**ABSTRACT**

**TITLE:- Analysis and Prediction of Employee Promotions Using Machine Learning**

Predicting employee performance is essential for organizations. The success or failure of a company often depends upon the competence of its employees, so CEOs and managers who want their organizations to succeed face the difficult task of determining which employees should be promoted. The current promotion process used in most organizations should be considered misleading because it depends on supervisors judgments. The major aim of this paper is to use classification algorithms to develop predictive models for predicting whether an employee is qualified for promotion or not and identifying the most important attributes affecting employee promotion. The dataset used in this paper is from Kaggle 2020. It contains information on multinational companies arranged in 54,808 rows and 13 columns. This dataset covers nine broad verticals across organizations. Several predictive modeling techniques, including K-Nearest Neighbors, Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, and Ensemble models (Adaboosting and Gradient Boosting models) were used to predict employee promotion. Based on measurements of accuracy, F1-score, and AUC, Gradient Boosting outperforms the other classification algorithms. The results also show that the most significant factor contributing to predicting employee promotion is the previous years rating. Department had no effect on employee promotions.

**Existing System:-**

The current system for employee promotions largely relies on subjective human judgment, typically from supervisors and HR managers. This manual process is not only time-consuming but also prone to bias and inconsistency. Decisions may be influenced by personal relationships or incomplete information, leading to deserving employees being overlooked. Moreover, this subjective approach often lacks transparency, leaving employees questioning the fairness of the promotion process. Without data-driven insights, organizations may fail to identify high-potential candidates, which ultimately impacts employee morale and the company’s productivity.

**Disadvantages of the Existing System**

1. **Bias and favoritism:** Human judgment can be biased, leading to unfair promotion decisions.
2. **Lack of transparency:** Employees may not understand the criteria used, leading to dissatisfaction and mistrust.
3. **Time-consuming:** Manual assessments take considerable time, especially in large organizations.
4. **Overlooks potential talent:** The system may miss identifying high-potential employees due to subjective evaluations.

**Proposed System:-**

The proposed system leverages machine learning algorithms to predict employee promotions based on objective data such as performance ratings, training scores, and years of service. By using data-driven methods, the system eliminates biases and improves the accuracy and fairness of promotion decisions. Machine learning models like Gradient Boosting, Random Forest, and Logistic Regression analyze historical employee data to identify patterns that indicate promotion readiness. This system not only accelerates the promotion process but also ensures transparency and consistency, enhancing overall employee satisfaction and organizational efficiency.

**Advantages of the Proposed System**

1. **Eliminates bias:** Decisions are based on objective data, ensuring fairness in promotions.
2. **Increases transparency:** Employees can understand how promotions are determined, fostering trust.
3. **Saves time:** Automated evaluations reduce the time required for decision-making.
4. **Improves talent recognition:** The system identifies high-performing employees based on data, ensuring potential leaders are not overlooked.