Title:

HR Analytics – Predicting Employee Attrition

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Objective:

To analyze employee data, identify key factors leading to attrition, and build a predictive model to foresee future resignations, thereby aiding strategic HR decisions.

Abstract:

High employee turnover can be costly and disruptive. In this project, we analyzed data from an HR system to understand patterns of attrition. Using Python and Tableau, we identified departments and demographic groups most at risk. A logistic regression model was developed to predict whether an employee will leave, based on key features like age, overtime status, years at company, and job satisfaction.

Tools Used:

- **Python**: pandas, matplotlib, seaborn, sklearn

- **Tableau**: For interactive dashboard

- **Jupyter Notebook**: For modeling and analysis

Steps Involved:

1. **Data Cleaning & Preprocessing** o   Removed nulls, encoded categorical features, scaled numerical columns.

2. **EDA (Exploratory Data Analysis)** o   Found high attrition in Sales & R&D.

   o   Younger employees and those doing overtime had higher attrition.

o   Life Sciences and Medical backgrounds showed more attrition.

3. **Model Building** o   Trained Logistic Regression using 80/20 train-test

split.

o   Achieved solid classification performance.

4. **Evaluation** o   Accuracy, confusion matrix, ROC curve, and feature

importance chart.

5. **Visualization** o   Tableau dashboard displays attrition by department,

education, gender, and more.

Conclusion & Suggestions:

- Overtime and job dissatisfaction are strong attrition predictors.

- Younger employees (under 35) leave more frequently.

- Recommend:

    o   Improving work-life balance o   Focused

    retention for high-risk departments o

        Salary and promotion reviews

Visualization:

Employee attrition trends by department, age, and education, visualized through an interactive Tableau dashboard.

HR ANALYTICS DASHBOARD

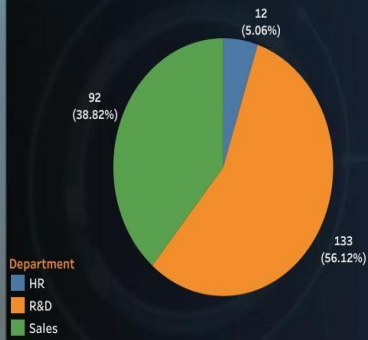| Employee Count	Attrition Count	Attrition Rate	Activate Employees	Avg. Age
1,470	237	16.12%	1,233	37

Attrition By Gender

Gender

Female 87

Male 150

Department wise Attrition

12 (5.06%)
92 (38.82%)
133 (56.12%)

Department
- HR
- R&D
- Sales

No of Employees By Age Group

Bin size 3

Employee Count 5 — 213

Age	Count
18	28
21	43
24	91
27	164
30	190
33	213
36	177
39	139
42	111
45	98
48	73
51	56
54	54
57	28
60	5
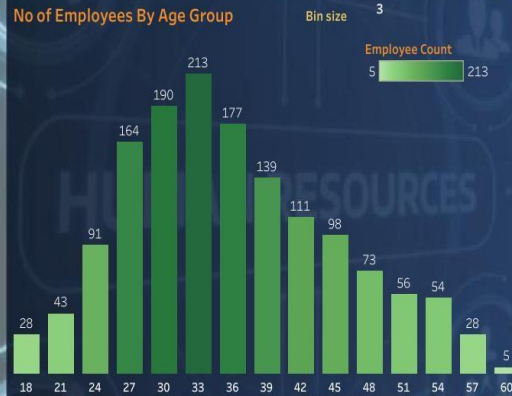
Job Satisfaction Rating

Job Role	Job Satisfaction				Grand Total
	1	2	3	4	
Healthcare Representative	26	19	43	43	131
Human Resources	10	16	13	13	52
Laboratory Technician	56	48	75	80	259
Manager	21	21	27	33	102
Manufacturing Director	26	32	49	38	145
Research Director	15	16	27	22	80
Research Scientist	54	53	90	95	292
Sales Executive	69	54	91	112	326
Sales Representative	12	21	27	23	83
Grand Total	289	280	442	459	1,470

Education Field wise Attrition

Education Field

Education Field	Value
Life Sciences	89
Medical	63
Marketing	35
Technical Degree	32
Other	11
Human Resources	
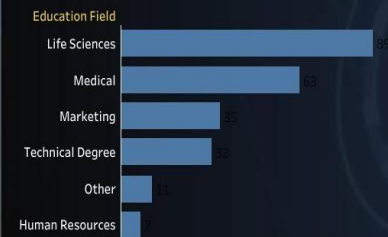
Attrition Rate By Gender For Different Age Group

Gender Female Male

Under 25	25 - 34	35 - 44	45 - 54	Over 55
20 (8.44%) 38 18 (7.59%)	69 (29.11%) 112 43 (18.14%)	37 (15.61%) 51 14 (5.91%)	16 (6.75%) 25 9 (3.80%)	8 (3.38%) 11 3 (1.27%)