Data Analysis for Bank Marketing Campaign

Google Analytics Capstone Project

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Overview

In this project, I analysed the bank marketing dataset from UCI Machine Learning Repository.
Data source: https://archive.ics.uci.edu/ml/datasets/bank+marketing

The data (bank-additional-full.csv) was related to direct marketing campaigns (phone calls) of a Portuguese bank.

The end goal of this campaign is to find out whether the campaign was successful to motivate customers to subscribe to a bank term deposit.

Randomly targeting every customer leads to wastage of time and resources. The analysis would also help us **identify the right demographic to target for bank marketing campaign in future and return a better return on investment (ROI).**

Stakeholders

- **Senior Management:** Campaign performance evaluation and decision making.

- **Marketing Department:** Getting insights from the data to curate better campaigns for future.

- **Analysts/Data Scientists**: Could use data to create predictions on which customers would subscribe in future.

Analysis

Understanding Data and Data Cleaning

- The data consisted of 41188 rows and 21 columns. All the attributes and their description is shown in Data Attributes table below.

- The last column (#21) in the dataset is the predictor variable, whether a customer subscribed ('yes') or did not subscribe ('no')

- Before the data analysis, data was cleaned of all Null values and any spelling errors were looked for. Data was pretty much clean.

- Only 11.3% of the total targeted customers subscribed to the term deposit.

Note: Four attributes (emp.var.rate, cons.conf.idx, euribor3m, nr.employed) are economic indicators and dont have much insights to contribute to this analysis.
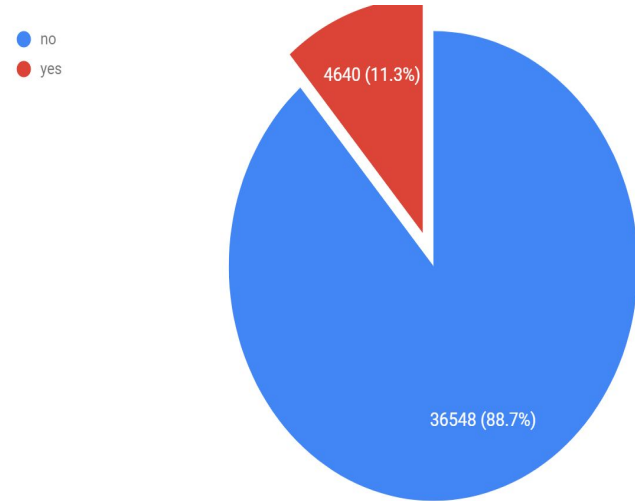
Customers who Subscribed at the end of Campaign

Data Attributes

Attribute	Kind	Attribute description	Values of attributes
age	numeric	age	values between 18 and 95
job	categorical	type of job	'admin.','blue-collar','entrepreneur','housemaid','management','retired','self-employed','services','student','technician','unemployed','unknown'
marital	categorical	marital status	'divorced','married','single','unknown'; note: 'divorced' means divorced or widowed
education	categorical	degree of education	'basic.4y','basic.6y','basic.9y','high.school','illiterate','professional.course','university.degree','unknown'
default	binary	has credit in default?	'no', 'yes', 'unknown'
housing	binary	has housing loan?	'no', 'yes', 'unknown'
loan	binary	has personal loan?	'no', 'yes', 'unknown'
contact	categorical	contact communication type	'cellular', 'telephone'
campaign	numeric	number of contacts during this campaign (included last contact)	values between 1 and 56

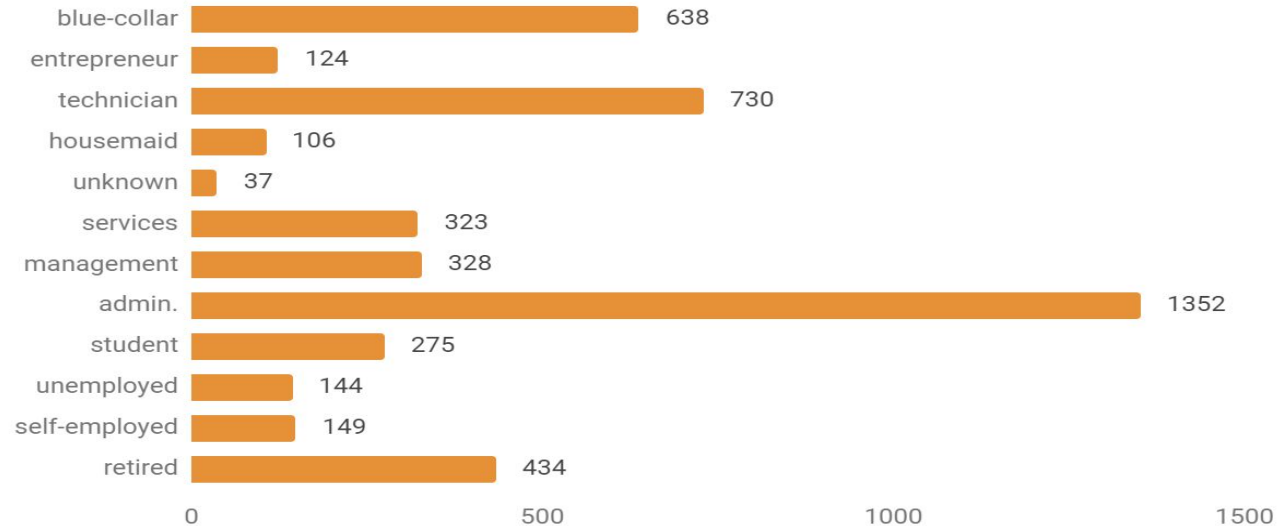| month	categorical	last contact month of year	'Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun', 'Jul', 'Aug', 'Sep', 'Oct', 'Nov', 'Dec'
day_of_week	categorical	last contact day of the week	'mon','tue','wed','thu','fri'
duration	numeric	last contact duration, in seconds	values between 0 and 4918
pdays	numeric	number of days that passed by after the client was last contacted from a previous campaign, note: 999 means client was not previously contacted	values between 0 and 27
previous	numeric	number of contacts performed before this campaign and for this client	values between 0 and 7
p-outcome	categorical	outcome of the previous marketing campaign	'failure','nonexistent','success'
emp.var.rate	numeric	employment variation rate	Values between -3.4 to 1.4
cons.conf.idx	numeric	consumer confidence index	Values between -50.8 to -26.9
euribor3m	numeric	euribor 3 month rate	Values between 0.634 to 5.045
nr.employed	numeric	number of employees	Values between 4963.6 to 5228.1
y	binary	has the client subscribed to a term deposit?	'no', 'yes'

Age

Subscribers by Age
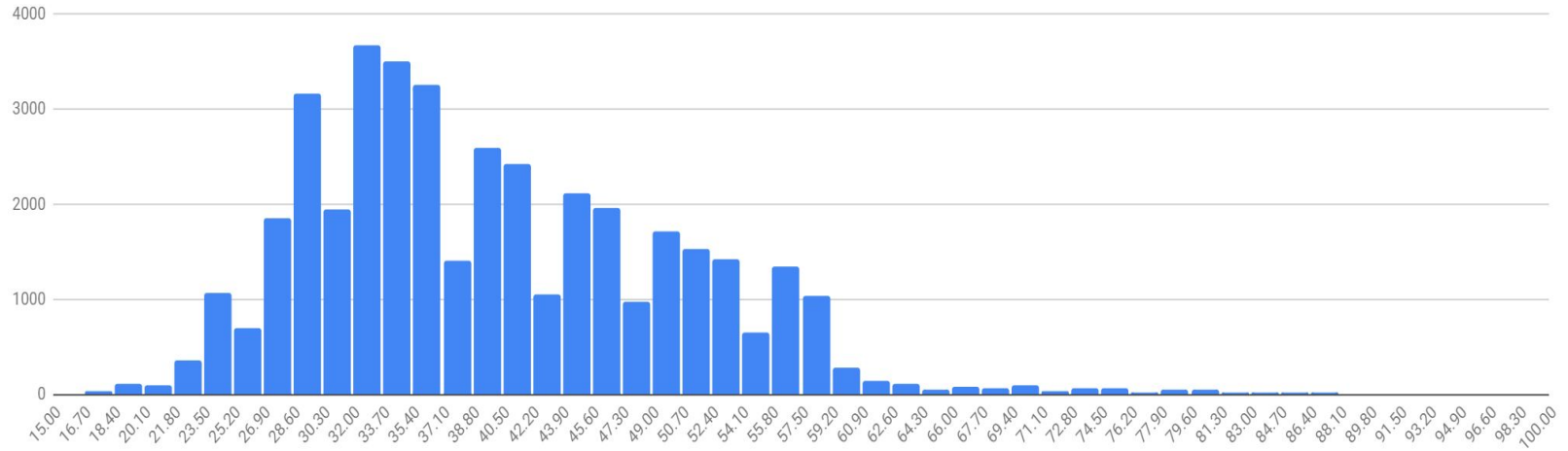
The Histogram shows that majority of the clients who subscribed to the bank deposit were in the age group 28-37.

# Job

Jobs of the targeted customers

Job	Count
blue-collar	638
entrepreneur	124
technician	730
housemaid	106
unknown	37
services	323
management	328
admin.	1352
student	275
unemployed	144
self-employed	149
retired	434

This was a categorical feature. From the exploratory analysis it is observed that the clients who subscribed to the deposit were into these categories of jobs: 'admin', 'blue-collar', 'technician'.

Marital
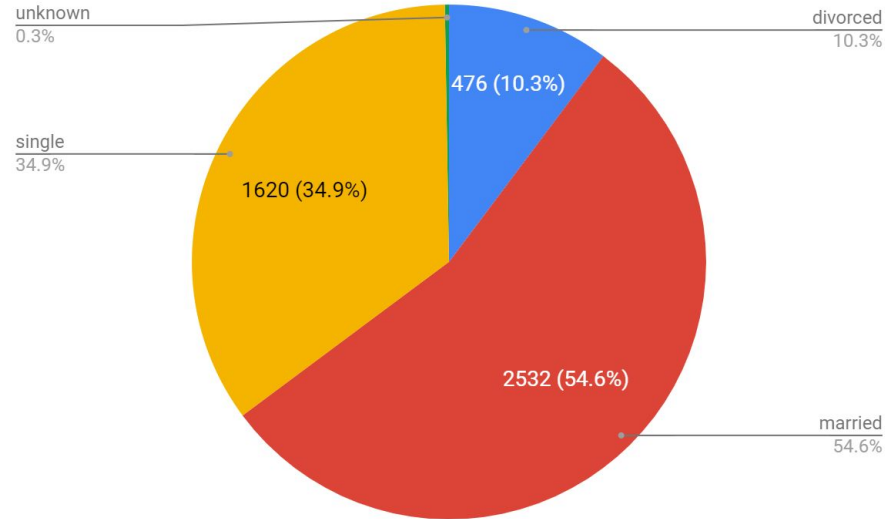
More than half of the clients who subscribed to term deposit plan were **married**(54.6%) followed by the single category (35%)
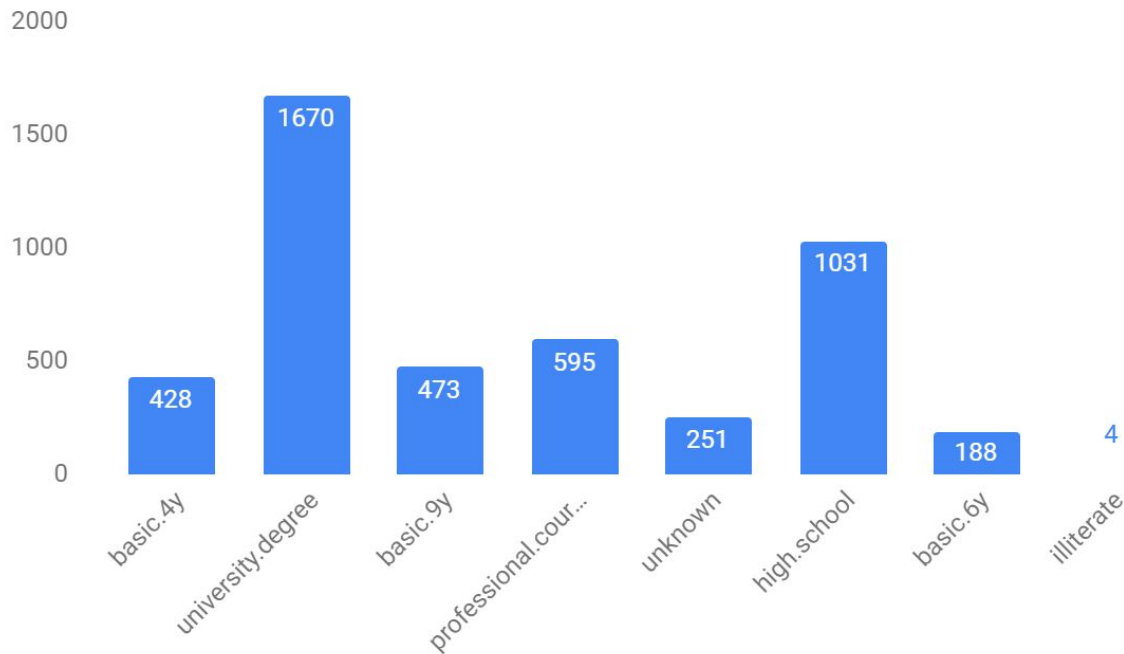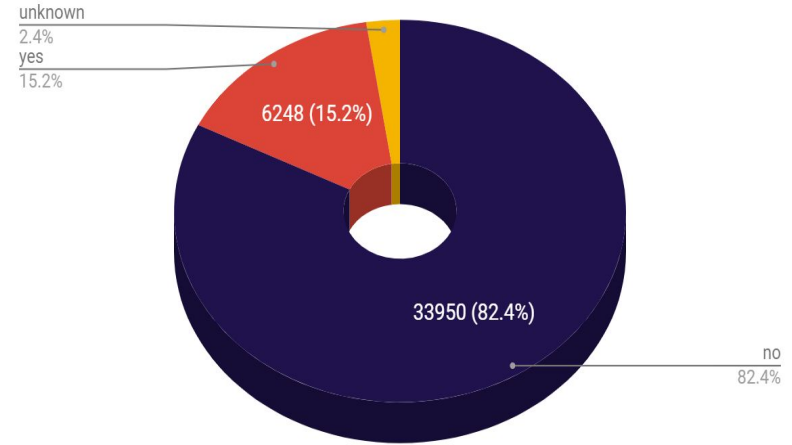
Customers with '**University Degree**' responded most positively to the campaign followed by one with a 'High School' Education and 'Professional' education.
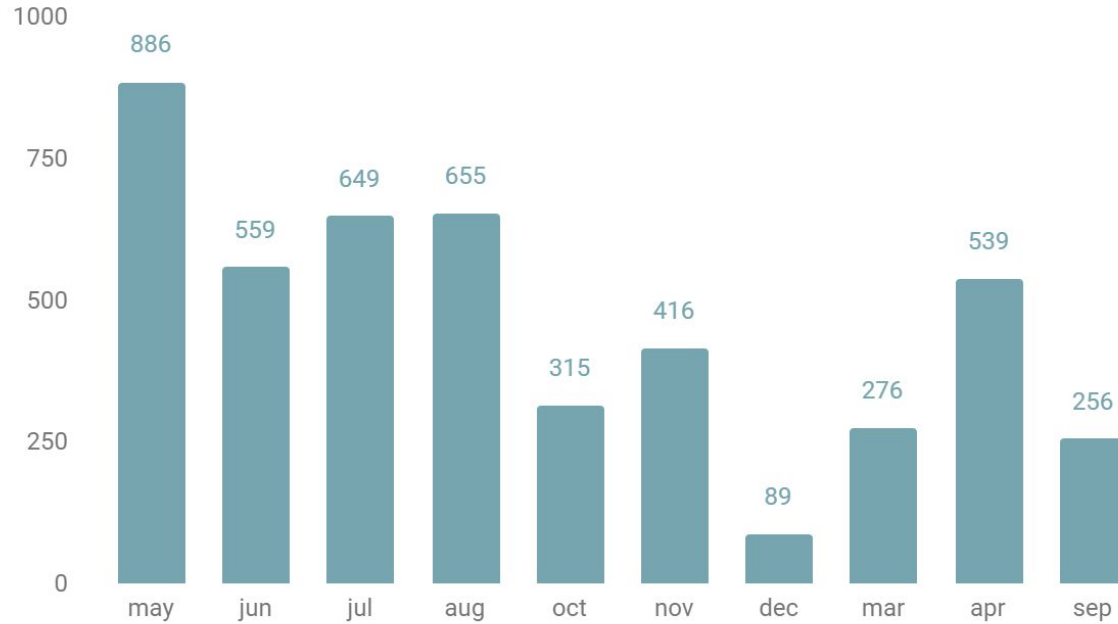
Housing Loan

- unknown 2.3%
- no 43.7% — 2026 (43.7%)
- yes 54.0% — 2507 (54.0%)
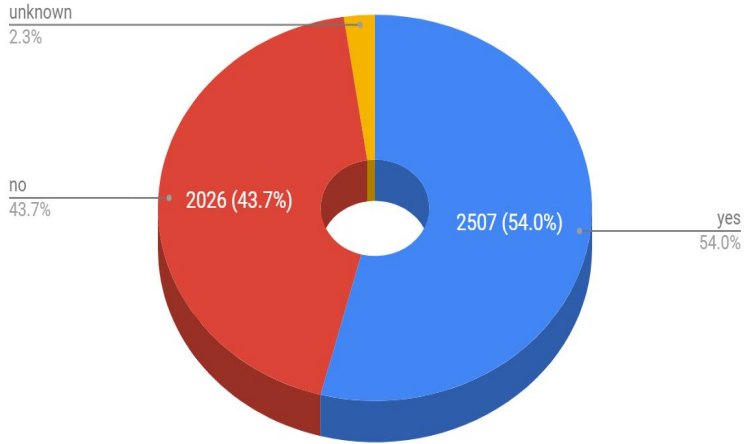
Almost half (52.4%) of the people who subscribed also had a housing loan

Personal Loan

- unknown 2.4%
- yes 15.2% — 6248 (15.2%)
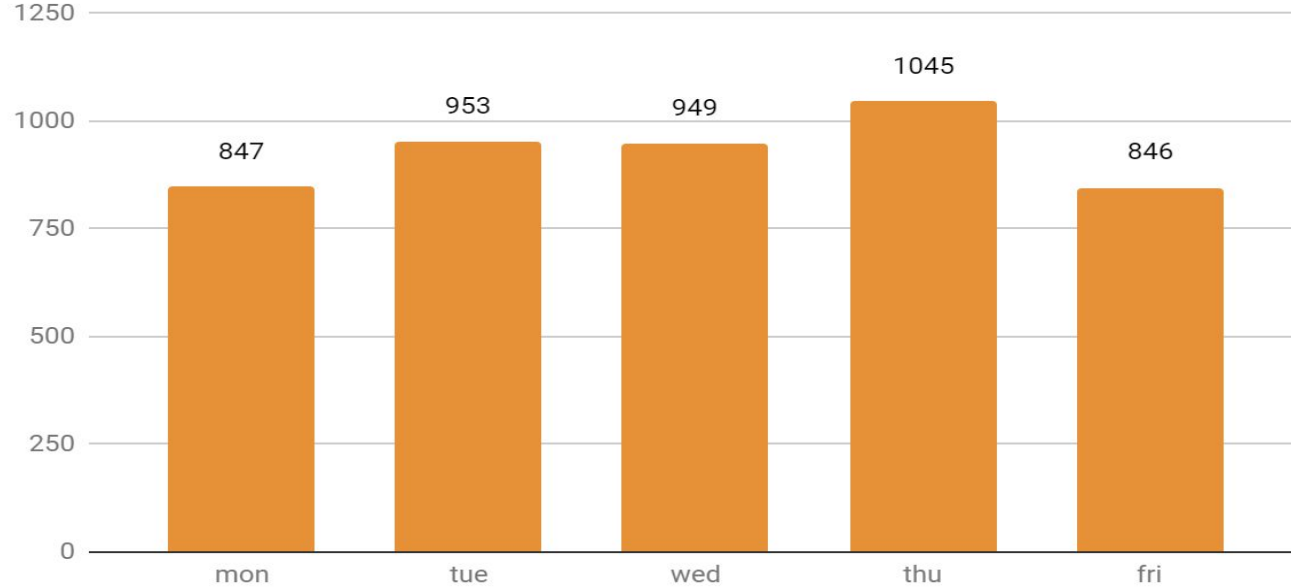- no 82.4% — 33950 (82.4%)

Almost 8 out of 10 people(83%) who did not subscribe to deposit had a personal Loan.

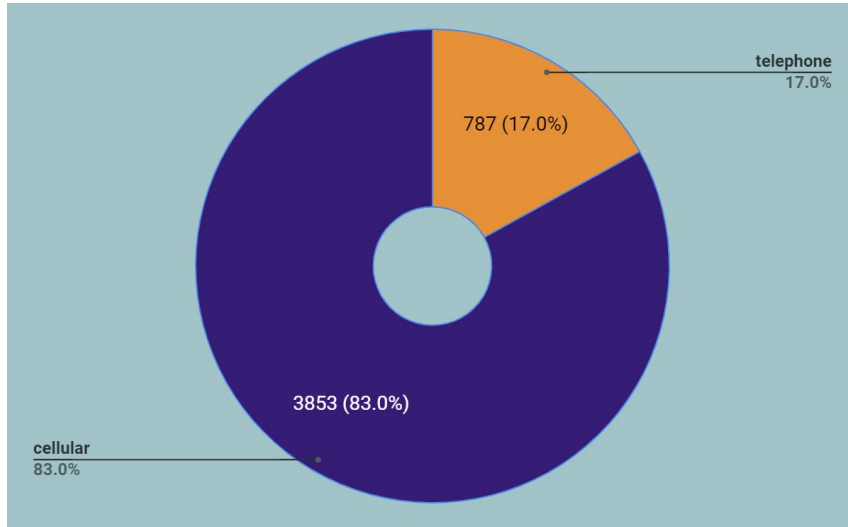# Month Preferred most by Customers who Subscribed

May is the most favorable month among the people to respond positively to the campaign.Other summer months like August, July and June appear to be favourable.

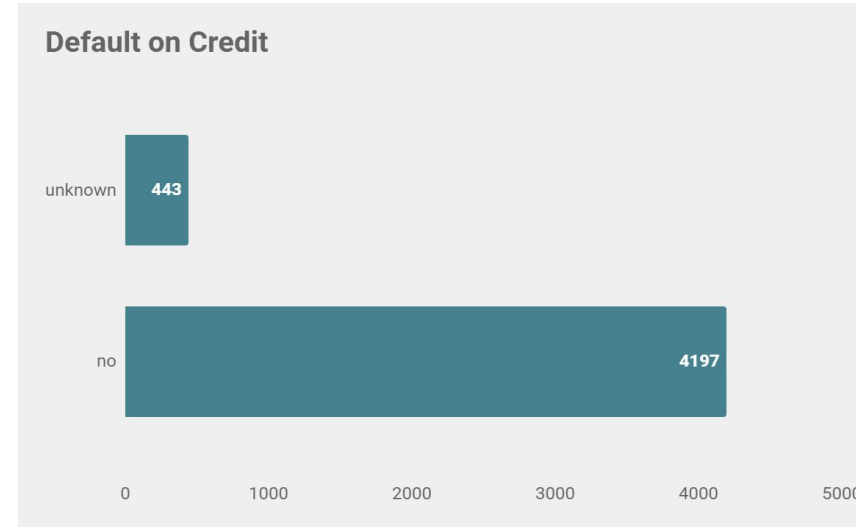# Preferred day of the week by customers who subscribe

Middle of the week days seem favorable with clients. **Thursday** was the best day of contact followed by Tuesday and Wednesday
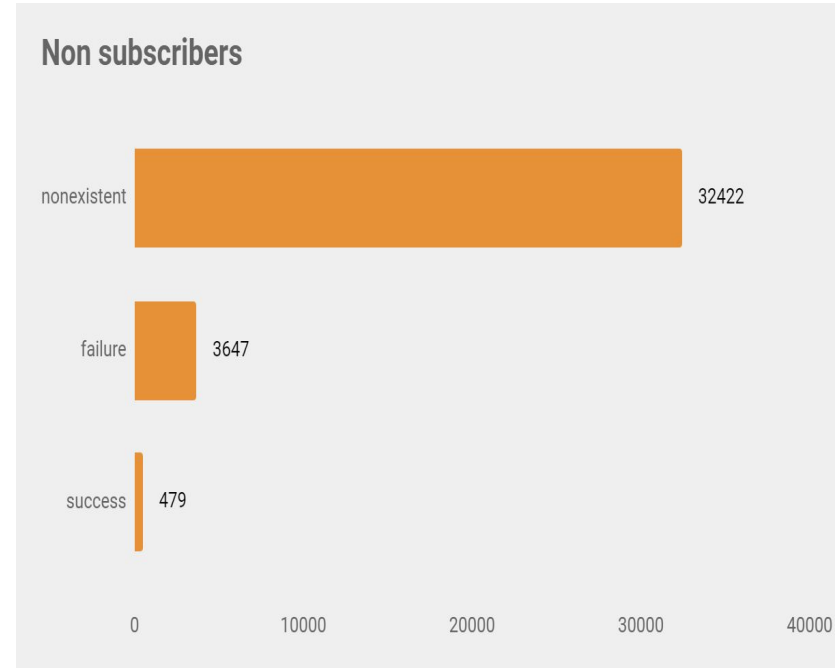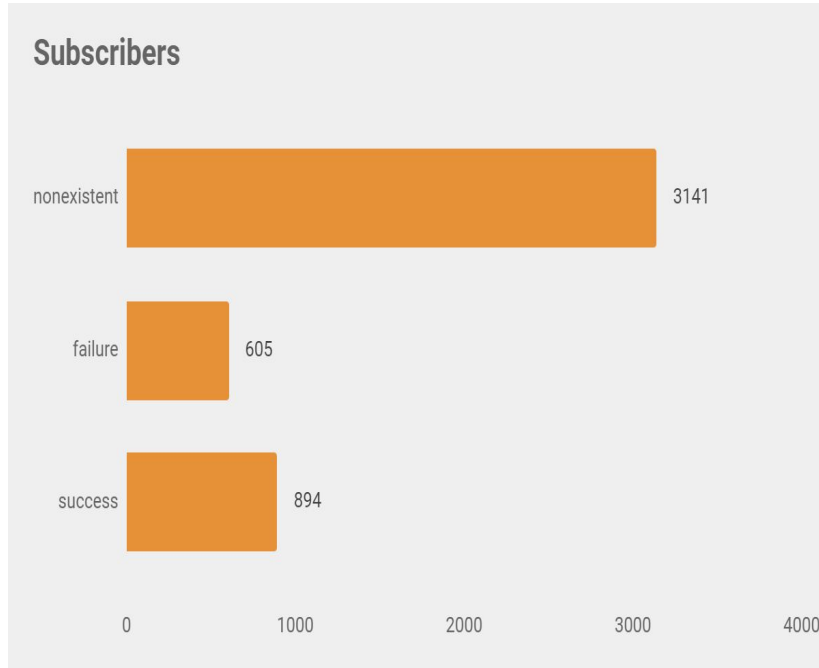
Method of Contact

Default

Almost 8 out of 10 customers who subscribed preferred to be contacted on cellphone than phone.

Majority of customers who agreed to subscribe to the term deposit had not defaulted on their credit.

Previous Marketing Campaign Outcome

Success of previous marketing campaigns was 19.3% for clients who subscribed versus a mere 1.3% for people who did not enroll.

Recommendations

The **future marketing campaign can lead to more subscriptions for the bank term deposit, if the marketing strategy takes into consideration targeting a specific demographic**:

- In the age group 28-37.
- In jobs related to 'admin', 'blue-collar', 'technician'.
- Have University degree, high school degree or Professional education
- Married individuals

The **other attributes that could also be kept in planning considerations for future marketing strategy are:**

- Targeting customers with personal and housing loan
- Targeting customers who had not defaulted on 'Credit' before
- Success of previous marketing campaigns increases the chances of converting.
- May and summer months are favourable among customers who respond
- Thursday is a better day for campaign to get a positive response

These insights can help to improve subscriptions by targeting specific clients rather than targeting anyone randomly.

Thanks