**Context of my Project**

**1. Proposed Project Title:**

**“**Analysing Employee Attrition & Layoff Trends Using Real-Time Data**”**

**2. Objective:**

The project aims to understand why employees leave their jobs—whether voluntarily or due to layoffs. By analyzing real-time data from different countries and industries, we can identify key trends, risk factors, and patterns behind employee attrition.

**3. Key Components of the Dataset**

1. **Employee Demographics** – Includes age, gender, marital status, and country of employment.
2. **Employment Details** – Captures job title, department, experience level, and industry.
3. **Compensation & Benefits** – Covers salary, bonuses, stock options, work flexibility, and retirement plans.
4. **Job Satisfaction & Work Environment** – Measures employee satisfaction, work-life balance, and stress levels.
5. **Layoff & Job Loss Factors** – Identifies reasons for layoffs (cost-cutting, company shutdown, AI displacement, etc.).
6. **Voluntary Resignation Reasons** – Includes lack of career growth, better salary offers, toxic work culture, and burnout.
7. **HR & Exit Interview Insights** – Captures performance ratings, company rehire possibility, and employee feedback.

**4. Attributes:**

**1. Employee Demographics**

* **Employee ID** (Unique identifier)
* **Age**
* **Gender**
* **Marital Status**
* **Number of Dependents**
* **Country/Region**
* **City/Town**
* **Education Level** (High School, Bachelor’s, Master’s, PhD)
* **Years of Experience** (Total career experience)

**2. Employment Details**

* **Job Title**
* **Department** (IT, HR, Finance, Marketing, etc.)
* **Employment Type** (Full-time, Part-time, Contract, Remote)
* **Company Name** (Optional for privacy)
* **Company Size** (Small, Medium, Large)
* **Company Industry** (Tech, Finance, Healthcare, etc.)
* **Years at Current Job**
* **Job Role Level** (Entry-level, Mid-level, Senior, Executive)

**3. Compensation & Benefits**

* **Annual Salary** (Standardized currency)
* **Bonus & Incentives** (Yes/No, Amount)
* **Stock Options** (Yes/No)
* **Health Benefits** (Yes/No)
* **Retirement Plan/Pension** (Yes/No)
* **Paid Time Off (Days per Year)**
* **Work-from-Home Option** (Yes/No)
* **Flexible Working Hours** (Yes/No)

**4. Work Environment & Job Satisfaction**

* **Job Satisfaction Score** (1-10)
* **Work-Life Balance Score** (1-10)
* **Manager Relationship Score** (1-10)
* **Career Growth Opportunities** (Yes/No)
* **Training & Development Provided** (Yes/No)
* **Team Collaboration Rating** (1-10)
* **Workload Stress Level** (Low, Medium, High)
* **Recognition & Appreciation Score** (1-10)
* **Toxic Workplace Indicators** (Yes/No)
* **Employee Engagement Level** (Low, Medium, High)

**5. Layoff & Job Loss Factors**

* **Laid Off?** (Yes/No)
* **Layoff Reason (if applicable)**:
  + **Company Downsizing**
  + **Business Restructuring**
  + **Cost-Cutting Measures**
  + **Company Bankruptcy/Shutdown**
  + **Industry Downturn**
  + **Tech/AI Job Displacement**
  + **M&A (Mergers & Acquisitions) Layoffs**
  + **Project/Contract Ended**
  + **Performance-Based Termination**
  + **Relocation Issues**
  + **Automation/AI Replacing Roles**
  + **Funding Issues (Startups)**
  + **Market Crash/Stock Drop Impact**
  + **Pandemic/Health Crisis Impact**
  + **Other Economic Factors**
* **Received Severance Package?** (Yes/No)
* **Notice Period Given?** (Yes/No, Weeks)
* **Rehire Possibility?** (Yes/No)
* **Company Offered Assistance (New Job Placement)?** (Yes/No)

**6. Voluntary Resignation Factors**

* **Why Did the Employee Leave?** (Multiple choice allowed)
  + **Better Salary Offer**
  + **No Career Growth**
  + **Lack of Job Security**
  + **Toxic Work Environment**
  + **Mental Health/Job Burnout**
  + **Work-Life Balance Issues**
  + **Micromanagement/Bad Boss**
  + **Long Commute/Relocation**
  + **Lack of Recognition**
  + **Lack of Work-from-Home Options**
  + **Retirement**
  + **Personal Reasons (Family, Health, Education, etc.)**
  + **Started Own Business/Freelancing**
  + **Moved to a Different Industry**

**7. HR & Exit Interview Insights**

* **Exit Interview Conducted?** (Yes/No)
* **Last Performance Rating** (1-5)
* **HR Feedback Score on Employee** (1-5)
* **Would Employee Recommend the Company?** (Yes/No)
* **Would Employee Return to the Company?** (Yes/No)
* **Final Employee Comments (Textual Feedback, if available)**

**5. Significance of the Dataset**

* **Captures recent layoffs & economic shifts** affecting job markets globally.
* **Provides insights into resignation trends** and how industries retain or lose employees.
* **Helps predict future attrition** using data-driven analysis.
* **Assists businesses in improving employee retention strategies** based on real factors.

**6. Proposed Machine Learning techniques which I want to use on this dataset:**

**1️. Classification Models (Predicting Attrition & Layoffs)**

These models help predict whether an employee is **likely to leave** or **stay**.

* **Logistic Regression** – A simple and interpretable model for binary classification (Attrition: Yes/No).
* **Random Forest Classifier** – Handles missing data well and captures complex relationships.
* **Gradient Boosting (XGBoost, LightGBM, CatBoost)** – Excellent for structured data with high accuracy.
* **Neural Networks (ANNs)** – Good for deep insights but requires large data.

**2️. Regression Models (Predicting Salary Drop Due to Layoffs)**

To **predict salary changes** after layoffs:

* **Linear Regression** – Basic but interpretable for salary trends.
* **Random Forest Regression** – Captures complex relationships in salary variations.
* **Gradient Boosting Regression (XGBoost, LightGBM)** – Best for large datasets with salary trends.

**3️. Clustering Models (Grouping Employees at Risk of Leaving)**

To **group employees based on attrition risk**:

* **K-Means Clustering** – Segments employees based on salary, job satisfaction, and layoffs.
* **Hierarchical Clustering** – Provides an organizational view of employee risk.
* **DBSCAN** – Identifies anomalies (outliers) in employee attrition trends.

**4️. Deep Learning for NLP (Exit Interview Analysis)**

By collecting **employee feedback (text data)**, using **Natural Language Processing (NLP):**

* **Sentiment Analysis (TextBlob, VADER, BERT)** – Understands employee emotions in feedback.
* **Topic Modeling (LDA, TF-IDF, Word2Vec)** – Extracts key themes from exit interviews.

**5️. Anomaly Detection (Spotting Unusual Layoff Trends)**

To detect **unexpected spikes in layoffs**:

* **Isolation Forest** – Detects anomalies in employee departures.
* **One-Class SVM** – Finds unusual job exits in historical data.

**Conclusion:**

This dataset offers a **comprehensive analysis of employee attrition and layoffs**, highlighting key factors behind workforce movement. By identifying trends in **voluntary resignations and layoffs**, the study provides insights to **improve retention strategies, predict attrition risks, and understand economic impacts on employment**. The findings can support **HR decision-making and workforce planning**, making the project valuable for both research and industry applications.