

A Study On Various Staff Level Attrition In An Automobile Industry Using Datamining Techniques

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Abstract—Attrition is an issue and high in the industry these days. It's the major problem which highlights in all the organizations. So, the organization loses key skills, knowledge and business relationships. Advance managers and administrators are really fascinated in reducing Attrition in the organization, in this way that it will contribute to the high effectiveness, big growth, and continues progress of the organization.

How to reduce employee's turnover intention is a challenge for HR. The study was done through some of the questionnaire taken from the exit interview and the from the HR database which holds the employee details in personal. From the analysis, it is known that turnover intention has most influence on attrition factors such as Career growth, working hours, personal / family reasons, and working condition, and salary package.

I. OBJECTIVE OF STUDY

The main objectives of this study is finding the primary and secondary reasons that causes attrition and applying various data mining classification tools in the dataset to find the accuracy level of each classifiers.

II. IMPORTANCE OF THE STUDY

The findings of the research will be summarized and submitted to the organization to adopt new techniques and approaches to minimize the attrition and to retain the employees in the organization to lead as successful Automobile Industry.

III. INTRODUCTION

Automobile Industry plays a vital role in the emerging world market. There are many new automobile industry which produces the large variety of vehicles. These vehicles are marketed to all over the world. In early days, transportation were done using animals. But the life cycle was changed and the mode of transportation was also changed. Now owning a branded vehicle makes as an ideal in their living society. Now it also becomes a passion to have a branded cars.

Though automobile industry produces large employment opportunity through direct and by contract with other company for their salary process and as their suppliers and for other functions, it is very often that employees are being

offered and resigned. Many of the automobile company are giving more salary and benefits like food, transport and other allowances. This makes many employees to have their vision to get employed in the automobile sector.

Every automobile industry has setup their production company all over the world. Through this, they have given work opportunities for thousands of employees. There are variety of employees are working in a production company. And each employee will have their own department and section depends of the mode of work. But majorly an automobile sector will have 70% of production employees and the balance 30% of employees are supporting team which includes HR, marketing and etc., they are even classified as direct, indirect and semi direct based on their work deployed to them.

IV. DATA MINING

The world contains more and more number of data. Data Mining can be defined in many directions. Data Mining is a process where we can mine the large amount of data as per our requirement and put the data together into a process to get the result that is suited to us. Hence data mining is process of mining the data from the vast number of data as per our requirement and acquire knowledge from the mining. People may say data mining is also a Knowledge Discovery from the various amount data available around the world.

This Knowledge Discovery having the below sequential process to acquire knowledge from the available data. The below picture shows the process in sequence.

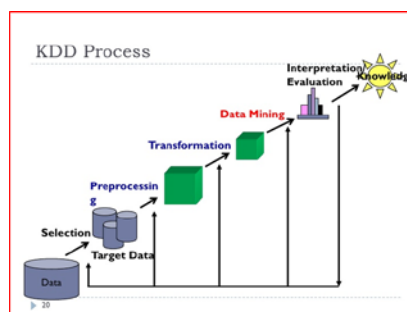


Fig:4.1 Step by step process of KDD

1. DATA CLEANING:

Data Cleaning is a process of removing noise and the inconsistent of data from the large amount of data. This is the primary process carried out in the KDD.

2. DATA INTEGRATION:

Integration is process of merging or combining the data to make the data as a meaningful.

3. DATA SELECTION:

Data Selection is nothing but the collecting the relevant data related to the knowledge process from the large amount of data available.

4. DATA TRANSFORMATION:

Here data are consolidated and are transformed into appropriate forms for mining operations.

5. DATA MINING:

This is the important role where intelligent ideas are applied to the data and get the data patterns from the available source of data.

6. PATTERN EVALUATION:

This pattern evaluation checks the truly interesting patterns that are representing the Knowledge Based data mining.

7. KNOWLEDGE PRESENTATION:

This the final stage where acquired knowledge are being visualized and displayed to the users for his better understanding.

V. WEKA TOOL

University of Waikato from New Zealand developed a data mining software “WEKA” (Waikato Environment for Knowledge Analysis) in 1997. WEKA is also named with Bird which is found in the islands of New Zealand. Weka is a flightless bird with an inquisitive nature. WEKA software contains a collections of machine level algorithms for performing the data mining tasks. These algorithms are either directly implemented by the data collected by the user. Or it can be called by using the java code to perform the task. WEKA 3 is an original designed tool used fully with the java code and it is used as a front end. Nowadays, this application is used in different areas like educational, agriculture and many research process.

WEKA tool has many advantage for his usage. It is portable. Because it is developed by the java code to understand by the user which can run in any platform Windows, Mac OS X and Linux. It is used as a GUI technology. GUI load the datasets, run the required algorithm and explore the result and experiments to publish. It is very easy to learn and work. The processing of a task is fast. Also it can available with the general public license.



Fig 5.1 – WEKA Tool

It also includes visualization tools. WEKA is also used for new creation of machine level language. WEKA is also a connectivity based software. i.e., Java and SQL can be easily connected with this software. Main features of WEKA that contains

- ❖ 49 data preprocessing tools
- ❖ 76 classification/regression algorithms
- ❖ 8 clustering algorithms
- ❖ 3 algorithms which is used for finding rule of association
- ❖ 15 attribute and subset evaluators + 10 search algorithms for feature selection.

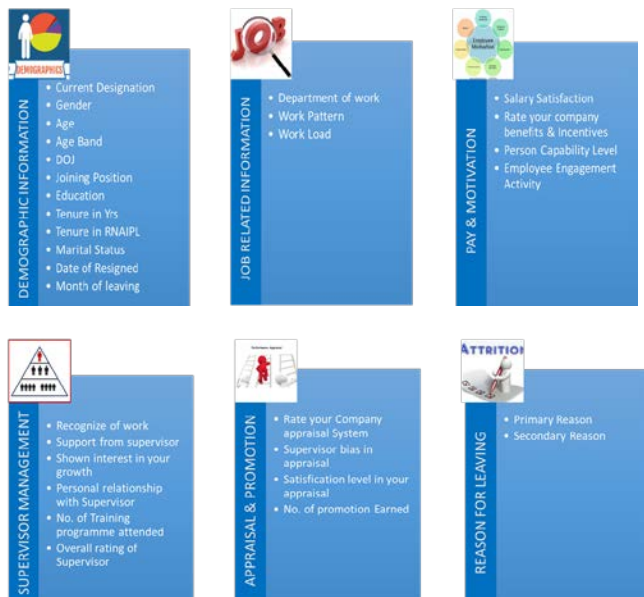
VI. ATTRITION

Attrition is a gradual loss of human resources known as employees over a period of time. In general, relatively high attrition is challenging one for companies. HR experts are often adopted to a leadership role in designing company compensation programs, work ethics and motivation part that help the organization retain top employees.



Fig: 6.1 Factors Affecting Attrition

In this study, data was collected with 30 questionnaire from nearly 300 employees worked with various designation in an automobile industry. The answers are directly proportional to individual attrition reasons. For example, Appraisal, salary, etc. Based on the data collection, the questionnaire was framed with 6 main clauses of data. They are



In an automobile industry, there are many reasons for the attrition in various level of employees. In that we are going to have a study on various staff level attrition. Based on the study and survey conducted with various level of employees in an automobile industry, the reasons are categorized as primary and secondary reasons for attrition. For easy understanding, it was grouped under a list of tables.

TABLE 6.1

S. No	Primary Reasons	Secondary Reasons
1	Behaviour of Supervisor	Nil appreciation from Supervisor
		No support from Supervisor
		Supervisor not transparent
		Difference of Opinion
		Supervisor being self-centric
2	Better Designation / Salary	Abroad Opportunity
		Better Career in Public Sector
		Better Career Opportunity
		Role Change
3	Higher Studies	Salary Increment
		Higher Studies
4	Own Business	Long Travel Time
		No Job Security
		Own Business
5	Personal	Family Reasons
		Health Issue
		Marriage
		Personal Reason
6	Unfair Appraisal	Relocation
		Appraisal Feedback / Results
		No New Projects
		Not proper Recognition
		Not satisfied with the appraisal
7	Voluntary Retirement	Not satisfied with the Rating
		Lack of Clarity in Roles and Responsibility
8	Work Load/ Job satisfaction	Voluntary Retirement
		More Documentation work

VII.ANALYSIS OF PRIMARY REASONS

The data after collection are classified into primary reasons and secondary reasons for employee attrition. The below are the count and respective percentage of the primary reason given by the employee for leaving the organization. It percentage clearly shows the weightage of maximum employees switching over the company. From the below list, maximum reason for leaving the company is for Better Designation or Salary which is greater than 50%.

TABLE 7.1

Primary Reasons	Count	%
Behaviour of Supervisor	11	4%
Better Designation/Salary	162	55%

Higher Studies	24	8%
Own Business	24	8%
Personal	56	19%
Unfair Appraisal	10	3%
Voluntary Retirement	1	0%
Work Load	7	2%
Grand Total	295	100%

VIII. ANALYSIS OF SECONDARY REASONS

The below are the count and percentage of the secondary reasons. In that, Designation change is the major reason that employee is moving out of company. And the second major reason is salary increment which acts as vital role for employee attrition.

TABLE 8.1

Secondary Reasons	Count	%
Abroad Opportunity	5	3%
Better Career in Public Sector	6	4%
Better Opportunities	4	2%
Designation Change	92	57%
New career Growth	2	1%
Role Change	11	7%
Salary Increment	42	26%
Grand Total	162	100%

IX. COMPARATIVE STUDY ON DIFFERENT ALGORITHMS USING WEKA TOOL

The research was based on the sample taken from the questionnaire. In this study, data was collected with 30 questionnaire from nearly 300 employees worked with various designation in an automobile industry. All the data are finalized and pre-processed. In this study, the dataset is manipulated and analyzed with various classification tree algorithms using WEKA. By implementing various algorithms in the dataset such as decision stump, J48, Random Tree, RepTree, Random Forest and LMT various results were determined with various accuracy rate. From overall result and summary one can analyze which algorithm performs efficient and produce good accuracy of results.

9.1 - DECISIONSTUMP ALGORITHM

This is the first tree algorithm in the WEKA Tool. Mainly decision stump is a one-level decision tree and the split in the root level is based on a specific value pair. The collected data was applied in the DecisionStump algorithm and the following result was generated.

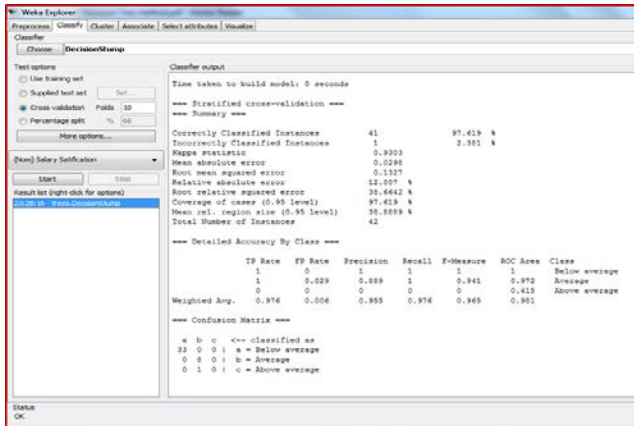


Fig : 9.1 – Output – Decision Stump Algorithm

9.2 J48 ALGORITHM

J48 is a modified source of C4.5 in WEKA. The C4.5 algorithm generates a classification-decision tree for the given data-set by recursive splitting of data. The decision is developed using Depth-first strategy. The algorithm considers all the tests and that can also split the data set and chooses a test that gives the best information gain.

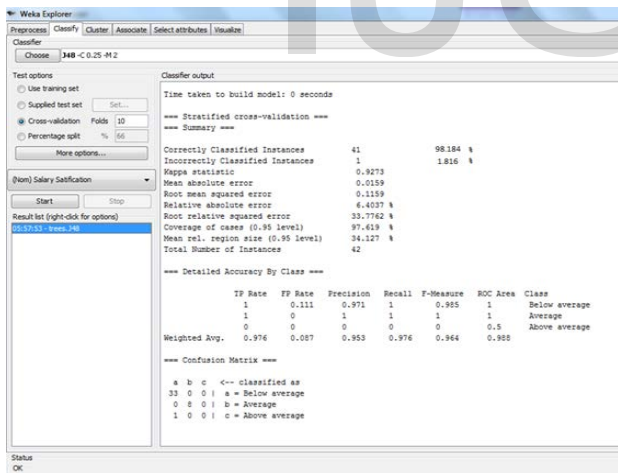


Fig : 9.2.1 – Output – J48 Algorithm

TREE STRUCTURE:

The following is the tree structure of J48 algorithm.

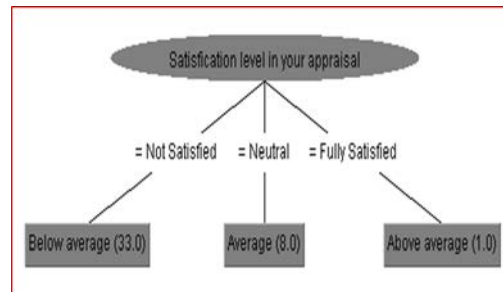


Fig: 9.2.2. – Tree Structure of J48 Algorithm

9.3 LMT ALGORITHM

LMT is a combination of induction trees and logistic regression. A combination of learners that depend on a basic regression models only little and/or noisy data is presented and add a more complex tree structure if there is adequate data to value such a structure. LMT uses cost-complexity pruning. This algorithm is considerably slower than the other algorithms.

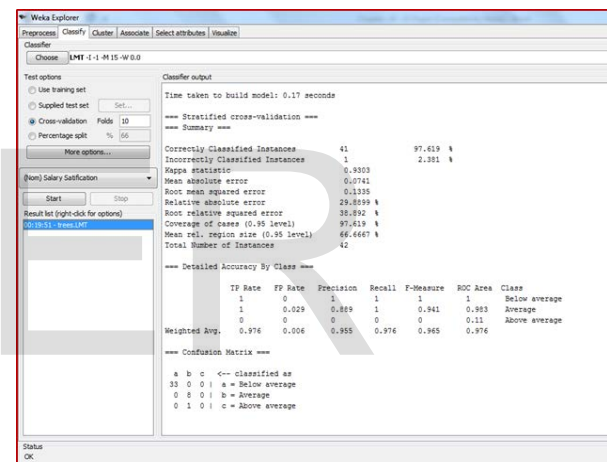


Fig: 9.3 – Output – LMT Algorithm

9.4 RANDOMFOREST ALGORITHM

Random forest (Breiman, 2001) is a group of unpruned classification or regression trees, induced from bootstrap samples of the training data, by means of random feature selection in the tree induction process. Prediction is made by aggregating the collective predictions. Random forest generally exhibits a significant improvement in a single tree classifier such as CART and C4.5. It also produces generalization error rate that compares favorably to Ad boost, yet is more robust to noise.

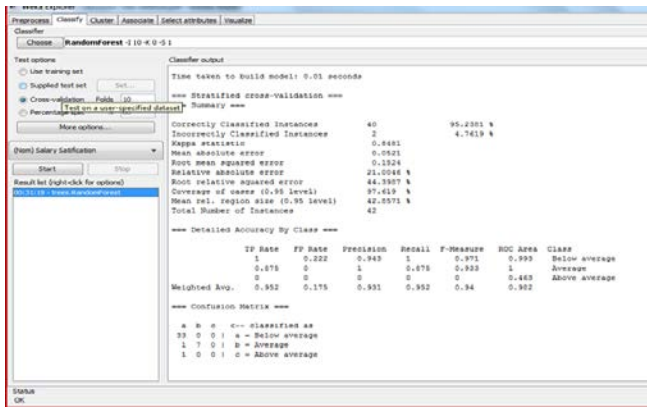


Fig: 9.4 – Output – RandomForest Algorithm

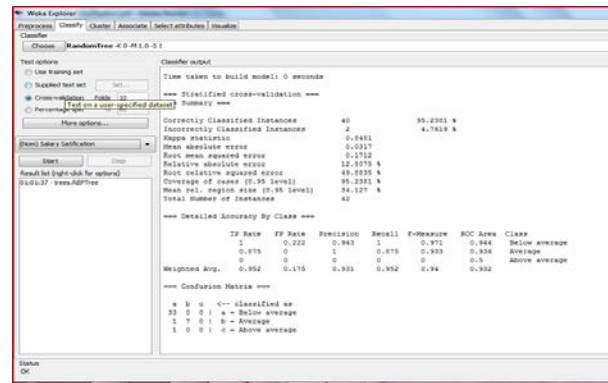


Fig: 9.6 – Output – RepTree Algorithm

9.5 RANDAMTREE ALGORITHM:

With k random features at each node, a random tree is a tree drawn with the random from a set of possible trees. In this context “at random” means that each treesfrom the set of trees produce an equal chance of being sampled. Another way of saying this is that the distribution of trees is “uniform”. Random trees can be generated efficiently and the combination of large sets of random trees generally leads to accurate models.

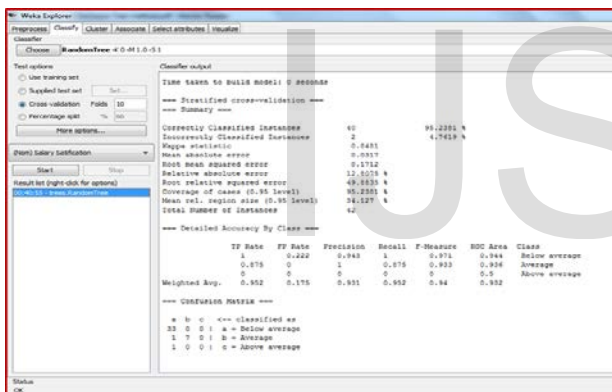


Fig: 9.5 – Output – Random Tree Algorithm

9.6 REPTREE ALGORITHM:

RepTree is a fastest decision tree learner which builds a decisiontree using information received and prunes it using as reduced error pruning. This will only sorts the values for the numeric attributes once a time. Then, C4.5 method is using for Missing values are distributed using fractional instances.

X. OVERALL RESULT

The classification results of various decision trees

Table 10.1

S. No	Algorithm	Size of Tree	Time Taken To build	Accuracy %
			(In Sec)	
1	DecisionStump	0	0	97.619
2	J48	4	0.02	98.184
3	LMT	1	0.17	97.619
4	RandomForest	10	0.01	95.238
5	RandomTree	25	0	95.238
6	RepTree	25	0	95.238

From the above results of implementing various decision trees, J48 producesmore accuracy rate of 98.184% and produces 4 tree structures which were placed in the respective algorithm. Hence, J48 algorithm is the best algorithm when comparing to the other for the current dataset J48 suits.

XI. FINDINGS OF STUDY:

1. Employee needs good recognition and a normal package based on his designation level
2. Employee and Employer feel autocratic management is main cause for organizational related problems for job attrition.
3. Employee feels Target pressure, Monotonous job and Work stress are main cause of job related problems for job attrition.
4. Employer feels Monotonous job, Target pressure and No Freedom to upgrade are main cause of job related problems for job attrition.
5. Employee feels recognition and job imparity are main cause of HR related problem for job attrition.
6. Employer feels recognition and Career hurdle are main cause of HR related problem for job attrition.
7. Employee and Employer feel Gap personal – work is main cause for family related problems for job attrition.

XII. CONCLUSION

This research attempts to study some of the factors which may be the possible reasons for an employee to leave the organization. This research will help the organization or management to study further on those areas and come out with creative/innovative action plans to make the employees feel loyal, comfortable and interesting place to work. This will certainly bring down the attrition level and in future help management to reduce cost spent all through this process of recruitment to exit.

Based on the research, this paper give some of the suggestions to the organization that are listed below. It is not possible to stop 100% of attrition. But if the organization follow these suggestions, it will definitely decrease the attrition when compared to the previous years.

1. Need to have proper Organizational Appraisal system. Performance of every employee should be monitor in every quarter and feedback should be given based on the performance. It will make employee to improve his skill when and where it gets down and not at the last time or year end.
2. Instead of having job for years, it can suggested to do Job rotation in a periodical time. It can also be done within the department or to another department. It will develop employees to attain multi-skill in different aspects.
3. Market Package Analysis (MPA) should be carried out with global level industry. This analysis can done for employee level with his age & designation. Based on that, salary ratio to be maintained.
4. Financial restructuring possibilities of the organization, Performance Salary Package (PSP) breakup as per employee need can be useful for the employees to stay for the long years in this organization.
5. Long term salary and level projection survey can be done with every employees. This projection should be based on his personal and financial growth in this organization. This will give the result of next few years' employees willing about their salary and designation. Based on this, attrition rate can be approximately predicted and it can be stopped.
6. Bonus is another part of the salary that can be paid not as a fixed structure, but it can be considered along with level and experience in company. When the year of service is more, they can expect more.
7. Tax saving session can be conducted twice of every year which can help the employee to save his yearly package. Saving is also another way of benefits to the employees given by the organization.
8. Management should change autocratic management style in order to reduce the job attrition.
9. Provide some activity or program for stress relieving.
10. Repeated Work should be avoided.
11. Work can be distributed as per the level to complete in time.
12. Job rotation can be done in a period of time for multi-skill.

13. Appraisal can be done based on individual multi-skill capability with his achievement in the specific work.
14. Provide opportunities for career development.
15. Internal job openings can be shown for interested employees.
16. Steps needs to take to reduce the gap in personal-work.
17. Work life balance benefits can be provided to the employees.
18. Family visit can be provided to mingle employees with their family.
19. Awards and Rewards can be provided for best cost reduction activity.
20. In motivation aspects, best employees are to be identified and display in posters to view all employees.

Although employees are satisfied with their nature of job, it is identified in the study that many employees willing transformation of their job by reason of measured growth of opportunities in their current profile. Companies can also conduct a regular gatherings to know what exactly employees expect. Organizations should give attention on exit interviews. The companies can also provide some Personality Development, Team Building and Communication training to their employees in a period of interval. Gradual performance has to be reviewed and should be accounted. It is better to have such training in the future.

XIII. FUTURE SCOPE

In recent years, the year of experience of an employees it not exceeding more than hardly 5 – 6 years. But in early days, the experience will be more than 15 – 20 years. Until or otherwise, there is an issue of less production, it doesn't matter of what package they are availed, they worked with heart and soul. They treated the company as a part of their family. Every employee will be moved as family members. It starts from the gate security to Managing Director.

Even Managing Director attends the family function of his employee. This creates a bond between the company and the employee. It makes a deep memory in the heart of every employee. It makes an employee not to switch over company.

Why this is not possible in recent days? What makes this difference? Either the organization mistake or an employee fault disturbing this long term employee relationship? To build this relationship, many kinds activity was taken from the organization level. It includes Outside Organization Tour, Team Building Activity, Stress Releasing games and etc. Organization spends a part of revenue to build this activity. Every employees are getting enjoyable. After all this, there is a gap found between the organization and the employee.

Long term relationship with an Organization is not only for the employment. But also believe on the organization that it will support the employee whenever needs. Analysis and research needs to be done in this part.

Nowadays, work life balance is also a challenge for an employee. Apart from the organization, it is also important to take care of family. Many organizations giving comfort

environment to the employees. But there is question that how many organization taking care their employee's family. After moved to home, employees should feel comfort with their family. Peace of work is possible only when the employee is free of tension from his family. This is also a reason for leaving the company. This can also be analyzed since it is a recent problem faced by an employee.

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