BI Final Project – Documentation

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1. **Select Dataset**

   Bank Marketing Campaign: Kaggle Dataset for Bank Marketing Campaigns

2. **Select BI Tool**

   Tableau

3. **Top-5 or top-10 pieces of information (background knowledge) about the dataset's domain.**

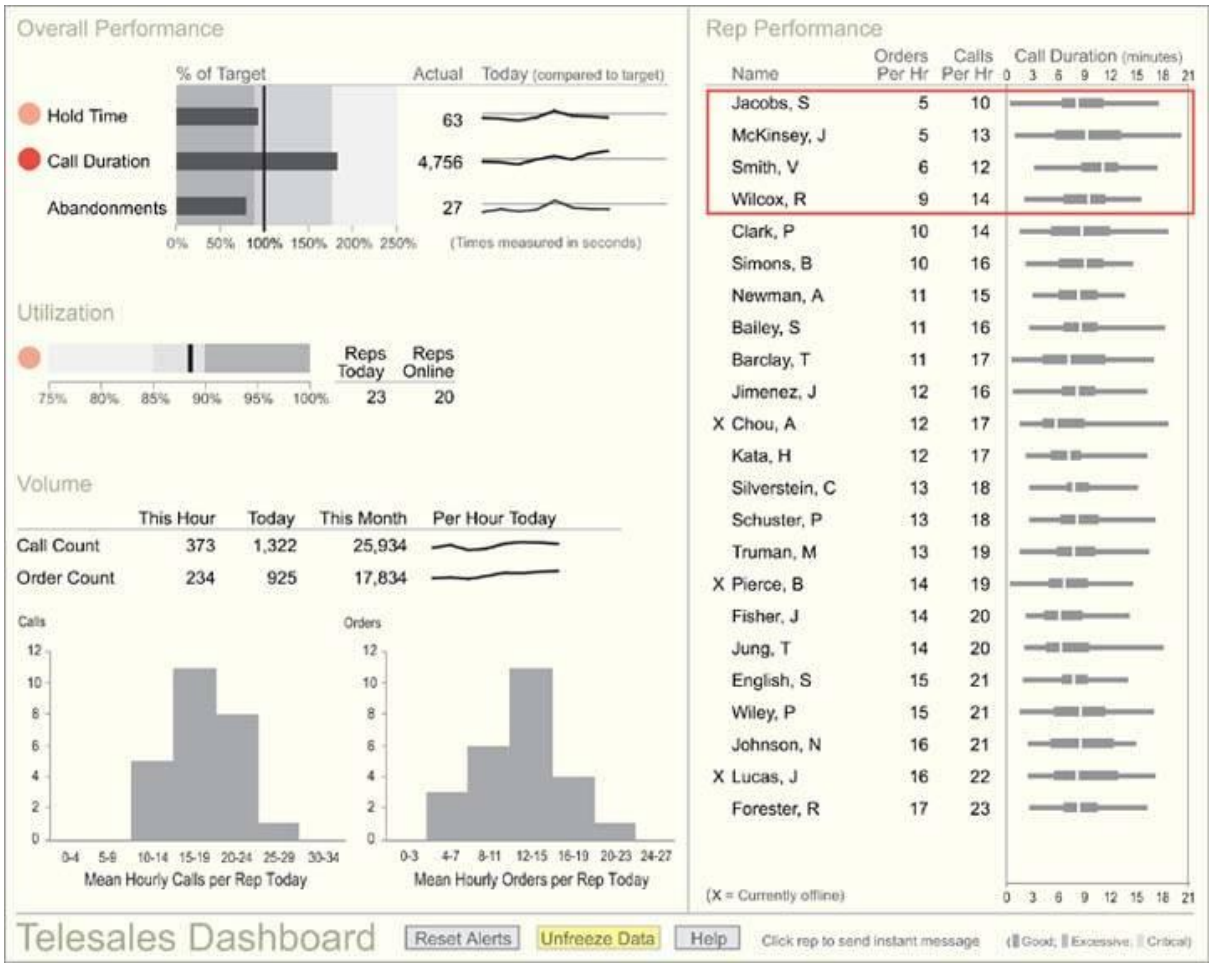
   The data is related with direct marketing campaigns (phone calls) of a Portuguese banking institution. The classification goal is to predict if the client will subscribe a term deposit (variable y).

   Attribute Information:

   - Age
   - Job - type of job (categorical: 'admin.','blue-collar','entrepreneur','housemaid','management','retired','self-employed','services','student','technician','unemployed','unknown')
   - marital - marital status (categorical: 'divorced','married','single','unknown'; note: 'divorced' means divorced or widowed)
   - Education - Shows the level of education of each customer (categorical: 'basic.4y','basic.6y','basic.9y','high.school','illiterate','professional.course','university.degree','unknown')
   - Default - Whether a customer has credit in default (categorical: 'no','yes','unknown')
   - Housing - Does the customer have a housing loan? (categorical: 'no','yes','unknown')
   - Loan - Does the customer have a personal loan? (categorical: 'no','yes','unknown')
   - Contact - The contact communication type (categorical: 'cellular','telephone')
   - Month - Last contact month of year
   - day_of_week - Last contact day of Week
   - Duration - Last contact duration in seconds. Important note: this attribute highly affects the output target (e.g., if duration=0 then y='no').
   - Campaign - Number of contact performed for the client during the campaign
   - pdays: number of days that passed by after the client was last contacted from a previous campaign (numeric; 999 means client was not previously contacted)
   - previous: number of contacts performed before this campaign and for this client

- poutcome: outcome of the previous marketing campaign (categorical: 'failure','nonexistent','success')
- emp.var.rate: employment variation rate - quarterly indicator
- cons.price.idx: consumer price index - monthly indicator
- cons.conf.idx: consumer confidence index - monthly indicator
- euribor3m: euribor 3 month rate - daily indicator
- nr.employed: number of employees - quarterly indicator
- y - has the client subscribed a term deposit? (binary: 'yes','no')

Various dashboards on Google regarding tele-sales marketing shows that subscription of any kind can be factored by customer's demographics (age, education, job etc) or campaign metrics (call duration, num of calls, day to call etc). Therefore, it is better to identify characteristics of those customers who are more likely to participate in a campaign to group them and do targeted marketing for better results. Attaching one of the dashboards that shows analysis of various campaign metrics that can be taken into account while predicting the targeted group of customers.



Using data collected from a previous bank marketing campaign, several features centred around the clients, the campaign itself, and general market conditions will be

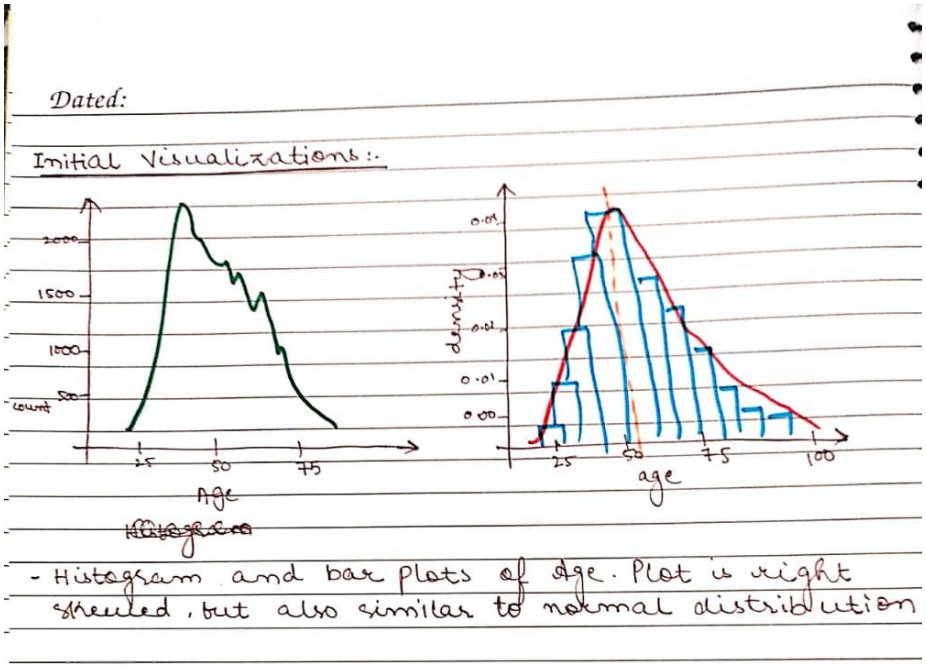
explored. Based on this data, machine learning models can be used predict which clients will subscribe and what banks can do to increase the rate of subscription. This can also effect the churn rate as it can be significantly reduced by more number of subscriptions and targeted marketing.

4. **Most important problem (ONLY ONE) that you will solve through this BI exercise.**

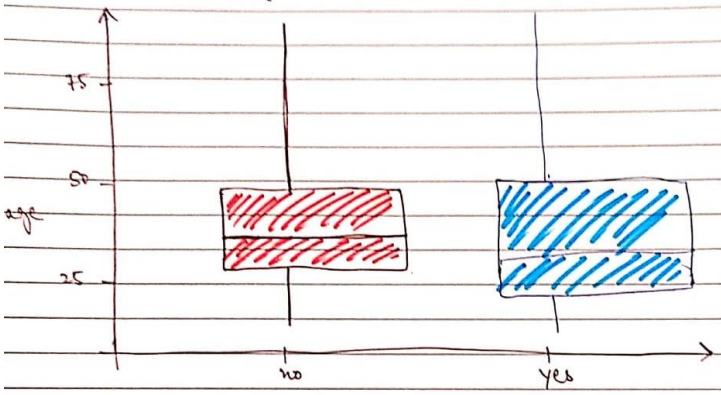
   Problem: Inefficient campaign results, less conversion rate, high churn rate.

   Solution: Identify group of customers based on customer demographics and campaign metrics to analyze what set of customers are most likely to subscribe term deposit.

5. **Upload images of your BI charts, dashboards, and story on paper with very brief explanations**



- Box plots of age for different results of campaign:

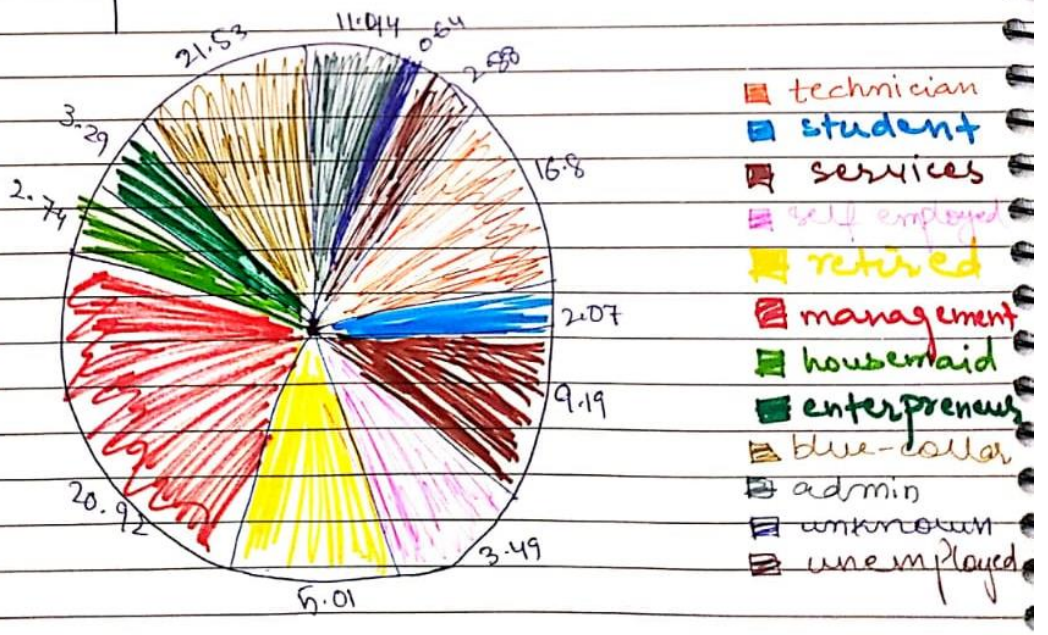


We see that distribution of clients, who subscribed a term deposit is more diffused, but it is because people, who said yes is less.

Dated:

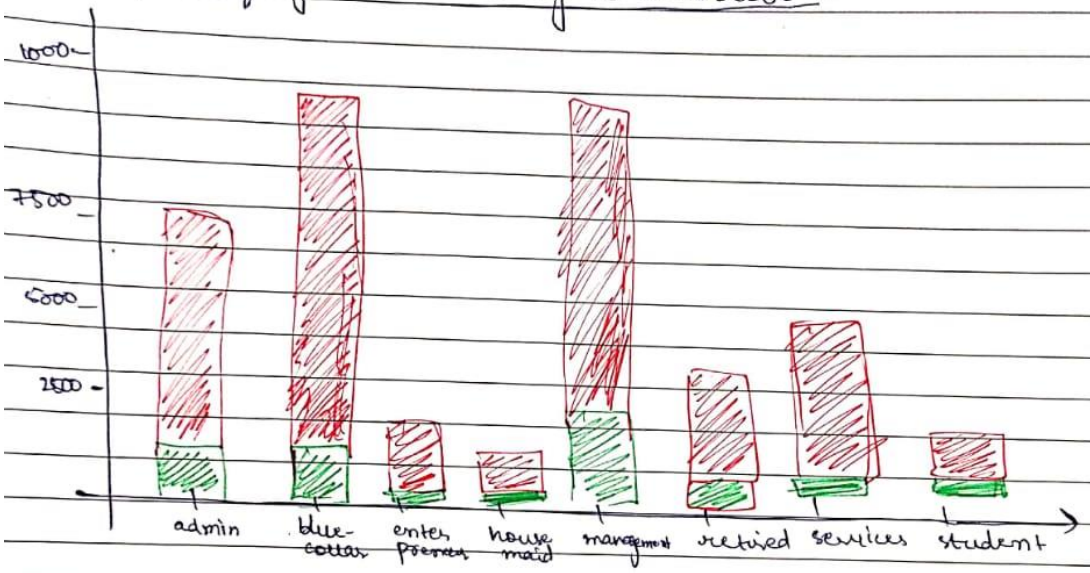
Table and Pie chart for job-type:-

S#	Job type	percent	count
1	unknown	0.64	288
2	unemployed	2.86	1303
3	technician	16.80	7597
4	student	2.07	938
5	services	9.19	4154
6	self-employed	3.49	1579
7	retired	5.01	2264
8	management	20.92	1240
9	housemaid	2.74	1487
10	enterpreneur	3.29	9732
11	blue-collar	21.53	5171
12	admin	11.44	2132

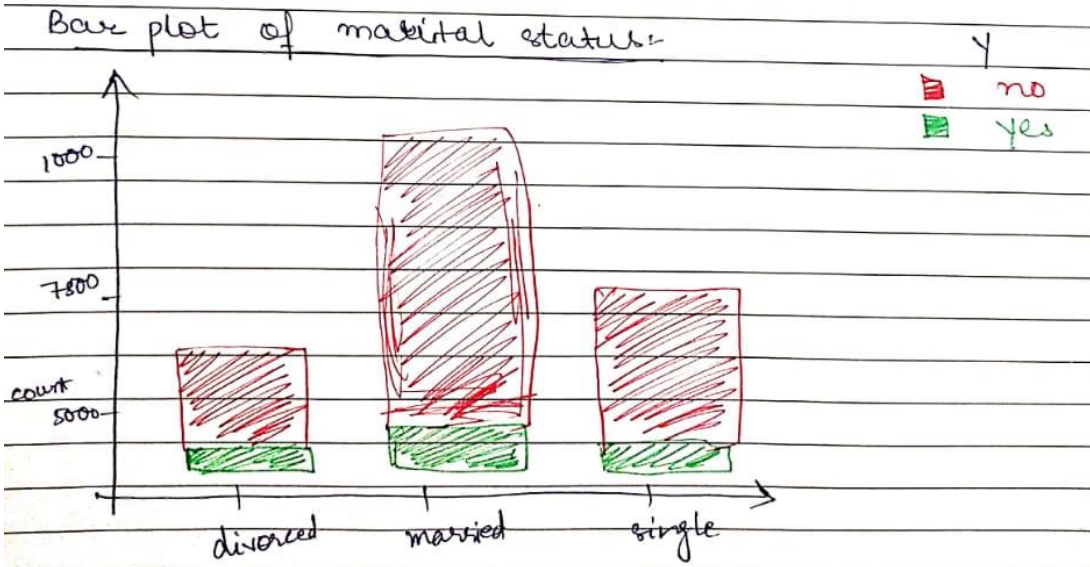


Dated:

Bar-plot of job according to results :-



Bar plot of marital status :-



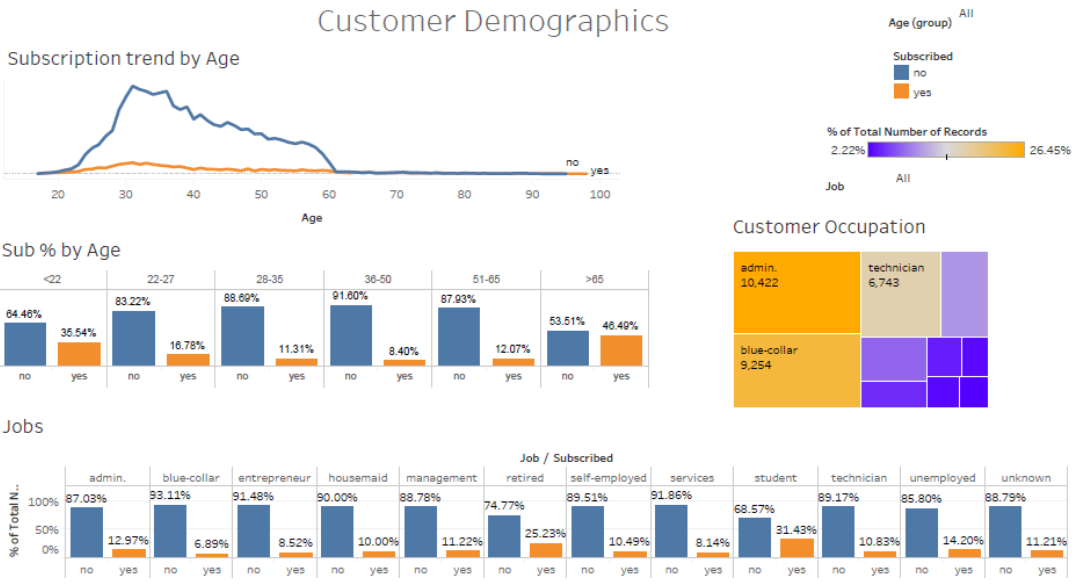
6. **Wrangle:**

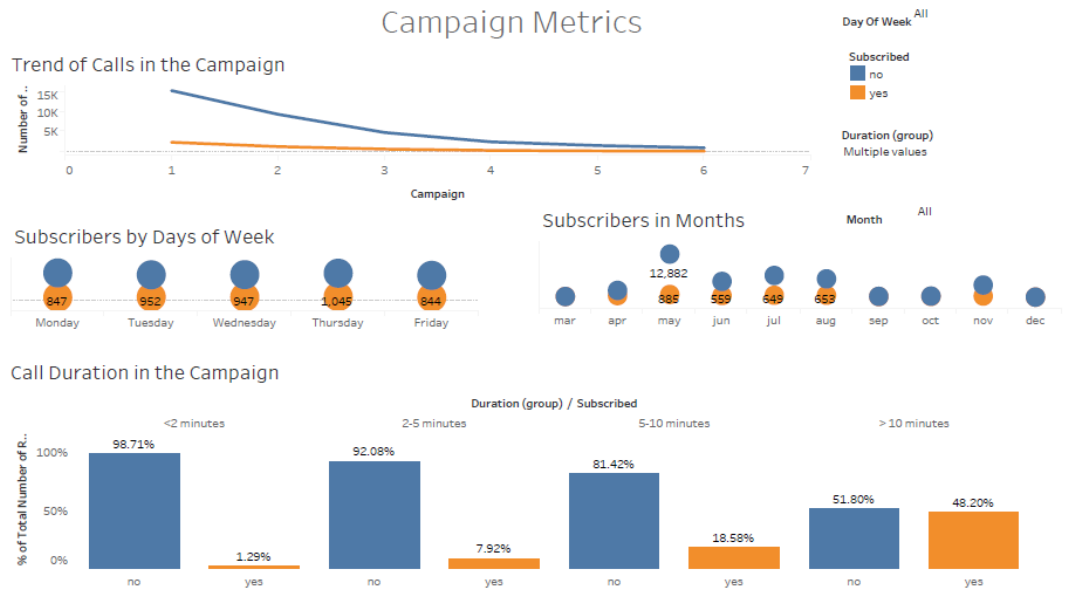
Jupyter Notebook and its pdf is given in the folder **Wrangling.**

7. Images of your actual BI charts, dashboard and story

PDFs of dashboards and the story are provided in the folder **Dashboards and Story.**

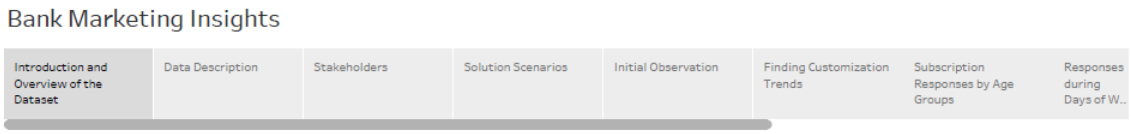
<u>Dashboards with BI Charts for Customer Demographics and Campaign Metrics:</u>





Story:

Page 1:



Overview:

This dashboard is aimed to monitor perfomance of a Banks Direct Marketing Campaigns. The campaign is to sign-up banks existing customers for long deposit products offered by the bank.

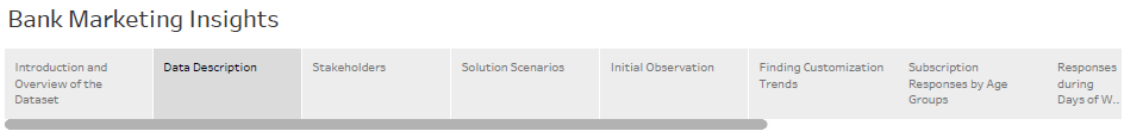
Scope:

The dashboards will display subscriber statistics based on customer demographics and campaign metrics.

The inferences from dashboard can be used to formulate hypothesis for further analysis and cannot be used to to make campaign decisons at gross level.

Financial information of customer will neither be used nor displayed in the dashboard.

Page 2:



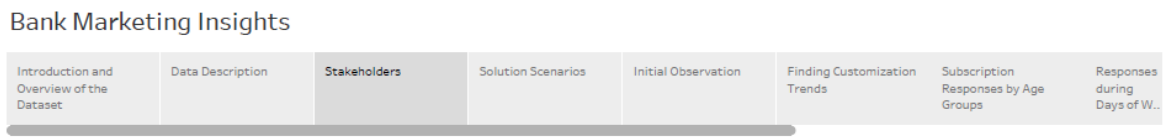
Data Source:

Kaggle: https://www.kaggle.com/volodymyrgavrysh/bank-marketing-campaigns-dataset

Observations: 30474, Supervised(Subscribed - Yes/ No)

Variables: 12
Numeric: Age, Duration, Calls.
Categorical: Job, Education, Marital Status, Weekday, Month, Loan, Housing, poutcome, campaign...

Page 3:



Stakeholders

Upper Management: Evaluate campaign performance and make decisions.

Marketing Team: Evaluate and plan other campaigns.

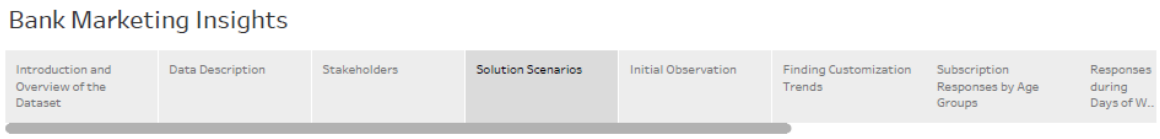
Sales Manager: Define targets for sales representatives and structure sales pipeline.

Sales Representatives: Monitor and track customer activity and customize startegies for conversion.

Analyst/ Datascientist: Derive initial insights from the dashboard to formulate further hypothesis for model building.

Designer: Customize dashboard views and deliver insights in a visually appealing manner tuned to target audience.

Page 4:

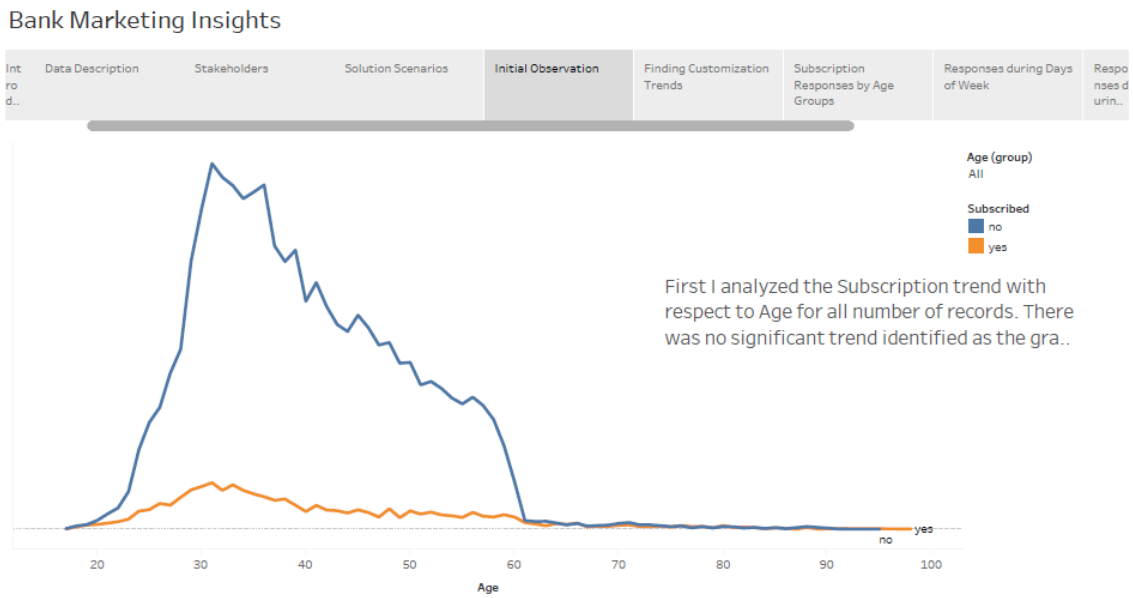


Solution Scenarios:

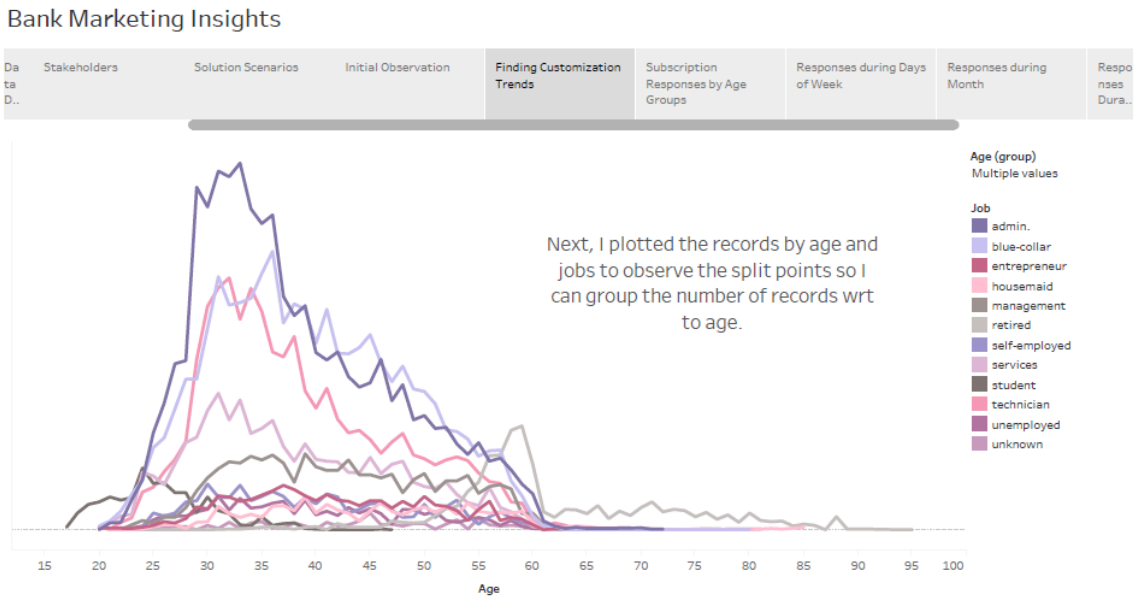
1. Find combinations of Customer & Campaign variable values and develop customer trageting strategies.

2. Develop sales pipeline and define actions and metrics for performance evaluation of sales representatives and customer stages.

Page 5:


Bank Marketing Insights
Int ro d..
Data Description
Stakeholders
Solution Scenarios
Initial Observation
Finding Customization Trends
Subscription Responses by Age Groups
Responses during Days of Week
Respo nses d urin..
Age (group)
All
Subscribed
no
yes
First I analyzed the Subscription trend with respect to Age for all number of records. There was no significant trend identified as the gra..
yes
no
20
30
40
50
60
70
80
90
100
Age

Page 6:


Bank Marketing Insights
Da ta D..
Stakeholders
Solution Scenarios
Initial Observation
Finding Customization Trends
Subscription Responses by Age Groups
Responses during Days of Week
Responses during Month
Respo nses Dura..
Age (group)
Multiple values
Job
admin.
blue-collar
entrepreneur
housemaid
management
retired
self-employed
services
student
technician
unemployed
unknown
Next, I plotted the records by age and jobs to observe the split points so I can group the number of records wrt to age.
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Age

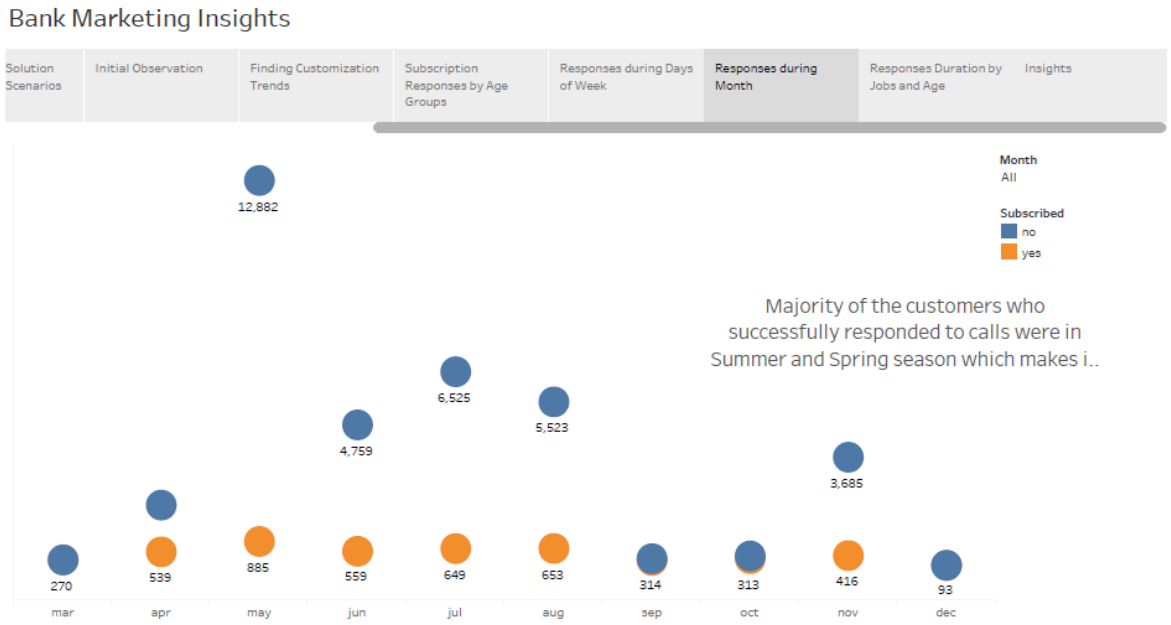
Page 7:

Bank Marketing Insights
Solution Scenarios
Initial Observation
Finding Customization Trends
Subscription Responses by Age Groups
Responses during Days of Week
Responses during Month
Responses Duration by Jobs and Age
Insights
<22
22-27
28-35
36-50
51-65
>65
64.46%
35.54%
83.22%
16.78%
88.69%
11.31%
91.60%
8.40%
87.93%
12.07%
53.51%
46.49%
no
yes
Age (group)
Multiple values
Subscribed
no
yes
Majority of the customers who do not subscribe are young (less than 30).

Page 8:

Bank Marketing Insights
Solution Scenarios
Initial Observation
Finding Customization Trends
Subscription Responses by Age Groups
Responses during Days of Week
Responses during Month
Responses Duration by Jobs and Age
Insights
7,667
7,137
7,185
7,577
6,981
847
952
947
1,045
844
Monday
Tuesday
Wednesday
Thursday
Friday
Day Of Week
All
Subscribed
no
yes
Best days to call the customers are Wednesday and Thursday when there is a high chance of customer conversion

Page 9:



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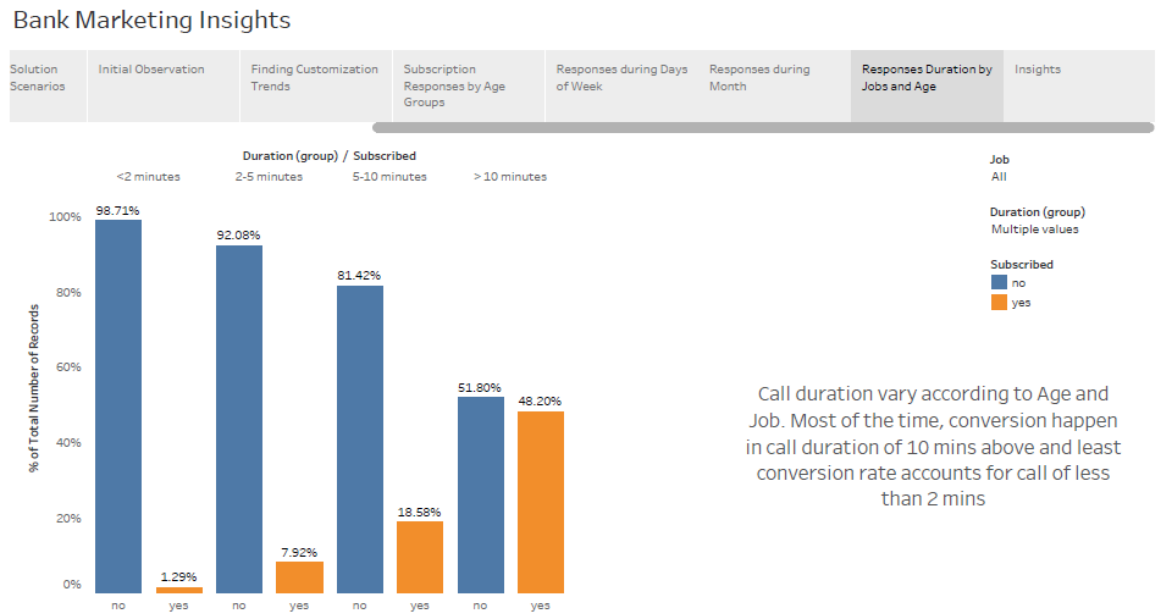

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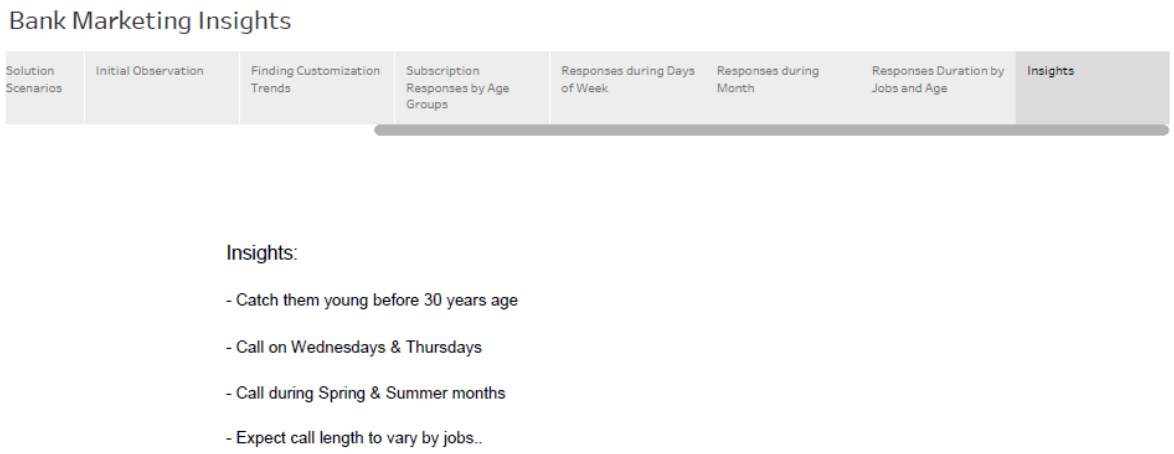

Mention the contribution of your group member's stake holder briefly.

- Suggested important KPIs for this dataset.
- Helped identifying important solutions for the suggested problems.
- Provided feedback on the paper story.
- Identified required charts for better visualizations.
- Provided feedback on the Tableau charts and how to improve them using filter options and drill down methods.
- Helped with the color schemes to make the dashboards look attractive.
- Feedback on story and its flow.

8. **Your stakeholder contribution role for the other project – how you helped improve the project of the other student in your group.**

- Suggested important solutions for the problem selected.
- Listed the important KPIs needed.
- Provided feedback on the paper story.
- Helped to make visualizations better by choosing better color schemes and smart choice of charts.
- Provided feedback on the Power BI charts and how to improve them using filter options and hierarchical structure.
- Feedback on story and its flow.