

Portuguese Bank TeleMarketing

Agenda

Introduction

Objective

Analysis Objective

Data & Methodology

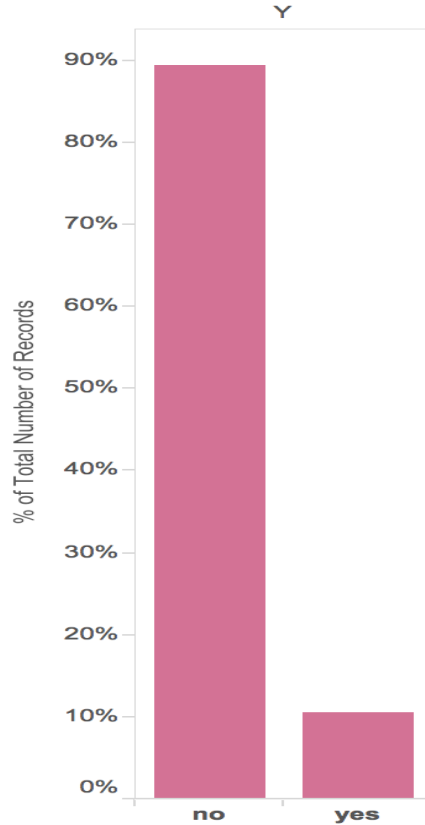
Strategic Solutions

Conclusion

Introduction

- The data set is about Portuguese bank's success over their customers **subscribing to Term Deposits**. (once deposited, cannot be withdrawn until the term period is over)
- Bank has used the method of direct marketing, that is Telemarketing.
- The reason behind the investment is that the bank wants its customer to deposit cash with them, so that they could use it to do business and also to obtain profits.
- Now the bank is trying to improve its **operational efficiency** over telemarketing.

Subscriptions of Term Deposit



% of Total Number of Records
for each Y.

Problem Identification

11.69 % success rate of subscription

5289 attempts made over calls.

Also total investment on calls would have been high



To improve the bank's
Direct Marketing
Campaign in order to
increase the **Client**
Subscriptions for
Term Deposits.

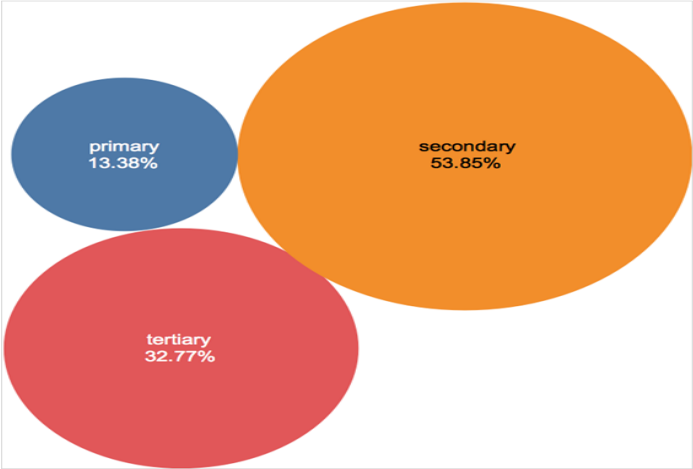
Data Set Description

Attribute Information :

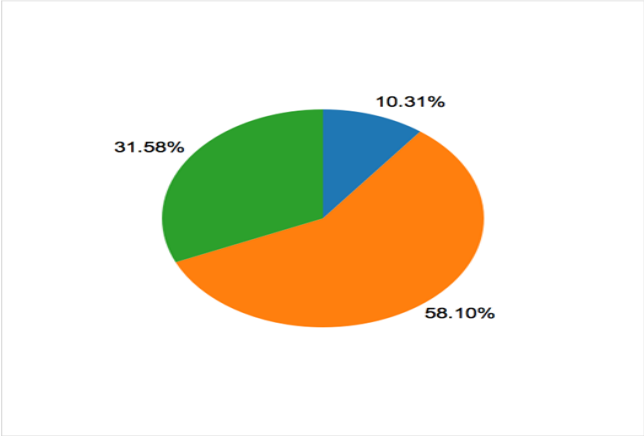
Age	Contact - Communication Type
Type of Job	Month - Last contact month of year
Marital Status	Day of week - last contact day of week
Level of Education	Duration - Last contact duration in sec
Default - Customer has credit in default	Campaign - Number of contact performed
Housing - has housing loan	Pdays - Number of days since last contact
Loan - has a personal loan	Previous - Number of contacts performed before this campaign and for this client
Poutcome - outcome of previous marketing	Target Variable : Y - has the client subscribed ? Yes or No

Demographics

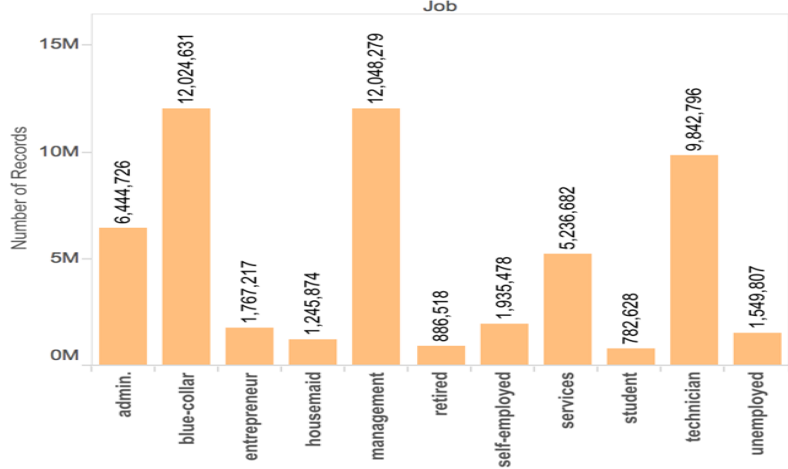
Level of Education



Marital Status



Distribution of Job Type



Number of Records
All values

Education

- ☐ primary
- ☐ secondary
- ☐ tertiary
- ☒ unknown

Education

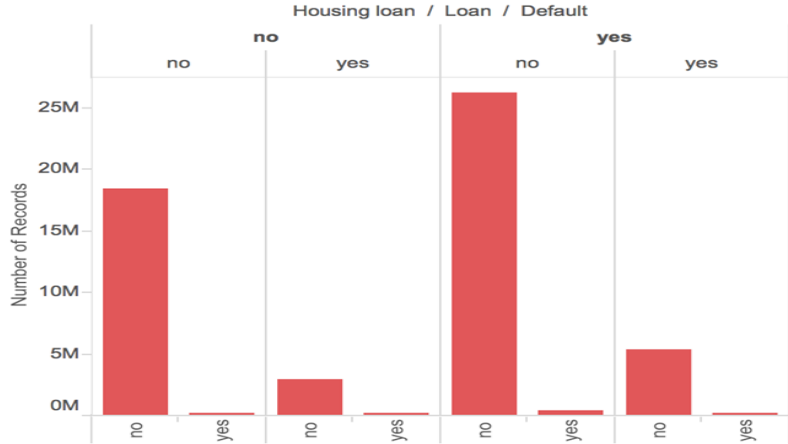
- ☒ primary
- ☐ secondary
- ☐ tertiary

Marital

- ☒ divorced
- ☐ married
- ☐ single

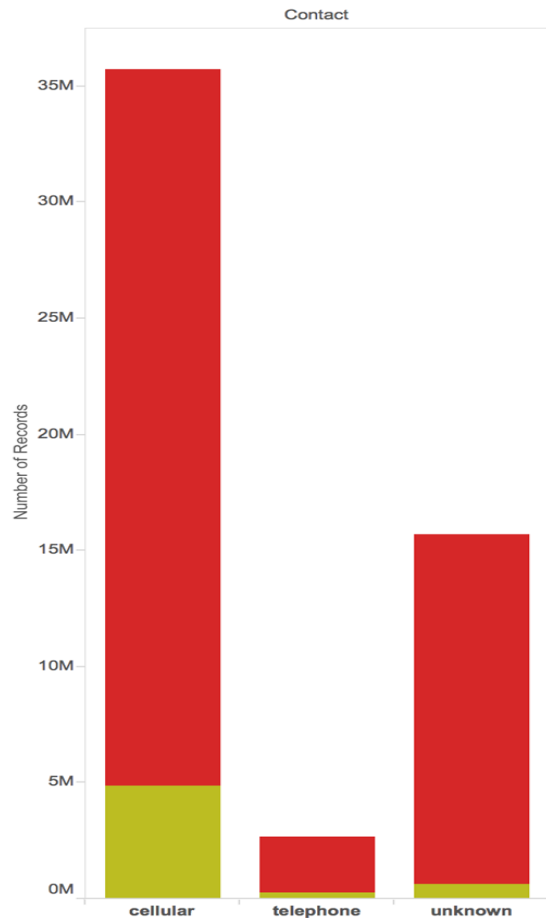
Number of Records
54,035,066

Customers with housing , personal or any default credit

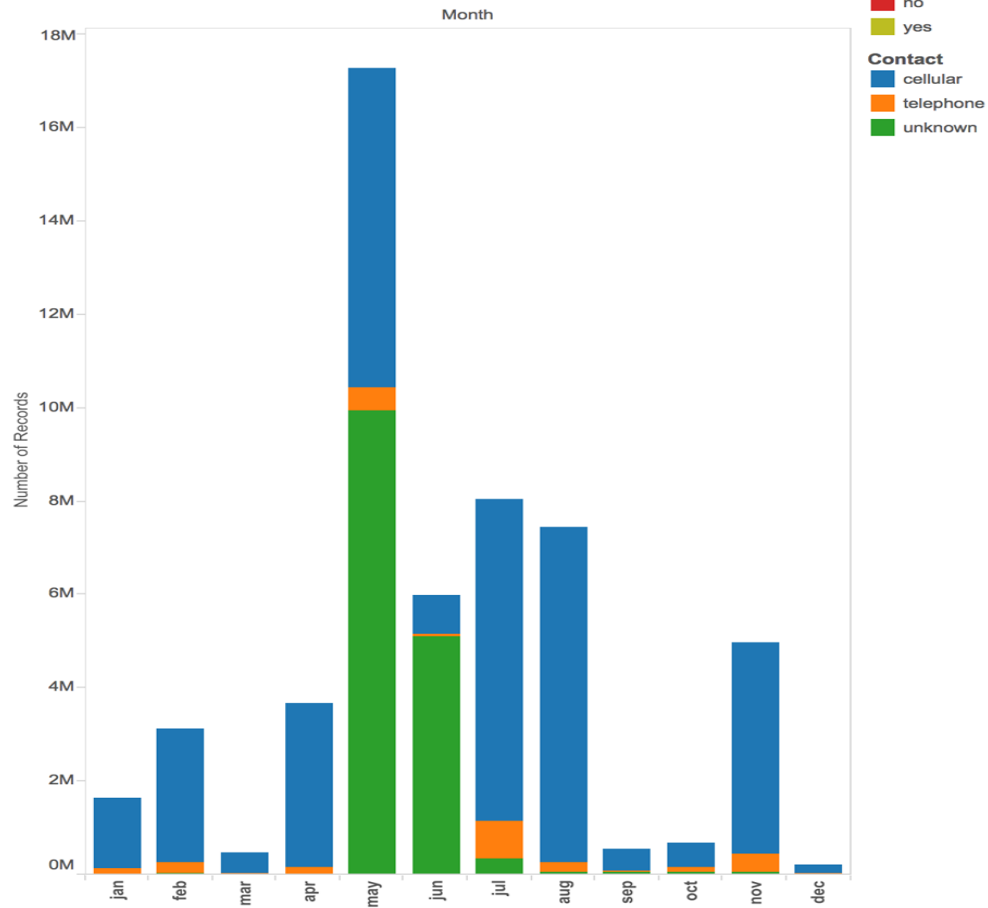


Trend of Marketing

Marketing Contact type

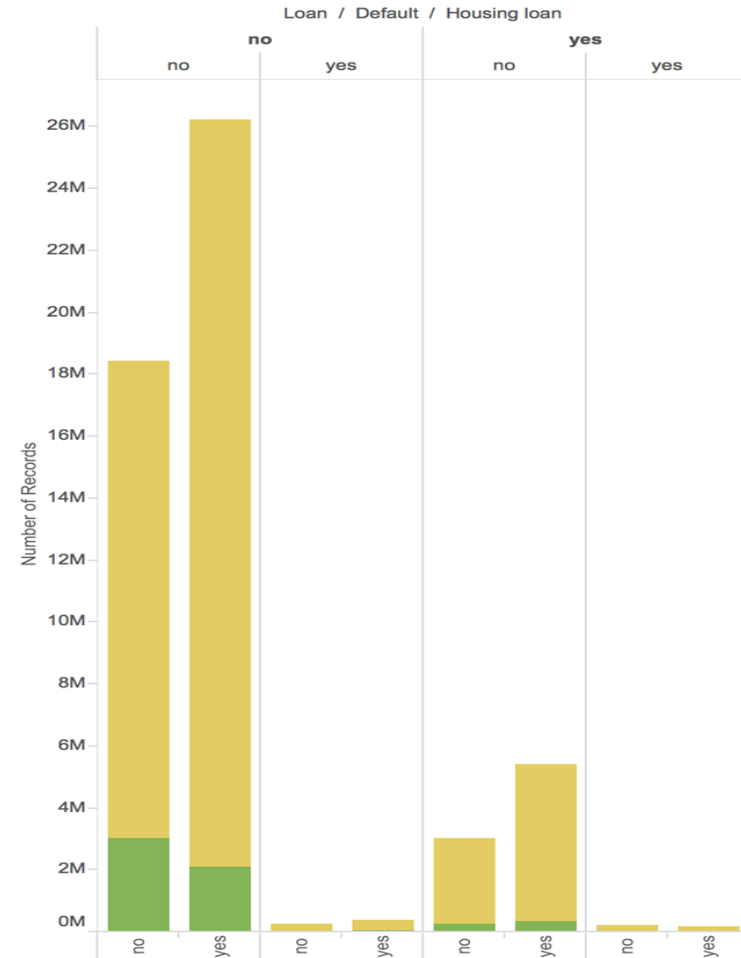


Type of Marketing over month

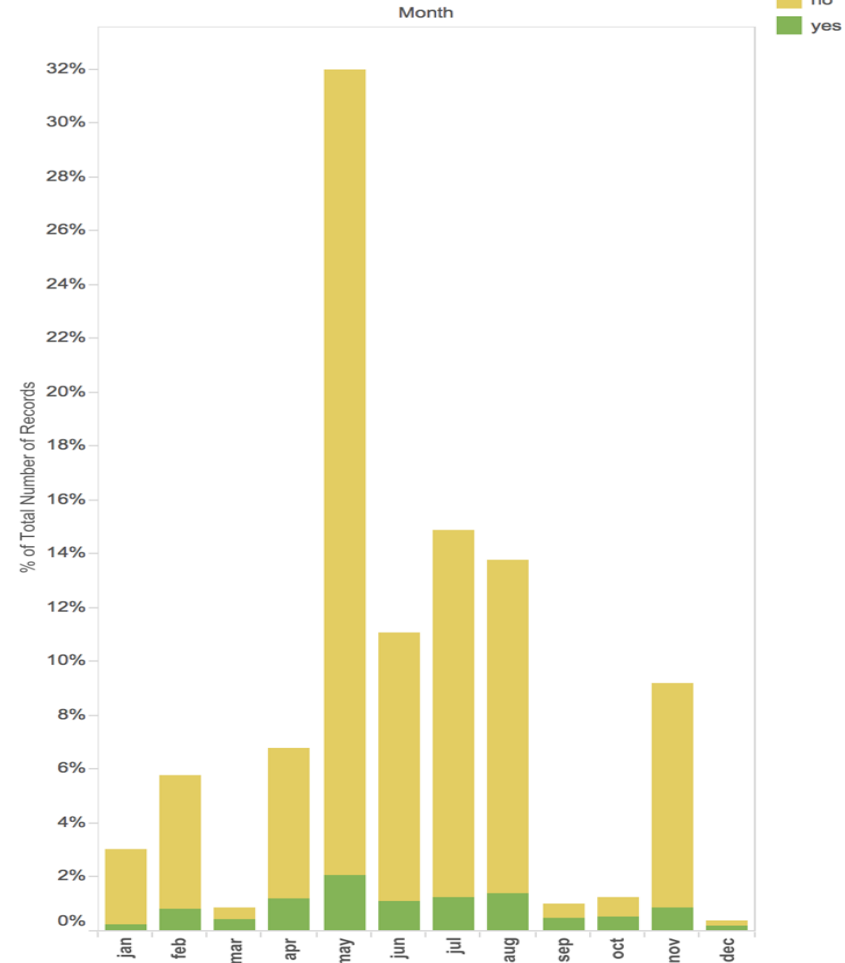


Factors that influence Subscription

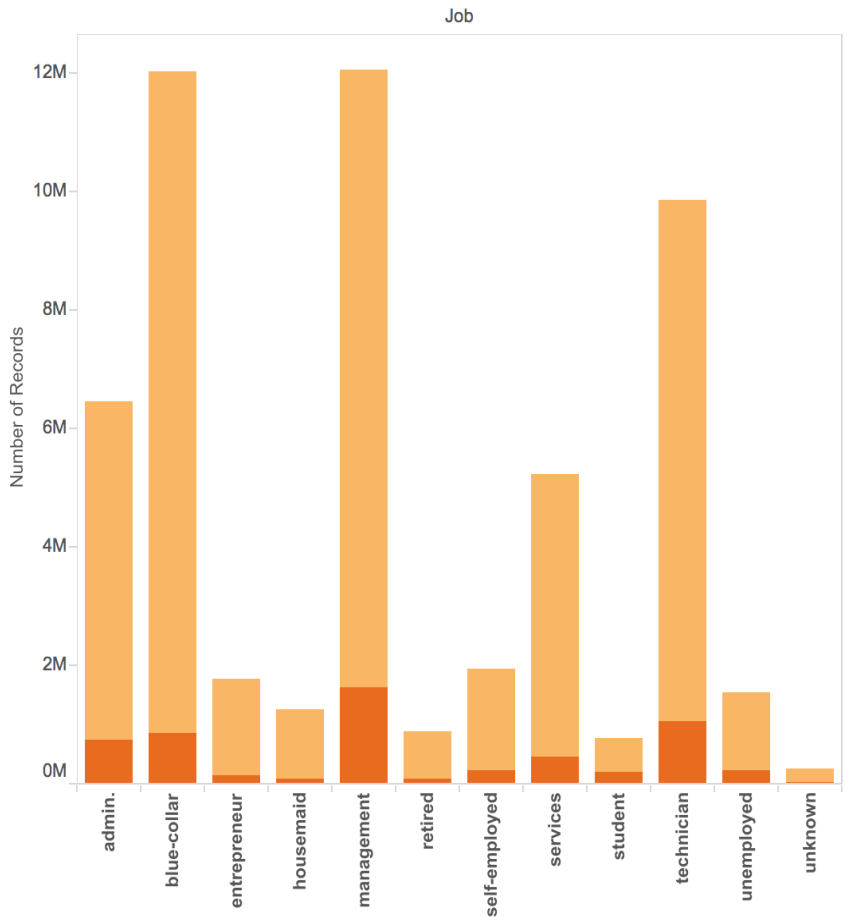
Loan / Default Credit line / Housing loan effect on the subscription



Month wise Subscription

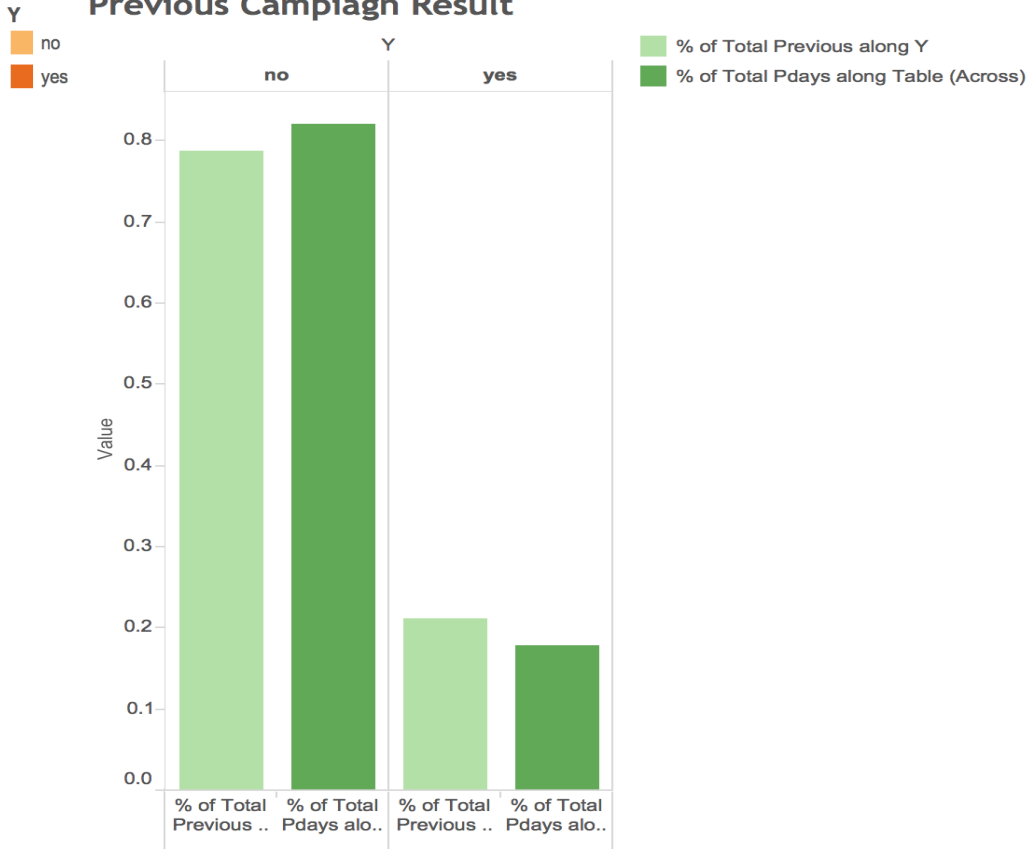


Subscription based on Job type



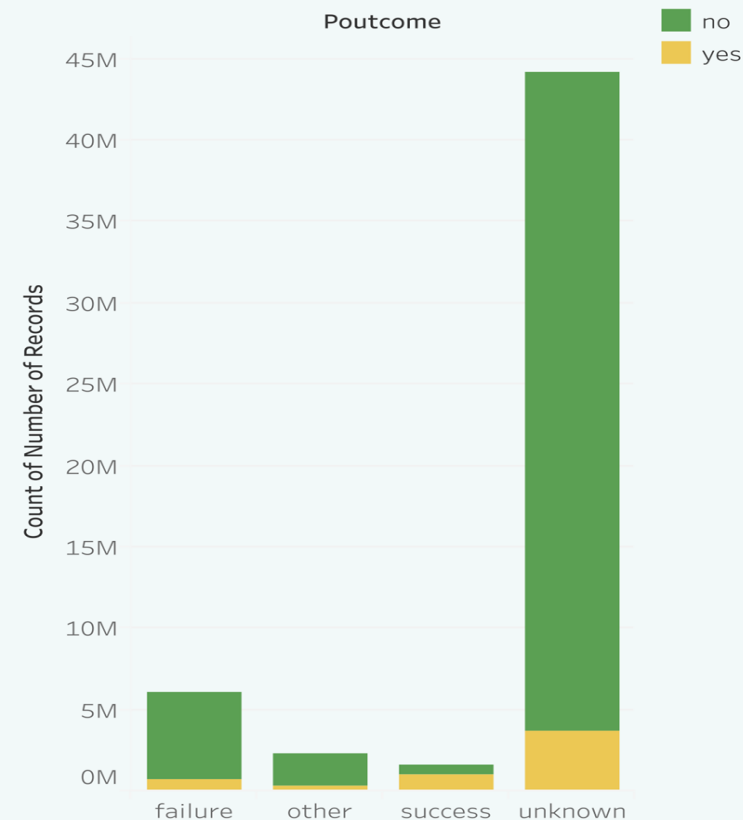
Sum of Number of Records for each Job. Color shows details about Y.

Last contacted from the Previous Campiagn Result



% of Total Previous along Y and % of Total Pdays along Table (Across) for each Y. Color shows details about % of Total Previous along Y and % of Total Pdays along Table (Across).

Outcome of the previous marketing campaign with whether the client subscribed or not



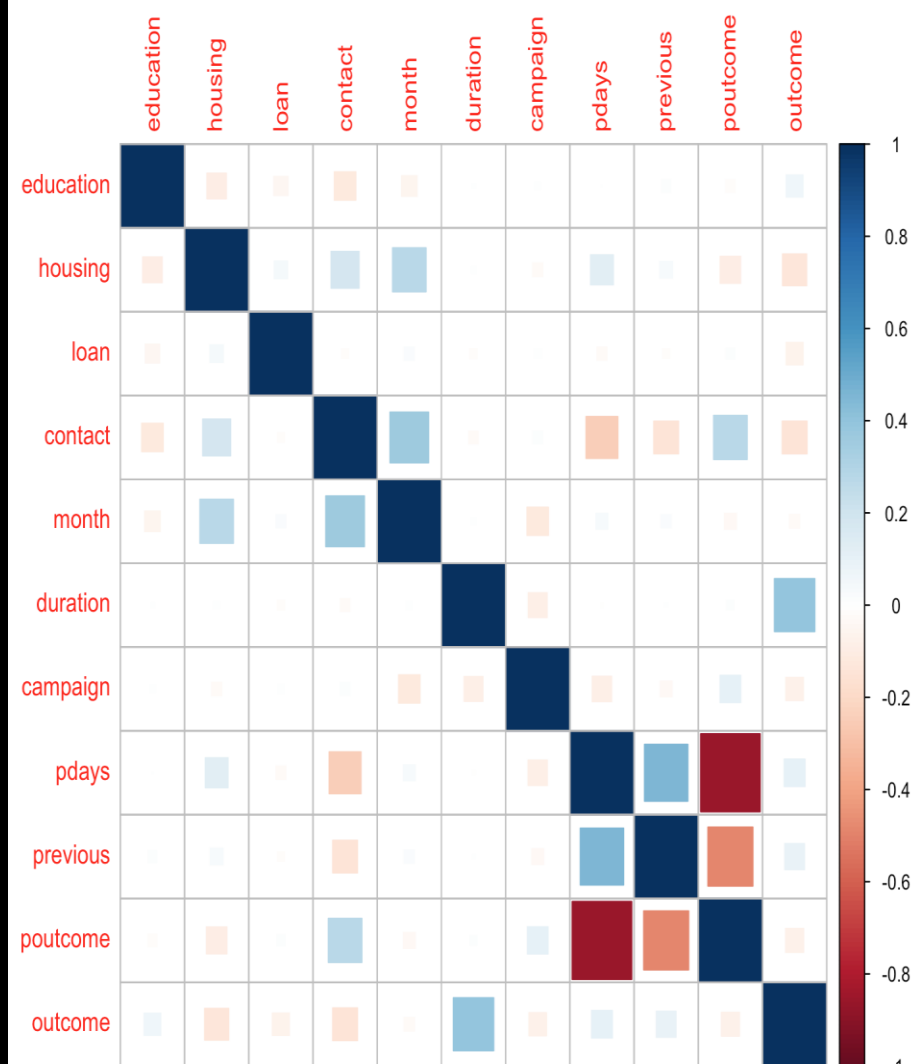
Count of Number of Records for each Poutcome.
Color shows details about Y.

Previous Campaign Results

- Since, most of the data of the previous campaign is unknown, hence cannot conclude that if we can use the previous campaigning strategies. But since the outcome of the known data is less, hence better to come up with new strategies.

Correlation Matrix

- Previous outcome of the campaign was negatively affected by the number of days that passed by after the client was last contacted from a previous campaign.
- Outcome of the calls has a highest correlation with the duration.



Statistical Analysis

Results of Naive Bayes

Prediction	No	Yes
No	14753	961
Yes	9715	1154

Since the accuracy is 88%, hence the results of naive bayes can be used to predict the future of outcomes.

Results of Decision Tree Analysis

Prediction	No	Yes
No	38904	1018
Yes	3444	1845

Accuracy of the prediction : 85 %

Since the accuracy is 85%, hence the results of decision tree can be also be used to check for the classification of the outcome and also the prediction

Logistic Regression Analysis

Table indicates the results of regression on how important each variable is for outcome of subscription

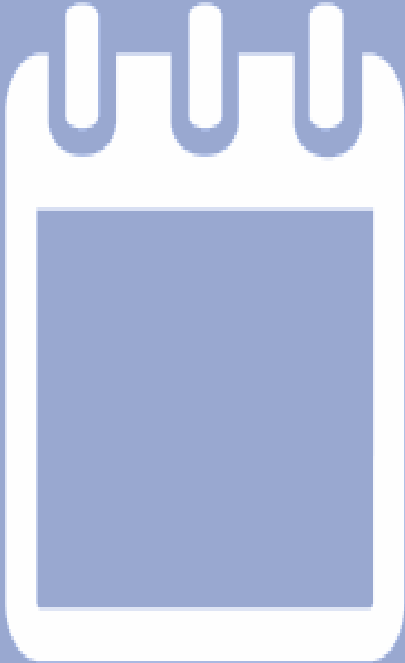
Variable	VarImpt	Variable	VarImpt	Variable	VarImpt	Variable	VarImpt
Age	0.05111568	Jobstudent	3.5048709	Educationunknown	2.41084802	Monthaug	8.8424634
Jobblue-collar	4.26415302	Jobtechnician	2.5535114	Defaultyes	0.10244117	Monthdec	3.91166829
Jobentrepreneur	2.84398758	Jobunemployed	1.58284871	Balance	2.49345192	Monthfeb	1.64763558
Jobhousemaid	3.69315796	Jobunknown	1.34181419	Housingyes	15.39545963	Monthjan	10.36721247
Jobmanagement	2.25505177	Maritalmarried	3.04620148	Loanyes	7.09072081	Monthjul	10.73310279
Jobretired	2.59585566	Maritalsingle	1.37521156	Contacttelephone	2.17294673	Monthjun	4.84281152
Jobself-employed	2.6638006	Educationsecondary	2.83255155	Contactunknown	22.18363802	Monthmar	13.26525582
Jobservices	2.66219429	Educationtertiary	5.03114967	Day	3.99296834	Monthmay	5.5213496

Strategic Solutions



Operational Changes

- From the tableau visualization and logistic regression, it is clear that the subscription is dependent on the client.
- Hence, Generate the list of customers with high probability of subscribing for the term deposit and then make a call, this will reduce the investment of time and resources



Targeted Trend Line

- Logistic Regression and classification shows that outcome of the calls are dependent on the Period of time that they contact the client.
- From tableau Visualization, it is clear that during may to august there are better outcomes of subscription.
- Hence the bank should concentrate on their telemarketing between May - August on their targeted list of customers generated by the first solution



Training Programs

- After including the operational and targeted trend lines strategies, it is better for the company to also focus on the internal employee skills development .
- Include training programs to improve the employees market and customer segment knowledge along with the term deposit benefits in order to attract more subscriptions