Technical Report: AI-Powered Resume Screening & Employee Sentiment Analysis

1. Problem Understanding

1.1 Resume Screening

- **Problem:**
  Manually screening resumes for a "Software Engineer" role is time-consuming and prone to human bias. There is a need automate the process by matching resumes with job descriptions based on skills, experience, and qualifications.
- **Solution:**
  Develop an AI tool that uses Natural Language Processing (NLP) and Cosine Similarity to rank resumes based on their relevance to the job description.

1.2 Employee Sentiment Analysis

- **Problem:**
  Analyzing employee feedback (e.g., surveys, exit interviews) manually is inefficient and may miss critical insights. There is a need to predict attrition risks and recommend engagement strategies.
- **Solution:**
  Build a Sentiment Analysis model using NLTK's Vader and a Random Forest Classifier to predict attrition risks based on employee feedback and HR metrics.

2. Proposed Solution

2.1 Resume Screening

- **Steps**:
  1. Extract text from resumes (PDFs) using PyPDF2.
  2. Preprocess text (lowercase, remove stopwords, tokenize) using NLTK and Spacy.
  3. Convert job description and resumes into numerical vectors using TF-IDF Vectorizer.
  4. Calculate Cosine Similarity between job description and resumes

5. Rank resumes based on similarity scores.

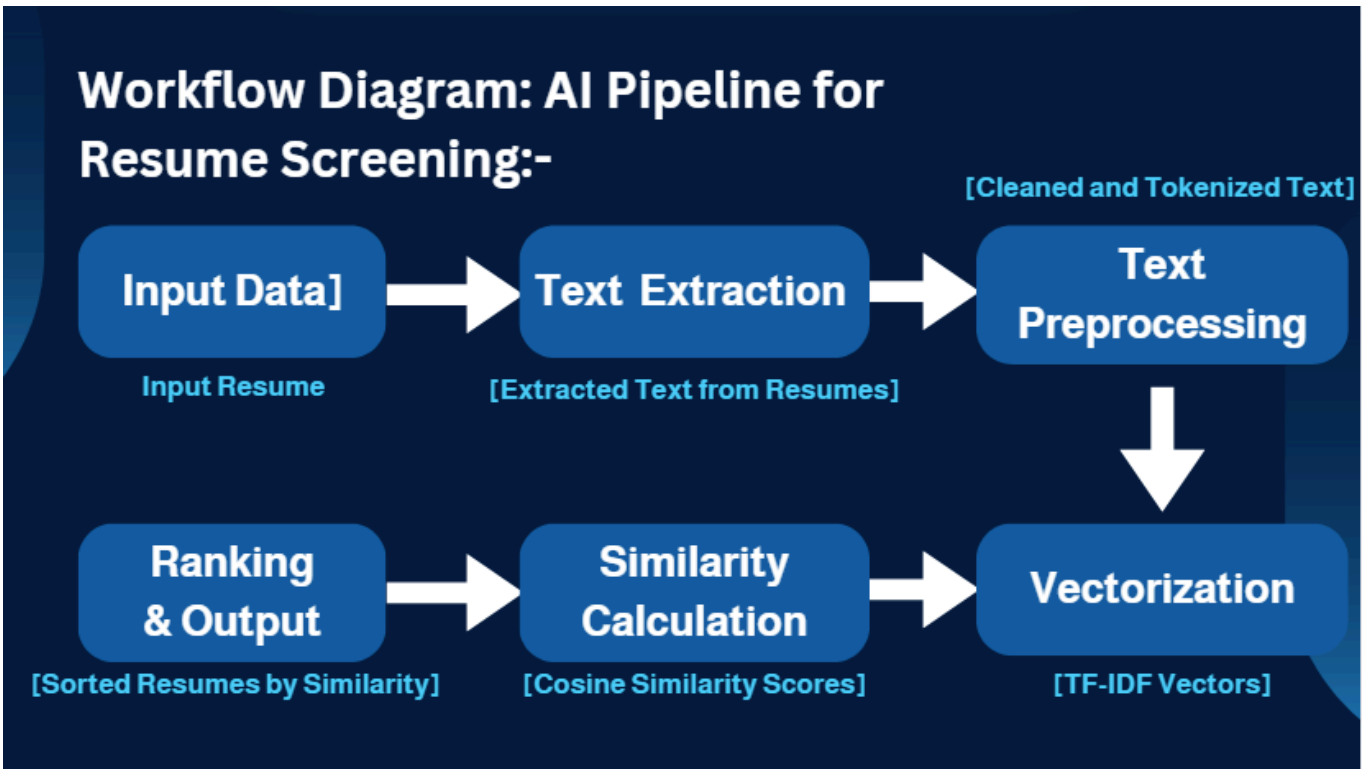
- **Tools Used:**
  Python, PyPDF2, NLTK, Spacy, Scikit-learn (TF-IDF, Cosine Similarity).

2.2 Employee Sentiment Analysis

- **Steps**:
  1. Analyze employee feedback using NLTK's Vader Sentiment Analyzer to calculate sentiment scores
  2. Encode categorical features (Department, Job Role) and normalize numerical features (Salary, Work Hours).
  3. Train a Random Forest Classifier to predict attrition risks
  4. Evaluate model performance using accuracy and classification report.
- **Tools Used:**
  Python, NLTK, Scikit-learn (Random Forest, LabelEncoder, StandardScaler).

3. Workflow Diagram

3.1 Resume Screening Workflow:-



3.2 Employee Sentiment Analysis Workflow:-