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Predictive Analytics of Employees Turnover: A Decision-Making Tool for Commercial Enterprises

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ABSTRACT: Employee turnover has ended up a basic challenge for commercial ventures, driving to expanded enrollment costs, misfortune of gifted ability, and diminished organizational efficiency. Conventional approaches to overseeing turnover are to a great extent responsive, tending to the issue as it were after representative acquiescence. This consider looks at the part of prescient analytics as a proactive decision-making device for determining worker turnover in commercial ventures. Employing a graphic and expository investigate plan, essential information was collected through organized surveys and backed by auxiliary sources. Key components such as recompense, work security, career development, work-life adjust, administration adequacy, acknowledgment, and work environment were dissected. The discoveries show that neglected worker needs altogether increment turnover deliberate. The ponder concludes that prescient analytics empowers early distinguishing proof of steady loss dangers and underpins data-driven human asset methodologies to improve representative maintenance and organizational steadiness.

KEYWORDS: Employee Turnover, Predictive Analytics, Human Resource Analytics, Employee Retention, Decision-Making, Commercial Enterprises.

I. INTRODUCTION OF THE STUDY

In today's competitive business environment, employees are the most valuable asset of any organization. The growth and success of commercial enterprises depend largely on their workforce. Employee turnover has become a major challenge affecting productivity and stability. High attrition leads to increased recruitment and training costs. It also results in the loss of skilled and experienced employees. Several factors such as job dissatisfaction and lack of career growth influence turnover. Traditionally, organizations handled turnover only after employees resigned. With advancements in technology, predictive analytics helps forecast attrition risks. It uses employee data to identify patterns and trends. Thus, predictive analytics supports proactive decision-making and improves employee retention.

OBJECTIVES OF THE STUDY:
- To identify and analyse the key factors influencing employee turnover.
- To develop a predictive analytics model capable of accurately estimating the probability of employee turnover
- To improve workforce planning and HR strategies by offering forecasts and recommendations that enhance employee retention and organizational stability

II. REVIEW OF THE LITERATURE

AlKetbi, Yam, Marti & Jaradat (2025)
Network Contagion in Financial Labor Markets: Predicting Turnover in Hong Kong. Graph analytics integrated into ML models to capture peer influence and network effects. To study how professional network effects can enhance turnover prediction. Incorporate temporal network signals to improve attrition forecasts. Peer influence significantly boosts predictive power and offers new angles for strategic HR planning.

Naveen Edapurath Vijayan (2025)

Mitigating Attrition: Machine Learning and Data Engineering. Applied data preprocessing, feature engineering, and SHAP explainability to predictive models on HR datasets. Addressed class imbalance and categorical variable handling. To provide an end-to-end predictive analytics workflow for HR practitioners. Well-engineered features and explainable models improve prediction performance and managerial trust. Use interpretable models in dashboards to allow HR managers to take data-driven retention actions. Combining analytics with interpretability bridges the gap between predictive insights and operational decision-making. Focuses on practical challenges in HR analytics implementation, such as messy datasets and the need for model transparency.

Konar, Das, Das & Misra (2025)

Employee Attrition Prediction Using Bayesian Optimized Stacked Ensemble Learning and Explainable AI. Stacked ensemble of ML classifiers with Bayesian optimization and XAI for interpretability. To develop a highly accurate, interpretable attrition prediction model. Hybrid ensemble methods with explainability offer high accuracy and managerial insights. Ensemble- based predictive analytics achieves very high accuracy and explains key retention factors.

Hojat Talebi et al. (2025)

Systematic Review of ML Approaches for Employee Turnover. Analysed 58 studies from 2000–2024, assessing ML techniques, features, and predictive performance. To summarize trends and guide researchers and practitioners. Random Forest dominated; job satisfaction, tenure, salary, and promotion frequency are key predictors. Incorporate **large datasets, deep learning, and explainable models** in future research. ML is mature and effective in turnover prediction; interpretability remains a priority for real-world application. Provides a **bird's- eye view** of the field, showing the evolution of techniques and predictors over two decades.

Haya Alqahtani et al. (2024)

Employee Attrition Prediction Using Machine Learning – Review. Literature review of 2019– 2024 studies analysing classification algorithms. Consolidate knowledge of ML applications and performance in HR attrition. Ensemble models (Random Forest, XGBoost) often outperform classical models. Organizations should adopt ensemble or hybrid models and explore deep learning integration for complex HR datasets. Ensemble and deep learning approaches are most effective; IBM HR Analytics dataset remains standard for benchmarking. Demonstrates **practical guidance** for HR practitioners on choosing predictive analytics techniques.

III. RESEARCH METHODOLOGY

Research is the systematic investigation into a study of materials and sources in order to establish facts and research new conclusions. Research is the art of scientific investigation. The advance learners.

SAMPLING TECHNIQUE

Convenient sampling techniques used in the research. When population elements are selected for inclusion in the sample based on the case of access, it is called convenience sampling.

SAMPLE SIZE

In this study, 102 respondents were taken as a sample for the interpretation of data in the research through a questionnaire.

TOOLS USED

- Simple Percentage
- Anova
- Ranking Analysis
- Weighted Average

DATAANALYSIS AND INTERPRETATION
The data collected for the study indicates that study on predictive analysis of employee turnover: a decision-making tool for commercial enterprises.

1. SIMPLE PERCENTAGE

TABLE 1.1
KEY FACTORS THATEMPLOYEESREQUIRED IN ACOMMERCIALENTERPRISES

Variable	Particulars	Frequency	Percentage
Gender	Female	51	50.50
	Male	50	49.50
	Total	**192**	**100**
Age Group	Below 25	41	40.59
	25-35	34	33.66
	35-44	19	18.81
	45-54	6	5.94
	No Response	1	0.99
	Total	**102**	**100**
Material Status	Married	54	53.50
	Unmarried	48	46.53
	Total	**102**	**100**
Educational Status	Undergraduate	53	46.53
	Postgraduate	17	16.83
	Diploma	17	6.93
	Professional Qualification	13	27.73
	No Response	2	1.98
	Total	**102**	**100**

Department	Marketing	36	35.64
	Finance	33	32.67
	Operational	21	20.79
	Other	11	10.90
Total		**102**	**100**

INTERPRETATION

The table shows that the majority of respondents belong to the Below 25 age group (40.59%). Female respondents slightly dominate the sample (50.50%). Most respondents are Undergraduates (46.53%), and 52.48% are Single. Marketing and Finance departments constitute the largest share of respondents. More than half of the respondents (52.48%) are permanently employed.

2. RANKING ANALYSIS:

TABLE 1.2
FACTORS INFLUENCE TO LEAVE YOUR JOB

S.NO	FACTORS INFLUENCE TO LEAVE THE JOB	WEIGHTED MEAN	RANK
1	Low salary	2.18	I
2	Lack of Career Growth	2.64	II
3	Poor work environment	2.95	IV
4	Lack of promotion	3.14	VI
5	High work stress	3.02	V
6	Poor management	3.27	VII
7	Job insecurity	2.81	III
8	Poor work life balance	3.34	VIII

INTERPRETATION

The above table shows the ranking of factors influencing employees to leave their jobs. Among the various factors, Low Salary secured the first rank with the lowest weighted mean score (2.18), indicating that inadequate compensation is the primary reason for employee turnover. This is followed by Lack of Career Growth and Job Insecurity, which also significantly influence employees' decisions to leave. Factors such as Poor Work Environment and Work Pressure moderately affect turnover. However, Work-Life Imbalance and Poor Management received comparatively lower priority.

3. WEIGHTED AVERAGE

WEIGHTED AVERAGE= (X1W1+X2W2+X3W3+..)/N

RATING SCALE FOR WEIGHTED AVERAGE

=Highest range – lowest range / Highest range

= 5- 1 / 5

= 0.8

1.00 – 2.00 Very Highly Important

2.01 – 2.75   Highly Important

2.76 – 3.50   Moderately Important

3.51 – 4.50   Less Important

4.51 – 9.00   Least Important

TABLE 1.3
FACTORS THAT MOTIVATE EMPLOYEES

| RANK	MOTIVATING FACTOR	WEIGHTED AVERAGE SCORE
1	Salary and benefits	2.42
2	Career Growth	2.66
3	Job Security	2.86
4	Work Environment	2.95
5	Recognition	3.00
6	Leadership	3.06
7	Work Life Balance	3.06
8	Status and Social Recognition	3.07
9	Work Itself	3.12

INTERPRETATION:

The weighted average analysis shows that Salary and Benefits is the most important motivating factor, followed by Career Growth. This indicates that employees are primarily driven by financial rewards and advancement opportunities. Job Security and Work Environment are moderately important, while intrinsic factors such as recognition and leadership rank lower. Overall, the results suggest that employees are mainly influenced by extrinsic motivational factors, particularly compensation and career development.

4. ANOVA ANALYSIS

HYPOTHESIS

NULL HYPOTHESIS H₀: There is no significant difference among the ranked sources of works tress.

ALTERNATIVE HYPOTHESIS H₁: There is a significant difference among the ranked sources of work stress.
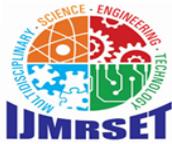
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TABLE 1.4
MAIN SOURCE OF WORK

ANOVA					
Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	112.396	6	18.733	12.363	0.000
Within Groups	1060.673	700	1.515		
Total	1173.069	706			

INTERPRETATION:

The calculated F-value is 12.363, with a significance value (p = 0.000), which is less than the 0.05
level of significance. Since $p < 0.05$, the null hypothesis is rejected. This indicates that there is a statistically significant difference among the various sources of work stress. The relatively higher between-group variance compared to within-group variance suggests that employees perceive certain stress factors as significantly more impactful than others.

FINDINGS

- Emolument, career development, and work security are major determinants of worker turnover.
- Destitute work-life adjust and intemperate workload increment burnout and whittling down hazard.
- Administration viability and acknowledgment altogether impact worker maintenance.
- Representatives with moo engagement and work fulfillment scores appear higher turnover purposeful.
- Prescient analytics successfully changes over worker needs into quantifiable factors for early distinguishing proof of whittling down chance.

SUGGESTIONS

- Coordinated prescient analytics with HR data frameworks for persistent observing.
- Reinforce recompense structures and career movement approaches.
- Advance work-life adjust through adaptable work courses of action.
- Improve administration preparing and representative acknowledgment programs.
- Guarantee moral taking care of and privacy of worker information.
- Prescient analytics viably changes over representative needs into quantifiable factors for early distinguishing proof of whittling down hazard.

IV. CONCLUSIONS

Representative turnover may be a vital challenge that specifically influences organizational execution and supportability. The consider illustrates that prescient analytics serves as an viable decision-making apparatus by empowering organizations to recognize workers at chance of clearing out some time recently renunciation happens. By connecting representative needs with prescient analytics factors, commercial endeavors can plan proactive maintenance techniques. The selection of analytics-driven HR hones improves workforce soundness, decreases turnover costs, and bolsters long-term organizational development.

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