evaluation of aspects within their job environment that influence their attitudes and behaviors. The questions were framed as pertaining to the Job Characteristics Model developed by Richard Hackman and Greg Oldham in 1976.It is claimed to be a widely used framework for job analysis and job design research.

There is a dearth of studies which looks after psychological traits and perceived job characteristics of any job to make the prediction of intention of the new hires to quit their job or not. The reviewed studies were based on various health workers, managerial professionals, students, faculties of universities etc. Moreover, private banking sector in India have seen dramatic peak of employee attrition and bank have also been one of the major contributors towards the nation building yet it has been seen that not much research has been done in this field ((L S Sharma, June 2017)The need to undertake study was thus identified. The paper here tries to build a framework which will identify the factors that determines the intention of new recruits to quit or stay in the organisation. The paper also suggests the model so that the intention of any individual can be predicted. This prediction would thereby help the organiation to identify those recruits who has more probability of quitting the organisation. The prediction would also help the organisation to reduce the burden of selecting such a recruit who would result in wasteage of resources and drainage of knowledge of the organisation. The designed model in the paper will try to figure out the new recruits that have a possibility to quit the organisation in a short span of 12 months' timeframe. The model would predict by classifying between those who intend to quit and those who intend to stay and also identifying the features that have significantly impacted both the classes.

The research questions identified for the paper are as follows:

RQ1: What are the various features which can help the organisation to predict individual's intention to quit the organisation?

RQ2: Can a practical model useful and convenient for the HR managers be built which would give a readymade answer to the manager regarding the intention of the particular candidate?

RQ3: Can a classification be done among the new hires who have intention to quit and intention to stay?

RQ4: Do the big 5 traits of individuals have any impact on intention of individuals to quit an organization?

RQ5: Do the individuals' perception towards the new job have any impact on intention of individuals to quit an organization?

To address the above questions, the authors discusses various demographic factors, the Big 5 psychological traits, perceived job characteristics to develop the model. The proposed model is then also tested for random input to check for the outputs. The features for the model are designed as close ended questions of a questionnaire for the new hires. The data has been collected on the basis of 4 categories : Part I

The first part of the questionnaire has questions regarding demographic details of the respondents which include age, gender, designation, work experience, educational qualification and marital status.

Part II

The individual personality traits in the questionnaire was based on Big 5 personality traits by TIPI (Ten Item Personality Measure)format used in understanding human behavior, general personal information with closed options. TIPI format consisted of bipolar adjectives. One descriptor being desirable whereas the other being undesirable anchored by 7point bipolar scale. The validated consistent tool was developed in the USA by Gosling, Rentfrow and Swan (2003)

Part III

The third part of the questionnaire tries to understand how the respondents think or perceives their job to be. Since the respondents are new to the organisation; either they have not undertaken any performance appraisal session or have been through just one. They are new to the system and have only thought their jobs "to be like". So, this part of the questionnaire is categorised as "perceived Job characteristics". Perceived set of job characteristics is defined as an individual's subjective evaluation of aspects within their job environment that influence their attitudes and behaviors.

Part IV

The last part of the questionnaire dealt with the intention to stay in a particular organisation. This part was based on validated shortened version of Intention to stay scale typically nomenclature as TIS-6 scale. (Chris FC Bothma, 2013)

The scales of the questionnaire has been tested for reliability and validity as per the below table

Name of the Scale	Cronbach's Alpha	No. of items
TIPI Scale ((Samuel D. Gosling, 2003)	0.72	10
TIS Scale((Chris FC Bothma, 2013)	0.8	6
Perceived Job Characteristics Scale (Calculated)	0.714	13

Table 1: Reliability Scores

For Validity checking, out of all the 7 Subject Matter Experts, 2 items were marked as essential by 6 experts and 1 expert marked "not so relevant". However, other 33items were marked as essential by all 7 experts. Therefore, Content validity ratio is 0.714 for the 2 items and for other 33 items, CVR=1. Hence the items of the questionnaire were found to be valid and reliable source for data collection.

The entire sampling is done in two phases: In the first phase, the 6 universities of each category namely central, state and private universities of Assam as per the year of establishment are selected i.e. two state universities, Gauhati university (1948), Dibrugarh University (1965); two private universities i.e. Assam Don Bosco University (2008) Assam Down Town University (2010) and two central university in Tezpur(1994) and Assam University ,Silchar (1994).In the second stage, from these 6 universities, respondents are selected from the alumni records ,those who have been selected in banks and left it before completion of 1year are selected in the sample. The ones who have been selected but not joined the organisation have also been considered. The alumni records are considered from the time frame 2012-2020. The sampling technique is multi stage convenience sampling. Valid response for the study was found out to be 89.4% in a sample size of 500.

The dependent variables considered for the study are demographic factors like age, gender, occupation , qualification, competitive exam aspirants, perceived job characteristics like dream job in banking sector, promotion and career development, job confidentiality, seriousness of the job, workload in the banking sector, current scenario of the sector, contribution towards the organisation during hours of need, affinity towards a particular bank and its reputation , job security , curiosity to know better about the sector and organisation, relocation, opportunity, open to new threats in job, adequate skill and qualification required, curiosity towards work, relocation, travelling in the course of job.

The predictive model was designed by three techniques i.e. Support vector Machine, Logistic regression and Random Forest classifier. These 3 tools were used from the python libraries and accuracy score for each were calculated. The most accurate model was considered for further analysis.

The accuracy of these three models are found to be

Classifier	**Accuracy Score**
Logistic Regression	88.9%
Random forest classifier	75.3%
Support Vector Machine	67.3%

Table 2: Accuracy Scores

The most accurate model is considered i.e. Logistic Regression and the confusion matrix is as follows:

	Prediction	
Reference	Positive(1)	Negative(0)
Positive(1)	42 (TP)	10(FP)
Negative(0)	7(FN)	87(TN)

Table 3: Confusion Matrix

The various metrics to describe the performance of the logistic regression model calculated from the confusion matrix is given by :

Precision= TP/(TP+FP)=42/49=85.7143%

Sensitivity= TP/(TP+FN)=42/52=80.7692%

Specificity= TN/(TN+FP)=87/94=92.5532%

The coefficients generated for each feature is a follows:

```
Coefficients: [[-0.0874912  -0.17189475 -0.0192401  -0.
   0.47111804 -0.23272515 -0.30307871  0.06349078 -0.41
  -0.45118615 -0.12907585 -0.55840168  0.14810636 -0.43
  -0.76774398 -0.28504584 -0.38373088 -0.39377927 -0.54
Intercept: [18.78272141]
```

Based on these features' coefficients , a plot of the importance of these feature has been obtained so to understand the basis of classification.

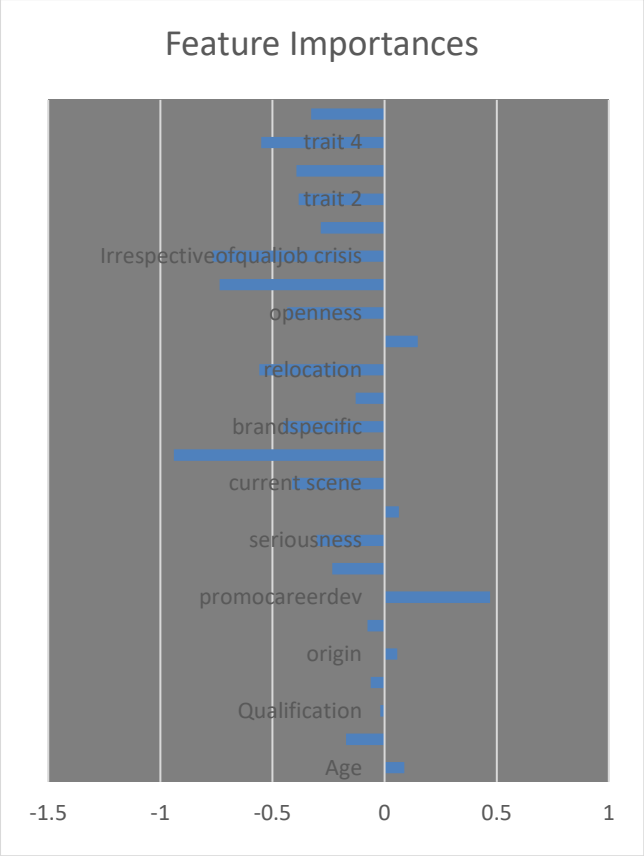

Chart1: Feature Importances

Positive coefficients indicate that the event of falling in the desired class ie intention to quit is more likely at that level of the predictor. Negative coefficients indicate that the event is less likely at that level of the predictor than at the reference level. The table here depicts the various features having positive coefficients . The interpretation based on the dataset available for each feature has also been discussed in the table.

Features	Coefficients	Interpretation
Opportunity	0.14810636	Since competition is high among the various players in the private banking sector, the candidates have enough opportunities luring them and hence job switch is rapid as competitors often pay hikes .
Workload	0.06349078	Perception of high work burden and pressure in banking sector , immense targets for loan disbursal, Accounts opening etc. just after induction, diverse responsibilities to a new hire, mostly the the new hires in the position of the tellers tend to leave more as they had to work for longer and continuous hours owing to demands of the customers.
Promo – Career Development	0.47111804	New recruits are very much attracted by the perception of career development in banking sector while they join the organisation. They are attracted by the multi level upskilling industry academia interactions

		programmes. They are however not able to stand out the load and additional benefits that consequences because of the upskilling programs and multiple job role assignments done by the banks.
Origin	0.05709738	The place of posting for the new recruits is also acting as one of the important feature though of less importance. The place of origin and place of posting if same resulted in no culture conflict, no language barriers, no problems in understanding the places of travel.
Age	0.0874912	Age was also identified to be a feature for classifying an individual into class 1 i.e. intend to quit. Investigating the data set it was found that age group of 20-25 and 25-30 years of age intends to quit more.

Table 4: Interpretation of Important Features

Finally, the authors also want to display the results for any random inputs on the basis of the given training. The model has been trained on the 70 % the dataset and tested with high accuracy as discussed above in the 30% of the dataset. The random inputs which when fed by any user as per the designated codes prescribe by the authors (eg, Yes-1, No -2; Option 1 for any question of the questionnaire-1, option 2- for any question of the questionnaire-2 etc.) , and click on the run button the result displayed will be either " the candidate is eligible" or " the candidate is not eligible" . the output " the candidate is eligible" means that the particular candidate has the intention of staying longer in the organization and vice versa.

Conclusion:

Though retention and attrition of employees of various sectors have been studied by many researchers. But accuracy is of prime concern for any such models while predicting any issues. As human resource is an important asset and hard to quantitatively assess various aspects of the human resource. So, based on psychological traits, perceived job characteristics it was a crucial task to be done in order to predict the retention with high accuracy. The presented model based on the mentioned significant features classifies the new hires into the two classes. This would help the selectors to make their efficient management decision in hiring only those who would be retainable for a longer tenure.

The presented model has been used to predict retention of new hires in banking sector, however ,it can be extended and checked for sectors like IT, insurance , FMCG, FMCD and automobile sector where retention of employee is of great concern.

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