**1. Employee Performance Prediction**

* **Project Title:** Employee Performance prediction model.
* **Date:** 17 August 2024.
* **Version:** 1.0.

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**3. Executive Summary**

* Employee performance prediction using machine learning involves developing a model that can assess and forecast an employee's future performance based on historical data and various influencing factors.
* By leveraging machine learning models, organizations can make more informed decisions in talent management, leading to better resource allocation, improved employee development programs, and overall enhanced organizational performance.

**4. Project Objectives**

**4.1. Identify High-Potential Employees**

The primary objective of an employee performance prediction model is to identify high-potential employees who are likely to excel in their current roles or advance to leadership positions.

**4.2. Improve Performance Management**

Managers can use these predictions to address potential performance issues early and provide targeted support or development opportunities. This proactive approach ensures that employees receive the necessary resources and guidance

**4.3. Enhance Recruitment Processes**

The model also aims to optimize the recruitment process by predicting the success of new hires based on their profiles and the historical performance data of existing employees. This helps in making more informed hiring decisions, ensuring that candidates who are most likely to perform well in specific roles are selected

**4.4. Optimize Training and Development**

Training and development programs benefit significantly from the model’s ability to assess individual needs and forecast growth potential. By tailoring these programs to address specific skill gaps and developmental areas, organizations can ensure that employees receive the most relevant training, enhancing their capabilities and career progression.

**4.5**. **Enhance Employee Engagement**

Moreover, the model can monitor and evaluate the impact of HR policies on performance and engagement, allowing for continuous improvement of strategies to align with organizational goals better. Through these objectives, the employee performance prediction model becomes a powerful tool for driving better HR practices and achieving long-term success.

**5. Project Scope**

* **Scope Statement:** The Employee Performance Prediction Model project aims to develop a machine learning model capable of predicting employee performance based on historical data, behavioral metrics, and other relevant factors.
* **Deliverables :** List the key deliverables or outputs of the project.
  + A robust system to ingest, clean, and pre process employee data.
  + A model capable of predicting employee performance, with documented accuracy and performance metrics.
  + User-friendly visual representations of predictions, trends, and key performance indicators.
  + Comprehensive documentation covering the model's design, development process, and user guidelines.
  + Web application integrated with the model, deployable in a real-world environment, including maintenance and updates.
* **Milestones:** Major milestones or phases of the project.
  + Data Collection.
  + Visualizing and analyzing the data using python libraries.
  + Data pre-processing
  + Training Machine Learning Model.
  + Application building using flask and web frameworks.

**5. Requirements**

* **Functional Requirements:** Data Ingestion and Preprocessing, Model training and performance prediction, Result accuracy and interpretation, Real-time prediction, Optimized and bug free Integration with web application.
* **Non-Functional Requirements:**Performance, Accurate prediction score, Model Scalability , Reliability and Robust.

**6. Project Plan**

* **Timeline:** 30 days (20th July - 20 August)
* **Work Breakdown Structure (WBS):**

1. Data Collection : Gathering employee data.
2. Visualizing and Analyzing data: Performing EDA(Explorary data analysis) and finding relation between diff columns of employee table. Studying correlation between columns and performing standardization and normalization.
3. Data pre-processing: Understanding each attribute and accordingly applying encoding methods(OneHotEncoding, OrdinalEncoding, etc..).
4. Model building: Using different machine learning models to test our data accuracy and mean absolute error and according using best ML model for our data.
5. Application Building: Using the Flask framework and and HTML & css to deploy our model. Creating interactive web applications such that users can easily enter values and  get the result.
6. Deploy.

**7. Quality Management**   **& Technologies**

* **Quality Standards:** Model's accuracy :
  + r2\_score: 0.182
  + MSE(Mean squared error): 0.023
  + MAE(Mean absolute error): 0.103
* **Technology's used:** Tech stack :
  + Programming language: Python, HTML & Css.
  + Python Libraries: Numpy, Pandas , Matplotlib, Sci-kitlearn, Seaborn.
  + Training Models: Xgboost, Random Forest, Linear Regression.
  + IDE: Jupyter notebook.
  + Framework: Flask, pipe.

**8. Project Member**

* **Team Members:** This project is solely done by Prajwat Srivastava.