# Analytics in Business – Group Project

# Problem Set

# Introduction

A team forms the backbone of any organization and it is critical to the way how companies organize and manage their work. In today’s hostile and increasingly competitive economic environment, it is especially crucial for any businesses to have high performing and well-integrated teams to solve complex business problems and achieve optimum results. Business leaders need to possess strong leadership competencies and the ability to put together the right people for the work. This project aims to explore the rationales on how leaders pick their teams for different tasks from the dataset given and propose appropriate measures to predict the degree of a person’s picking decisions are based on the friendship network.

The three tasks used in this project to assess the people-picking skills are design, influencing and implementation.

# Regression

Poisson regression and negative binomial regression are the most commonly used modelling methods for discrete count variables. The significant differences in values of mean and variance calculated for our variables indicates possibility for over-dispersed outcomes. Negative binomial regression was chosen here as it adjusts for the variance independently from the mean thus offering more flexibility and better fit.

|  |  |  |
| --- | --- | --- |
| Table 1. Mean and variance for key variables | | |
|  | Mean | Variance |
| Friendship | 5.53 | 9.00 |
| Design Task | 5.42 | 14.3 |
| Influencing Task | 5.27 | 21.9 |
| Implementation Task | 5.53 | 17.3 |

**Figure 1. Negative Binomial Regression Plots**

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Table 2. Negative Binomial Regression Results | | | | |
|  |  | Estimate | Standard Error | P value |
| Design Task | Intercept | 0.927 | 0.154 | 1.86\*10-9 |
| Friendship | 0.125 | 0.022 | 1.35\*10-8 |
| Implementation Task | Intercept | 0.823 | 0.168 | 9.63\*10-7 |
| Friendship | 0.143 | 0.024 | 3.17\*10-9 |
| Influencing Task | Intercept | 1.10 | 0.21 | 2.61\*10-7 |
| Friendship | 0.094 | 0.033 | 3.84\*10-3 |

The regression results suggest that friendship has an positive effect on the likelihood of a person being picked for a team. More friends a person has, the more likely he/she will get picked.

# Cosine Similarity

|  |  |  |  |
| --- | --- | --- | --- |
| Flexibility score and ranking | | | |
| Rank | **ID** | **Flexibility score** | **Z score** |
| 1 | 2 | 1 | 1.3499475 |
| 2 | 13 | 1 | 1.3499475 |
| 3 | 15 | 1 | 1.3499475 |
| 4 | 18 | 1 | 1.3499475 |
| 5 | 57 | 1 | 1.3499475 |
| 6 | 33 | 0.9444444 | 1.1362865 |
| 7 | 34 | 0.9444444 | 1.1362865 |
| 8 | 28 | 0.9391419 | 1.1158936 |
| 9 | 32 | 0.9391419 | 1.1158936 |
| 10 | 41 | 0.9319586 | 1.0882673 |
| 11 | 29 | 0.9254644 | 1.0632912 |
| 12 | 9 | 0.9139337 | 1.0189453 |
| 13 | 1 | 0.8587977 | 0.8068979 |
| 14 | 4 | 0.8333333 | 0.7089644 |
| 15 | 7 | 0.8333333 | 0.7089644 |
| 16 | 26 | 0.8333333 | 0.7089644 |
| 17 | 30 | 0.8333333 | 0.7089644 |
| 18 | 38 | 0.8333333 | 0.7089644 |
| 19 | 45 | 0.8333333 | 0.7089644 |
| 20 | 8 | 0.8174258 | 0.6477856 |
| 21 | 16 | 0.8174258 | 0.6477856 |
| 22 | 40 | 0.7777778 | 0.4953033 |
| 23 | 58 | 0.7466401 | 0.375551 |
| 24 | 23 | 0.7222222 | 0.2816422 |
| 25 | 52 | 0.7222222 | 0.2816422 |
| 26 | 60 | 0.7222222 | 0.2816422 |
| 27 | 44 | 0.6666667 | 0.0679812 |
| 28 | 59 | 0.6666667 | 0.0679812 |
| 29 | 49 | 0.6560617 | 0.0271954 |
| 30 | 6 | 0.6452932 | -0.014219 |
| 31 | 24 | 0.6153655 | -0.129318 |
| 32 | 47 | 0.6116172 | -0.143733 |
| 33 | 20 | 0.6111111 | -0.14568 |
| 34 | 31 | 0.6111111 | -0.14568 |
| 35 | 46 | 0.6111111 | -0.14568 |
| 36 | 3 | 0.5952036 | -0.206859 |
| 37 | 39 | 0.5640142 | -0.32681 |
| 38 | 37 | 0.5555556 | -0.359341 |
| 39 | 51 | 0.5555556 | -0.359341 |
| 40 | 54 | 0.5555556 | -0.359341 |
| 41 | 12 | 0.5449505 | -0.400127 |
| 42 | 21 | 0.5449505 | -0.400127 |
| 43 | 22 | 0.5333333 | -0.444805 |
| 44 | 10 | 0.532961 | -0.446238 |
| 45 | 55 | 0.5131355 | -0.522484 |
| 46 | 50 | 0.5 | -0.573002 |
| 47 | 35 | 0.4899011 | -0.611841 |
| 48 | 19 | 0.4844022 | -0.632989 |
| 49 | 48 | 0.47879 | -0.654574 |
| 50 | 17 | 0.4772189 | -0.660616 |
| 51 | 25 | 0.4285369 | -0.847842 |
| 52 | 36 | 0.3333333 | -1.213985 |
| 53 | 27 | 0.2115841 | -1.68222 |
| 54 | 43 | 0.1666667 | -1.854968 |
| 55 | 56 | 0.1575265 | -1.89012 |
| 56 | 5 | 0 | -2.495952 |
| 57 | 11 | 0 | -2.495952 |
| 58 | 42 | 0 | -2.495952 |

Cosine similarities were calculated across all three tasks and an average was taken for each person in the dataset. All IDs were ranked based on their flexibility score which was given by using 1 – cosine similarity. Leader ID #2,13,15,18,27 showed to have highest flexibility ratings whilst #5,11,42 had the lowest.

# Leaders

Creativity leader 33

Implementation leader 25

Influence leader 7

# Id Rankings

# Extra

If the decisions people make reflect the consensus of a group.….