

EMPLOYEE EFFICIENCY MODEL

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Abstract: An employee efficiency model is used to measure the productivity of employees in a given industry or organisation. The model is based on the idea that labour efficiency can be quantified by measuring the output produced by a worker relative to the amount of time and resources they spend in producing that output. Such a model is useful for companies and industries that rely heavily on labour to produce their goods or services, as it can help identify areas where productivity can be improved. The model considers a range of factors that influence labour efficiency, including the skills and training of workers, the technology and equipment they use, and the organisational structure of the company. By applying the model, companies can increase productivity and competitiveness in the marketplace, ultimately leading to increased profitability and success. For example, in the manufacturing industry, an employee efficiency model can be used to identify the most productive employees and analyse their work processes. In retail, it can be used to track the performance of sales associates and identify areas where training or coaching is needed. In the healthcare industry, such a model can be used to analyse the performance of clinical and non-clinical staff to ensure that patients receive timely and effective care by optimising staffing levels. In the education sector, an employee efficiency model can be used to track the performance of teachers and support staff to improve student outcomes. Overall, a multi-sector employee efficiency model can help to enhance performance in different sectors by identifying areas of strengths and weaknesses. The key is to customise the model to the specific needs and challenges of each sector and to use data to drive continuous improvements.

Keywords: Employee efficiency; Labour efficiency; Machine learning; Efficiency modelling; Machine learning

Introduction

In today's fast-paced business environment, companies are striving to increase the productivity and efficiency of their employees. As a result, various employee efficiency models have been developed and implemented to bring maximum output from employees while limiting time and resources. These models aim to identify factors that positively impact employee performance and address any underlying issues that may hinder their productivity, in order to identify the scope of improvement.

This research paper will address the effectiveness of the machine learning model and the outcome of each employee in terms of performance. The study will examine various aspects such as, implementation, factors that contribute to the potential and also the drawbacks. Considering the existing research this paper seeks to provide a comprehensive overview of the current state of knowledge in this field. The study will explore the key factors that affect employee productivity, such as job satisfaction, motivation, and engagement, and how they are incorporated into these models. Additionally, the paper will examine the role of technology in improving employee efficiency and the potential benefits and challenges associated with its use. The findings of this research paper will provide valuable insights into the effectiveness of different employee efficiency models and their impact on companies overall performance. This information will help managers and decision-makers in identifying the most effective strategies for improving employee efficiency and make the set of necessary decisions for improvements and rewarding the best in the field.

The dataset used to train the model has information on employees' characteristics, such as age, gender, education, and experience, as well as job-related variables, such as job type, seniority, and workload. In addition the dataset includes measures of employee performance, such as productivity, quality of work, and absenteeism. The data set was compiled from a reliable source.

2.2 THE MAJOR FINDINGS OF OUR MODEL ARE

Workload Optimization: The model identifies bottlenecks in the workforce, such as excessive workloads which can be balanced well by study of our model.

Predictive Insights: By analysing historical data and patterns, the model can predict insights into future employee performance and also the profit or loss in terms of business .

Technology Integration: the model can guide how companies can use technology to enhance efficiency.

2.3 Formula

Following is the formula to calculate Overall line Efficiency

Here's the formula used to get the productivity ratio which only measures output:

30 orders (accomplished) divided by 40 orders (the target goal) = 75% (productivity ratio)

$$\text{Work accomplished / the target goal} = \text{productivity} \\ = \text{Productivity ratio}$$

Based on this productivity formula, the employee should be able to process 25% more orders each shift.

As the productivity scores don't give us the complete picture. Here's the formula used to get the efficiency score: 8 hours (scheduled shift) – 2 hours (non-productive hours) = 6 hours (75% of scheduled hours)

For example in Garment industry:

Line Efficiency (in %) = $\text{Line Output} \times \text{Garment SAM} / \text{Manpower} \times \text{Shift Hours} \times 100$

Where

The line output - The Line output is the overall number of items the line produces. Garment Standard Allowed Minutes (SAM) - Standard minutes of a garment (including machine SAM and manual SAM)

Manpower - Total number of people working on the line in manpower (including all departments)

Shift Hours - Shift hours are the number of hours a factory is open each day.

The production efficiency of workers and batch production are both measured using the efficiency formula. Efficiency is the work produced from a process, represented as a percentage, divided by the work input into the same operation. The following generic formula is used to determine efficiency -

$$100 \text{ times } (\text{Work output} / \text{Work input})$$

The efficiency formula would look something like this if you thought of work input and output in terms of "minutes". the ratio of total standard minutes generated to full minutes spent on the task.

2.4 Flow Diagram

The performance management and efficiency calculation process is intended to create an ongoing dialogue between the supervisor and employee. The Division of Human Resources and Organisational Effectiveness recognizes the PCER (Plan, Coach, Evaluate, and Reward) model for facilitating the performance management process. Through this process, best practices are utilised to create a performance plan, coach for successful completion of the plan, and complete the annual performance evaluation.



2.5 Model

Mathematical models used

- `lr = LinearRegression()`
- `dtr = DecisionTreeRegressor()`
- `knr = KNeighborsRegressor()`
- `rfr = RandomForestRegressor()`

```
• svr = SVR()
```

2.6 Program code

```
plt.figure(figsize=(20,8))

plt.subplot(1,2,1)
plt.title('Actual Productivity')
sns.distplot(data.actual_productivity)

plt.subplot(1,2,2)
plt.title('Actual Productivity')
sns.boxplot(y=data.actual_productivity)

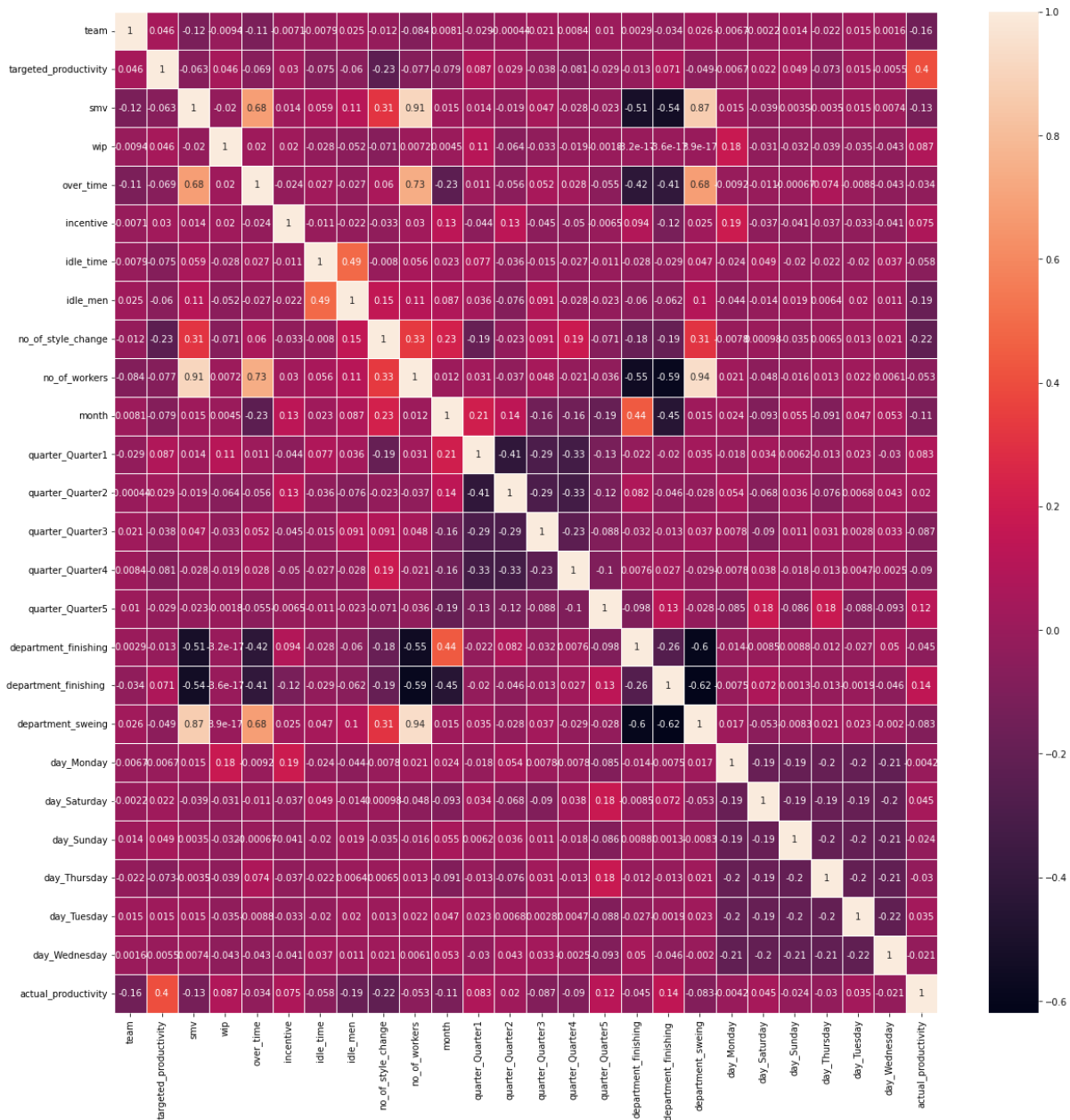
plt.show()
```

2.7 Observation-

By analysing performance metrics before and after the implementation of training initiatives, the employee efficiency model can quantify the impact of these programs on productivity and efficiency. This observation can be further analysed using statistical techniques such as hypothesis testing.

Below in the representation it shows the maximum outcome of any employee can touch 1 in terms of our performance factor. The values that touch 1 are taken as to be maximum output generators of the company and hence are the best employees.

As we go through these values can range between 0 to 1 showing the scale of improvement for such employees and for the overall company as well.



Conclusion

The model can be used to guide the development of training programs and interventions to improve employee skills and knowledge, as well as to create more supportive work environments that promote employee motivation and job satisfaction. The model can also be used to inform leadership practices and strategies, helping managers to better understand how to create effective teams and manage employee performance.

Furthermore, the model can help organisations to identify areas of weakness and opportunities for improvement in their current practices. By conducting ongoing

assessments and monitoring of employee efficiency, organisations can identify patterns and trends over time, enabling them to make data-driven decisions to optimise their workforce.

Overall, the employee efficiency model developed in the research paper has the potential to provide valuable insights and guidance for organisations seeking to improve employee performance, productivity, and overall organisational success.

References

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Strategic marketing and management tools used to increase **employee efficiency**