IBM HR Analysis

**Data set:** <https://www.kaggle.com/datasets/pavansubhasht/ibm-hr-analytics-attrition-dataset>

## Problem statement

**Problem:**

The HR department of a mid-sized organization is facing high employee attrition\* and lacks clarity on the underlying causes. With rising recruitment and training costs, it’s critical to identify which roles, departments, and conditions are most likely to lead to employee turnover.

*\*Attrition is when employees leave the workforce faster than the rate at which their employers hire. Vacancies remain open longer, or the role is eliminated.*

**Objective:**

Analyse employee demographics, job roles, satisfaction metrics, and compensation to uncover patterns in attrition. Use SQL to produce reports that identify risk factors, department-level trends, and potential areas for intervention, ultimately helping the organization retain top talent and improve job satisfaction.

## Business Questions

1. **What is the overall attrition rate in the company?**
2. **Which departments or job roles have the highest attrition rates?**
3. **Is there a correlation between job satisfaction or environment satisfaction and attrition?**
4. **What is the average age, income, and experience of employees who left vs those who stayed?**
5. **Are overtime hours contributing to attrition?**
6. **How does attrition vary by education level or business travel frequency?**
7. **What’s the distribution of attrition across monthly income bands?**
8. **Which locations (if available) or education fields show the lowest retention?**

## Tools Used

* **SQL (MS SQL Server):** Data cleaning, aggregation, and query generation
* **Excel:** Data cleaning and formatting
* **Tableau:** Data visualisation and dashboard creation
* **Exploratory Analysis:** Demographics, attrition patterns, satisfaction scores

## Key Insights

1. **Overall Attrition Rate**
   1. 16.1% of employees left the company signalling a significant retention challenge.
2. **High-Risk Roles and Departments**
   1. Sales department and roles like Sales Representative and Laboratory Technician experienced the highest attrition rates.
   2. Research Directors and Managers had the lowest attrition.
3. **Satisfaction and Engagement**
   1. Employees who left reported lower job and environment satisfaction (avg. scores ~2.47 vs 2.78).
   2. Workload and engagement appear to strongly influence retention.
4. **Overtime and Work-Life Balance**
   1. Attrition among employees working overtime was 30.5%, nearly 3x higher than those without overtime.
   2. Overtime is one of the most significant predictors of turnover.
5. **Demographics and Tenure**
   1. Those who left were on average younger (33.6 vs 37.6 years), less experienced (8.2 vs 11.9 years), and earned less monthly income.
   2. Early-career employees are more vulnerable to attrition.
6. **Income Band Effects**
   1. Employees earning <3K monthly had nearly 29% attrition.
   2. Those earning 12K+ monthly had the lowest attrition (~5.6%).
7. **Other Insights**
   1. Frequent business travel and lower education levels correlated with higher attrition.
   2. Medical and Technical Degree fields had stronger retention.

## Recommendations

* Targeted retention programs for high-risk roles like Sales and Lab Technicians.
* Rebalance Overtime with healthier workloads and flexible work policies.
* Boost Satisfaction through structured feedback loops and better onboarding.
* Invest in entry-level talent with mentorship, compensation reviews, and development tracks.
* Re-evaluate pay structure for lower-income employees at risk of leaving.
* Monitor frequent travellers for burnout and turnover signals.