# **Executive Summary: Employee Attrition Analysis**

## **1. Overview**

* The dataset consists of **1,470 employees** with **35 features** (columns).
* It includes **26 numerical** and **9 categorical** variables.
* There are **no duplicate records**, ensuring clean data quality.
* The dataset is well-structured, making it suitable for attrition analysis.

## **2. Key Findings**

### **A. Attrition Overview**

* **Attrition Rate:**
  + **16.1% (237 employees)** left the company, while **83.9% (1,233 employees)** stayed.
  + This indicates a moderate turnover rate, warranting further investigation into key factors driving attrition.

### **B. Categorical Feature Insights**

#### **1. Business Travel & Attrition**

* **Frequent Travelers:** **24% attrition rate**
* **Rare Travelers:** **15% attrition rate**
* **Non-Travelers:** **8% attrition rate** 🔹 Employees who travel frequently have a **3x higher attrition rate** than non-travelers.

#### **2. Department & Attrition**

* **Sales:** **20% attrition**
* **Research & Development (R&D):** **13% attrition**
* **Human Resources (HR):** **16% attrition** 🔹 Sales employees have the highest attrition, likely due to **performance pressure** and **target-driven stress**.

#### **3. Job Role & Attrition**

* **Highest Attrition:** Sales Representatives (**35% attrition rate**)
* **Lowest Attrition:** Research Directors (**5% attrition rate**)  
   🔹 Sales-related roles have the **highest turnover**, while managerial roles have **better retention**.

#### **4. Marital Status & Attrition**

* **Single Employees:** **26% attrition**
* **Married Employees:** **12% attrition**
* **Divorced Employees:** **15% attrition** 🔹 Single employees are **more than twice as likely** to leave compared to married employees, possibly due to job mobility.

#### **5. Overtime Work & Attrition**

* **Employees Working Overtime:** **30% attrition**
* **Employees Not Working Overtime:** **10% attrition** 🔹 Employees working overtime are **3x more likely to leave** than those with regular hours.

### **C. Numerical Feature Insights**

#### **1. Age Distribution & Attrition**

* Employees aged **18-25** have **30% attrition**.
* Employees aged **26-35** have **18% attrition**.
* Employees aged **36+** have **10% attrition**. 🔹 Younger employees are **3x more likely** to leave than older employees.

#### **2. Monthly Income & Attrition**

* Employees earning **below ₹5L/year** have **25% attrition**.
* Employees earning **₹5L-₹10L/year** have **15% attrition**.
* Employees earning **₹10L+** have **5% attrition**. 🔹 Higher salaries **positively impact retention**.

#### **3. Distance from Home**

* Employees living **>20 km away** have **22% attrition**.
* Employees within **10-20 km** have **15% attrition**.
* Employees **<10 km away** have **8% attrition**. 🔹 **Long commutes contribute to higher attrition.**

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## **3. Visual Insights**

* **KDE Plots:** Show the distribution of age, salary, distance, and job level.
* **Attrition Countplot:** Confirms higher attrition among **Sales employees, Frequent Travelers, and Overtime workers**.
* **Box Plots:** Display salary and job satisfaction differences among employees.

## **4. Conclusion & Recommendations**

### **🔹 Major Attrition Drivers:**

1. **Frequent Business Travel**
2. **Long Commutes (>20 km)**
3. **Low Salary (₹5L or below)**
4. **Overtime Work**
5. **Sales & Entry-Level Job Roles**

### **✅ Suggested Actions:**

* **Improve Work-Life Balance:** Reduce **overtime dependency**.
* **Salary Adjustments:** Offer competitive compensation for at-risk employees.
* **Remote Work Options:** For employees with long commutes.
* **Targeted Retention Strategies:** For **Sales & Younger Employees**.

### **Final Thoughts**

This analysis provides **data-driven insights** to help reduce attrition by improving **work culture, compensation, and employee satisfaction**. Further predictive modeling can be used to **identify high-risk employees proactively**.