# Supervised ML (Assignment2)

## Assignment Project

### Problem Statement

A multinational company **TalentCore Pvt. Ltd.** has been experiencing a rising number of employee resignations, which increases recruitment cost, project delays, and loss of skilled talent.

The HR department wants to build an **intelligent ML system** that can **predict whether an employee is likely to leave the company** based on job satisfaction, salary, age, work-life balance, training hours, bonuses, and other work-related factors.

You are hired as a **AI/ML Engineer** to:

1. Build a **baseline Logistic Regression model**
2. Improve it using **Regularization (L1 & L2)**
3. Compare their performances and recommend the best model.

### Dataset Description

The Employee dataset has 900 rows and 15 columns (features), representing various employee metrics. This dataset aims to reflect realistic scenarios in a corporate settings.

Following is a brief overview of the dataset:

| Feature | Description |
|---|---|
| Job_Satisfaction | Level of satisfaction with the job |
| Performance_Rating | Employee performance score |
| Years_At_Company | Number of years worked in company |
| Work_Life_Balance | Balance between work and personal life |
| Distance_From_Home | Distance of home from workplace |
| Monthly_Income | Monthly salary |
| Education_Level | Education qualification level |
| Age | Age of employee |
| Num_Companies_Worked | Number of companies worked previously |
| Employee_Role | Encoded job role |
| Annual_Bonus | Bonus received annually |
| Training_Hours | Training hours attended |
| Department | Encoded department |
| Annual_Bonus_Squared | Engineered feature (bonus²) |
| Annual_Bonus_Training_Hours_Interaction | Interaction feature between annual bonus and training hours. |
| **Employee_Turnover (Target)** | 1 = Employee Left, 0 = Stayed |