Employee Churn Analysis

In recent years, the company has faced challenges in retaining employees, impacting the workforce and leading to a decline in productivity. At the request of the HR team, the analytics team will assist by providing predictive analytics to address the following questions: 1. Which departments are predicted to have the highest employee churn?, 2. What factors contribute most to employee churn? Additionally, the analytics team will provide recommendations on actions the company can take to reduce churn among new employees.

Churn Percent
15%

Departments	Avg of Avg Monthly Hours	Avg Satisfaction Level	last_evaluation
10	212.85	0.5	0.47

This analysis utilizes the PyCaret library to implement machine learning for predicting employee churn. The HR employee dataset is split into training and testing sets. The model is trained and validated using K-fold validation. After training and validation, the Light Gradient Boosting Machine (LGBM) is selected as it outperforms other models. The testing set is then used to evaluate performance, demonstrating the model's ability to generalize to unseen data with 98% accuracy and an F1-score of 0.96. Finally, the model is deployed to predict churn in a new employee dataset.

1 Which departments are predicted to have the employee churning?
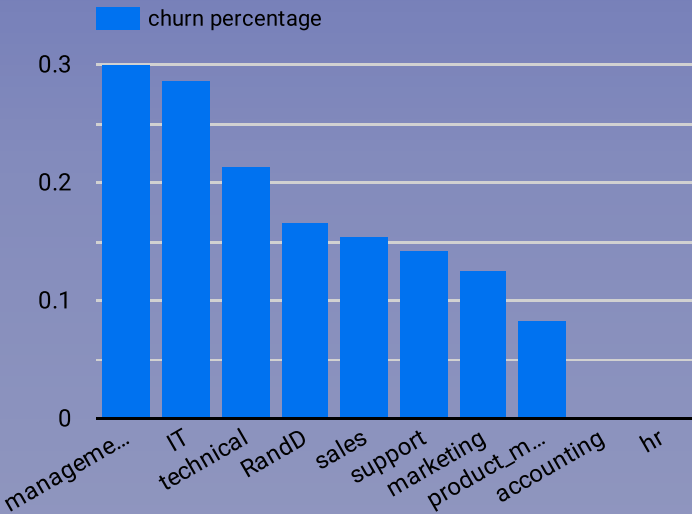
Number of Churn
15

Fifteen employees from the new employee list are predicted to churn, accounting for 15% of the total workforce. A department-wise analysis reveals that management, IT, and technical departments have the highest predicted churn rates at 30%, 29%, and 21%, respectively. In contrast, accounting and HR departments are not expected to experience any employee departures. These findings highlight the need for targeted retention strategies to address potential turnover effectively.

2 What factors contribute to the churning the most? And what are the indicators to identify them?

Avg Avg Churn Monthly Hours	Avg Churn Satisfaction Level	Avg Last Evaluation
231.13	0.17	0.44

According to the model, the top three factors contributing to employee churn are average monthly hours, satisfaction level, and last evaluation. On average, employees predicted to leave work 19 more hours per month, have a 0.3 lower satisfaction level, and score 0.03 lower on their last evaluation compared to the overall dataset. Additionally, moderate factors such as the number of projects and tenure at the company also influence churn, while the remaining factors have a minimal impact. A deeper analysis may be required to fully understand the influence of the top three factors on employee turnover.

Recommendations

1. Balance Workloads – Limit excessive work hours by monitoring overtime, promoting flexible schedules, and preventing burnout.
2. Boost Employee Satisfaction – Improve morale through feedback, recognition programs, and career growth opportunities.
3. Enhance Performance & Growth – Ensure fair evaluations, offer mentorship, and create clear career development paths.

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