



HR Analytics to Track Employee Performance

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Abstract--- We're building a simple Employee Management System using Python. It's like a digital HR helper that lets you manage employee information, track who comes to work, and handle time off requests. Admins can easily add, update, or remove employee details, while employees can check their own information and ask for leaves. We're keeping it straightforward with SQLite as the database, making it perfect for small businesses or teams. The goal is to make HR tasks quicker and easier, so you can focus on what's important. The Employee Management System is designed to streamline HR processes with features like Employee Data Management, Attendance Tracking, Leave Management, and Admin Controls. Admins can add, and mark attendance, and manage leave approvals. The system is built using Python with skinter for GUI and sqlite3 for database management, leveraging SQLite's lightweight and easy to-set-up nature. The simple and built-in Skinter framework makes it perfect for small businesses or teams. Employee Data Management: Add, update, and view employee details (e.g., name, ID, department contact info), Attendance Tracking: Mark attendance, view attendance records, and generate reports. Leave Management: Apply for leaves, view leave status, and manage leave approvals, Admin Controls: Add, update, or remove employee records, and manage system settings. In Technical Details: Programming Language: Python (using libraries like skinter for GUI and sqlite3 for database) Database: SQLite (lightweight and easy to set up), GUI Framework: Skinter (simple and built in with Python)



INTRODUCTION

Understand how employees are contributing to the company and In every organization, employees are one of the most valuable resources. The success and growth of a company largely depend on the performance and productivity of its employees. Therefore, it is important for organizations to regularly track and evaluate employee performance. This helps management identify areas where improvements are needed. HR Analytics is the process of collecting and analysing employee-related data to make better human resource decisions. By using HR Analytics, organizations can study different factors such as employee productivity, attendance, work efficiency, and performance trends. This helps companies improve employee management, increase productivity, and support employees in their professional growth. The main objective of this project, "HR Analytics to Track Employees' Performance," is to analyse employee performance using data analysis techniques. In this project, Python is used as the main programming language to process and analyse employee data. Python provides powerful libraries such as Pandas, NumPy, and Matplotlib, which help in data analysis and visualization. In every organization, employees are one of the most valuable resources. The success and growth of a company largely depend on the performance and productivity of its employees. Therefore, it is important for organizations to regularly track and evaluate employee performance. This helps management understand how employees are contributing to the company and identify areas where improvements are needed. HR Analytics is the process of collecting and analysing employee-related data to make better human resource decisions. By using HR Analytics, organizations can study different factors such as employee productivity, attendance, work efficiency, and performance trends. This helps companies improve employee management, increase productivity, and support employees in their professional growth. The main objective of this project, "HR Analytics to Track Employees' Performance," is to analyse employee performance using data analysis techniques. In this project, Python is used as the main programming language to process and analyse employee data. Python provides powerful libraries such as Pandas, NumPy, and Matplotlib, which help in data analysis and visualization. By using Python, the project can organize employee data, analyse performance patterns, and generate meaningful insights. These insights can help organizations identify high-performing employees, understand performance gaps, and take better decisions related to employee training and development. Overall, this project shows how HR Analytics combined with Python can help organizations track employee performance more effectively and make data-driven decisions&improve,productivity.

1. PROPOSED METHODOLOGY

The proposed methodology for this project explains the steps used to analyse and track employee performance using HR Analytics and Python. The project follows a systematic process to collect, process, analyse, and visualize employee data to insights.

1.1 Data Collection

The first step is collecting employee-related data. This data may include employee ID, department, attendance, working hours, task completion rate, performance scores, and other relevant information. The dataset can be collected from HR records or sample datasets.

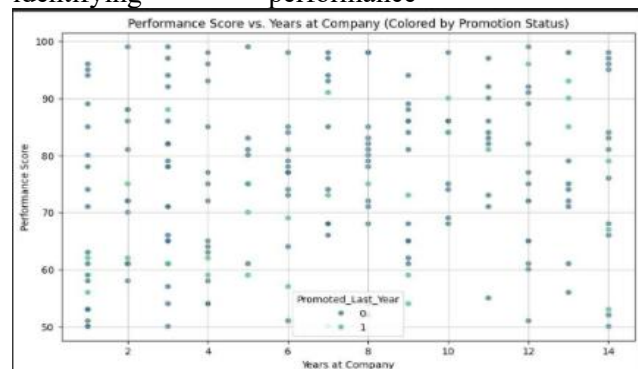
1.2 Data Preprocessing

After collecting the data, it is cleaned and prepared for analysis. In this step, missing values, duplicate records, and incorrect data are removed or corrected. This ensures that the dataset is accurate and reliable for further analysis.

1.3 Data Analysis

Using Python The cleaned data is then using Python. Libraries such as Pandas and NumPy are used to organize and process the data. Through this analysis, patterns &relationships between different performance factors identified.

1.4 Data Visualization To better understand employee performance, the analysed data is presented using charts and graphs. Python libraries such as Matplotlib or Seaborn are used to create visualizations like bar charts, pie charts, and line graphs. These visuals help in easily identifying performance



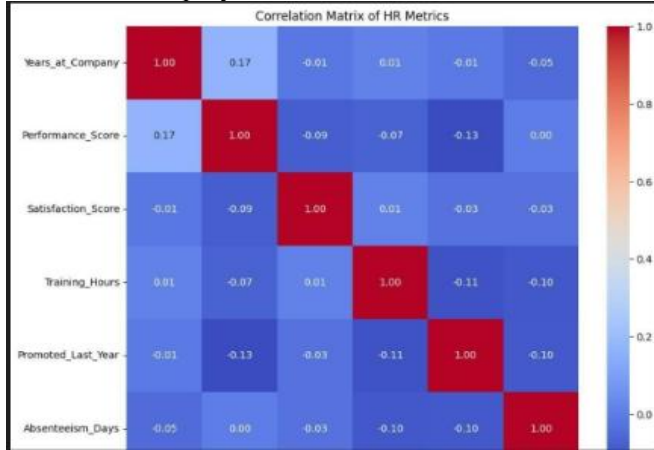
1.5 Performance Evaluation

Based on the analysis and visualizations, employee performance is evaluated. Highperforming employees, average performers, and employees who need improvement can be identified. This helps HR departments make better decisions regarding training, promotions, and employee development.



1.6 Result Interpretation

Finally, the results obtained from the analysis are interpreted to understand employee productivity and overall performance trends in the organization. Through these steps, the project effectively uses HR Analytics and Python to track and evaluate employee performance in a structured manner.



2. ALGORITHMS & DRAWBACKS

In this project, different algorithms and techniques are used to analyse and track employee performance using Python. These algorithms help in organizing the data, analysing patterns, and generating useful insights.

2.1 Data Cleaning Algorithm

This algorithm is used to prepare the dataset before analysis. It removes missing values, duplicate records, and incorrect data entries. Clean data helps in improving the accuracy of the analysis.

2.2 Descriptive Analysis

This technique is used to summarize employee data. It calculates important values such as average performance score, total working hours, attendance percentage, and other statistics. This helps in understanding the overall performance of employees.

2.3 Classification Algorithm

A classification method can be used to categorize employees into different groups such as high performers, average performers, and low performers based on their performance scores and productivity.

2.4 Data Visualization Algorithm

Visualization techniques are used to present the analysed data in graphical form. Charts such as bar

charts, pie charts, and line graphs help in easily understanding performance patterns and trends.

2.5 Performance Ranking Algorithm

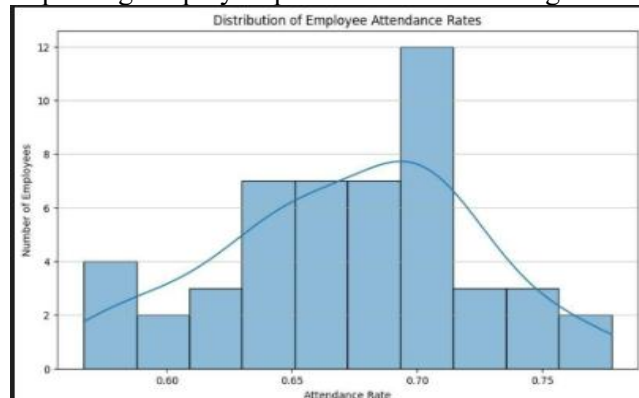
This algorithm ranks employees based on their performance scores. It helps identify the top performing employees as well as those who need improvement. By using these algorithms, the project can effectively analyse employee data and provide meaningful insights about employee performance using Python.

3. MODEL TRAINING

Model training is the process where the system learns patterns from the given dataset. In this project, the employee dataset is first divided into two parts training data and testing data. The training data is used to teach the model about different employee performance factors such as attendance, working hours, task completion, and performance scores. Using Python libraries, the model analyses the training data and identifies relationships between different variables. Through this process, the model learns how different factors affect employee performance.

4. MODEL EVALUATION

After the model is trained, it is tested using the testing dataset. This step is called model evaluation. The purpose of evaluation is to check how accurately the model can predict or analyse employee performance. Different evaluation methods are used to measure the performance of the model. These methods help determine whether the model is reliable and producing correct results. If the model accuracy is good, it means the model can effectively analyse employee performance. Through proper model training and evaluation, the project ensures that the analysis is accurate and the results are meaningful for tracking and improving employee performance in the organization.



5. CONCLUSION

The HR Analytics to Track Employees' Performance project focuses on analysing employee data to understand and evaluate their performance in an



organization. By using data analytics techniques, organizations can gain better insights into employee productivity, attendance, and overall work efficiency. In this project, Python is used to collect, process, and analyze employee data. Libraries such as Pandas, NumPy, and Matplotlib help in organizing the data, performing analysis, and creating visual representations. These tools make it easier to identify patterns and trends in employee performance.

Through this analysis, organizations can identify highperforming employees, understand areas where employees need improvement, and make better decisions related to training, development, and performance management. The use of HR Analytics helps HR departments move from traditional methods to data-driven decision making. Overall, this project demonstrates how HR Analytics and Python can be effectively used to track employee performance and support organizations in improving productivity, employee satisfaction, and overall growth.