



MACHINE LEARNING AND OPTIMISATION

Integration planning at SFB (A)

MIM 22 Group 23 – E2

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Kusha's Goal



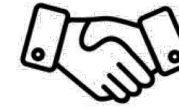
Main Objective

- Design an analytical model to facilitate the headcount reduction following the closure of the SFB Lyon office
- Therefore, **the main task is to make an unbiased, informed and data-driven decision on which employees to fire or “encourage” to leave**
- A further objective when identifying which employees are likely to leave is to avoid a mass exodus



Brand Image

- Since employment-related decisions can have repercussions on reputation and morale, it is key that **sample bias is avoided** to ensure a diverse working force
- Another objective is to avoid brand dilution by respecting the workforce and offering severance packages
- Furthermore, **talent must be maintained** (avoiding too many leaves) and the organization needs to remain balanced and integrated with BAP



Severance Agreement: RCC

- We expect **40 employees** from the Lyon office **to leave voluntarily and accept severance compensation**
- Since severance packages are important to minimise regulatory issues, the costs associated to these be controlled and kept as low as possible
- Precisely, the target for the **labour cost reduction is of \$3 million**

Tools to solve the problem

Classification

- Use a label to identify which employees are "intent on staying" and which ones are "intent on leaving"
- Furthermore, labels can be used to classify employees according to the number of years they have worked in the company (more loyal ones tend not to want to leave), their performance in the workplace and their overall satisfaction

Clustering

- Clustering can be used to assess the performance of the employees and divide them into "clusters" according to average, below average and above average performance
- The clusters would also allow to select a diverse staff, since the best approach would be to select employees belonging to different clusters

Logistic Regression

- The logistic regression will be employed to see which employees to let go of and which to keep
- Specifically, a binary regression would tell us if the outcome is to let the employee go or if to keep them

Process to solve the problem

1. Data Pre-processing and normalization of data

- Since the acquirer and target are from different geographical regions, they likely have different regulations imposed upon them and different norms in terms of culture
- Due to these reasons, some data points such as income should be coupled with healthcare benefits to understand total capital expenditure per employee
- Removing features such as gender and nationality is important for an unbiased dataset and therefore an unbiased model for employee dismissal

2. Classification through logistic regression and clustering

- Using either a logistic regression or clustering, we can understand employees that are vital to the company's operation and individuals who are not
- With logistic regression, since the output variable is binary, we can Create a Regression that That indicates vital and non-vital employees
- With Clustering, we can visually see employees performance and other metrics in comparison to total capital expenditure and classify them as vital, useful and non-vital

3. Optimization of severance packages of non-vital employees

- Once we are able to classify employees, we can use 2 optimization models on the non-vital employees. Since we have an inherent incentive to keep the vital employees
- The first optimization model would use integer programming to minimise reputational damage for the company. This would provide a short-list of employees that can be dismissed with minimal reputational damage
- The second optimization model would use linear programming on the short-listed data from the first optimization model to determine severance package values for each individual to minimise total severance pay as a company

Details regarding the optimization models (step 3)



Optimization model 1

Decision Variables

- To keep or not to keep specific non-vital employees in regards to reputational damage this decision could cause the firm

Objective

- Minimize impact on reputation due to employee removal

Constraints

- A maximum of 40 employees for severance
- Cannot eliminate a large portion of employees from a singular department since this may cause an exodus within that department



Optimization model 2

Decision Variables

- The dollar value required for each employee for their dismissal

Objective

- Minimize value of total severance package to save costs for the merged entity.

Constraints

- A maximum of 40 employees for severance