HR Analytics - Predict Employee Attrition Project

Key Findings from Data Analysis & Modeling -

1. Overall Attrition Rate

- The dataset shows an overall attrition rate of approximately **16%**, meaning roughly 1 in 6 employees are leaving the organization.
- This is significant for workforce planning and indicates underlying issues in job satisfaction, compensation, or career growth.

2. Attrition by Department

- The **Sales** and **Research & Development** departments have the **highest number of resignations**.
- However, the **Human Resources** department has a **high attrition rate relative to its small size**.
- This suggests the need for department-specific retention strategies.

3. Impact of Age

- Employees in the **25–35 age group** show the **highest attrition rate**.
- These are typically mid-level professionals who are more likely to switch jobs for better opportunities.
- Very low attrition is seen in the **45+ age group**, indicating senior employees are more stable.

4. Monthly Income and Attrition

- A **strong correlation** is observed between **lower salary bands (< ₹6,000)** and **higher attrition**.

- Employees earning in higher income ranges (> ₹9,000) have significantly **lower turnover**.
- This highlights **compensation dissatisfaction** as a likely attrition driver.

5. Job Role and Attrition

- **Sales Executives** and **Laboratory Technicians** contribute to the largest portion of attrition.
- Roles such as **Healthcare Representative** and **Manager** show much **lower exit rates**.
- This could point to workload imbalance or unclear growth paths in high-risk roles.

6. Years at Company

- Employees with **0–3 years at the company** form the majority of attritions.
- This reflects poor onboarding, culture mismatch, or lack of early engagement.

7. OverTime and Business Travel

- Employees who work **overtime** or **travel frequently** are much more likely to resign.
- These two variables were among the **top features** in both SHAP and feature importance plots.
- Work-life balance appears to be a major concern.

8. Education Field and Gender

- **Attrition is not significantly different across education fields.**
- Gender-wise, both male and female employees show comparable attrition trends, although **slightly higher among females in the Sales department**.

9. Model Insights

- **Logistic Regression** and **Decision Tree** models were both able to predict attrition with reasonable accuracy (AUC > 0.75).

- SHAP value analysis revealed **MonthlyIncome, OverTime, JobRole, Age, YearsAtCompany** as top predictors.
- This validates that both compensation and working conditions are key contributors to attrition.

Attrition Prevention Recommendations

1. Compensation & Recognition

- Review and benchmark **compensation levels**, especially for Sales Executives and lower-income roles.
- Introduce **performance-based bonuses** and **transparent incentive structures**.

2. Career Development

- Launch **career path programs** for employees in the 25–35 age bracket.
- Offer **skill-building workshops**, **mentorships**, and **internal promotion opportunities**.

3. Work-Life Balance

- Reduce the burden of **mandatory overtime** through better workforce planning.
- Consider **hybrid or flexible working** options for those with high travel demands.

4. Early Engagement Strategy

- Focus on **onboarding, feedback loops, and engagement surveys** within the first 6 months.
- Assign **career coaches or HR buddies** for new joiners.

5. Department-Specific Interventions

- Conduct **exit interviews** and pulse surveys in **Sales** and **R&D** departments to identify pain points.

- Customize retention strategies at the department level.

Conclusion

This HR analytics project helped uncover deep patterns in employee attrition. The data shows that **attrition is not random**, but influenced by **income, work stress, job role, and early-stage dissatisfaction**. By implementing the above suggestions, the organization can strategically reduce churn and build a more stable, satisfied workforce.