Keeping IBM Talent / *Insights into Employee Retention*

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01/ Overview

Overview

This project aims to help IBM understand why employees leave the company and how to improve employee retention. By analyzing employee data, we identified key factors that influence whether an employee stays or leaves. We used simple machine learning methods to find the most important reasons for employee turnover. The project includes clear visualizations to illustrate our findings. Based on this analysis, we provide practical recommendations to help IBM keep its employees happy and reduce turnover.

02/ Business Understanding

Stakeholders

The primary stakeholders:

- HR department at IBM - interested in understanding employee turnover to develop better retention strategies.
- Executives - concerned with the overall performance and stability of the company, which can be affected by high turnover rates.
- Team managers - want to maintain a stable and motivated team to ensure productivity and morale.

Business Objective

The main objective of this project is to help IBM reduce employee turnover by identifying the key factors that lead to employees leaving the company. By understanding these factors, IBM can implement targeted strategies to improve employee satisfaction and retention, ultimately leading to a more stable and productive workforce.

Business Problem

IBM faces a high turnover rate, which is costly and disrupts productivity. The challenge is to pinpoint why employees leave and provide actionable recommendations to improve retention.

03/ Data Understanding

Dataset

The dataset captures diverse employee attributes and work-related factors, including demographic details, job specifics, and satisfaction metrics. It also includes indicators of employee turnover, providing a comprehensive view of organizational dynamics. With a mix of numerical and categorical variables, the dataset offers opportunities to explore patterns influencing employee attrition and organizational outcomes.

Data Analysis

Here we prepared the dataset by encoding categorical variables and addressing class imbalance using SMOTE. In feature selection, we treated employee attrition as the target variable, while all other variables were considered as features. This approach helped us identify the most relevant features for predicting employee attrition while excluding the target variable from the feature selection process.

04/ Modelling

Modelling

In our modeling phase, we tried out three different approaches: Decision Trees as the baseline model, Random Forests, and a tuned version of the Random Forest. We wanted to see which one could best predict whether an employee would stay or leave the company.

Decision Tree

The Decision Tree gave us an accuracy of about 78%, which was okay but not great. It struggled a bit with figuring out who would leave the company.

Random Forest

Then, we tried the Random Forest, hoping it would do better. It did improve the accuracy to around 87%, which was good. We also looked at which factors were most important in predicting whether an employee would leave.

Tuned Model

After that, we decided to make the Random Forest even better by fine-tuning it. This process helped us adjust the model to be even more accurate, up to about 92%.

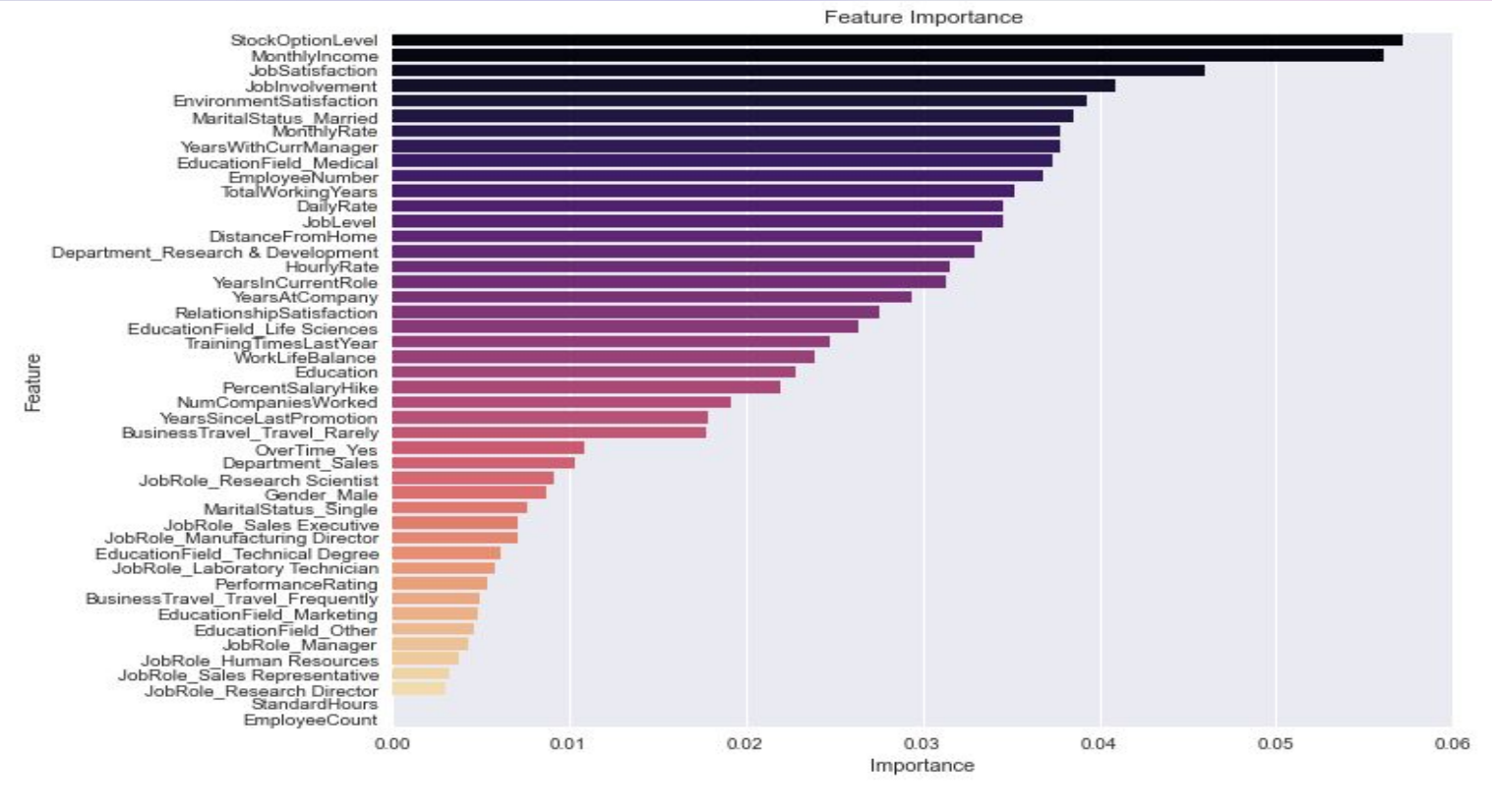
05/ Evaluation

Evaluation

In the evaluation stage, we looked at how well each model performed. The tuned Random Forest came out on top, showing it could predict employee turnover pretty well. Overall, these steps helped us understand our data better and build models that could predict employee turnover more accurately.

06/Recommendations

Feature against Importance tuned model



Recommendations

Based on the feature importance analysis, several recommendations can be made to improve employee retention:

- **Focus on Stock Option Programs:** Companies should consider enhancing or introducing stock option programs to incentivize employees to stay with the organization longer.
- **Address Job Satisfaction and Involvement:** Employers should prioritize initiatives aimed at improving job satisfaction levels, such as recognizing employee achievements, providing opportunities for career advancement, and fostering a positive work environment that promotes engagement.
- **Consider Marital Status:** Employers could explore benefits tailored to married employees, such as family-friendly policies or support programs to help balance work and personal life.
- **Promote Diversity and Inclusion:** Organizations should foster an inclusive environment where employees from diverse backgrounds feel valued, respected, and supported. Implement diversity training, establish affinity groups, and create opportunities for cross-cultural collaboration.

Recommendations

- **Enhance Training and Development Opportunities:** Investing in training programs, skill development workshops, and educational opportunities can demonstrate a commitment to employees' growth and encourage them to remain with the organization.
- **Address Work-Life Balance:** Employers should strive to promote work-life balance by offering flexible work arrangements, implementing policies to prevent overwork, and encouraging employees to take regular breaks to recharge.
- **Address Overtime:** Employers should monitor and manage workload distribution effectively to prevent employee burnout and dissatisfaction associated with excessive overtime.
- **Consider Role Satisfaction:** Employers should tailor retention strategies to address the unique needs and challenges faced by employees in different roles.

Thank *you!*