**CAPSTONE PROJECT ONE: PREDICT EFFECTIVENESS OF MARKETING CAMPAIGN**

**Project Summary**

The objective of this capstone project is to predict if the customers of the banking institution will subscribe to a term deposit (variable y). The client in question, a Portuguese Banking Institution seeks to maximize the effectiveness of its marketing campaign (phone calls) with regards to term deposit product (variable y).

Based on the results of findings, the client will be empowered to carry out targeted marketing campaigns for product ‘y’, by ensuring that marketing efforts are directed at customers who are most likely to subscribe to the term deposit. This could potentially have a high impact on the client’s bottom line, by reducing costs, through targeted customer marketing and streamlined processes.

The data was gathered from the direct marketing campaign activities of a Portuguese banking institution. The method of execution of the campaign was through phone calls to customers.

The following steps were followed in executing this project:

* Clean Data
* Explore Data
* Identify and visualize explanatory variables
* Explore correlation between variable to be predicted, and the explanatory variables
* Select explanatory variables for K-means clustering
* Select explanatory variables for predictive analysis and machine learning
* Model Data and Train Data
* K-Means clustering
* Random Forest
* Support Vector Machines
* Gradient Boosting Algorithm

DATA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable Name | Data Type | Category | Variable Type | Comments | USE |
| Term Deposit | Binary | Categorical | Target | ‘Yes’ , ‘No’ |  |
| Age | Numeric | Integer | Predictor | 17 - 98 |  |
| Job | Character | Categorical | Predictor | admin, blue collar, entrepreneur, housemaid, management, retired, self-employed, services, student, technician, unemployed, unknown |  |
| Marital Status | Character | Categorical | Predictor | divorced, married, single, unknown |  |
| Education | Character | Categorical | Predictor | basic.4y, basic.6y, basic.9y, high.school, illiterate, professional.course, university.degree, unknown |  |
| Credit Default | Character | Categorical | Predictor | no, yes, unknown |  |
| housing | Character | Categorical | Predictor | no, yes, unknown |  |
| Loan | Character | Categorical | Predictor | no, yes, unknown |  |
| Contact | Character | Categorical | Predictor | cellular, telephone |  |
| Month | Character | Categorical | Predictor | January – December |  |
| Day of week | Character | Categorical | Predictor | Monday - Friday |  |
| Duration | Numeric | Integer | Benchmark |  | Dropped |
| Campaign | Numeric | Integer |  | (number of contacts) |  |
| pdays | Numeric | Integer |  | (999 – not previously contacted) |  |
| previous | Character | Categorical |  | (number of contacts before current campaign) |  |
| poutcome | Character | Categorical |  | failure, nonexistent , success |  |
| emp.var.rate | Numeric | Float |  |  |  |
| cons.price.idx | Numeric | Float |  |  |  |
| cons.conf.idx | Numeric | Float |  |  |  |
| euribor3m | Numeric | Float |  |  |  |
| nr.employed | Numeric | Float |  |  |  |

CLEAN DATA

EXPLORE DATA

IDENTIFY AND VISUALIZE EXPLANATORY VARIABLES

EXPLORE CORRELATION

SELECT EXPLANATORY VARIABLES FOR K-MEANS CLUSTERING

SELECT EXPLANATORY VARIABLES FOR PREDICTIVE ANALYSIS AND MACHINE LEARNING

MODEL DATA AND TRAIN DATA

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