



# **Data Driven Strategy of Bank Marketing**

**- by Carol C**

# Business Background

Portuguese banking institution was launching a direct marketing campaign.

## The campaign:

- Based on **phone calls**.
- The product was a **term deposit**.
- Clients were contacted to access if the product would be **('yes') or not ('no') subscribed**.





# Problem Statement

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Base on the dataset, only **11%** of the clients subscribed the product.

That means, by randomly contact the clients, average **9 clients** need to be contacted to get **1 successful subscription**.



Can we launch the campaign in a **more cost effective** way by **accurately targeting the clients**?

# Solutions(Goals)

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## 1. Targeting existing clients

Provide the campaign a list of clients that most of them will subscribe the term deposit.

- Create a model to accurately predict whether or not a client will subscribe the term deposit.





# Solutions(Goals)

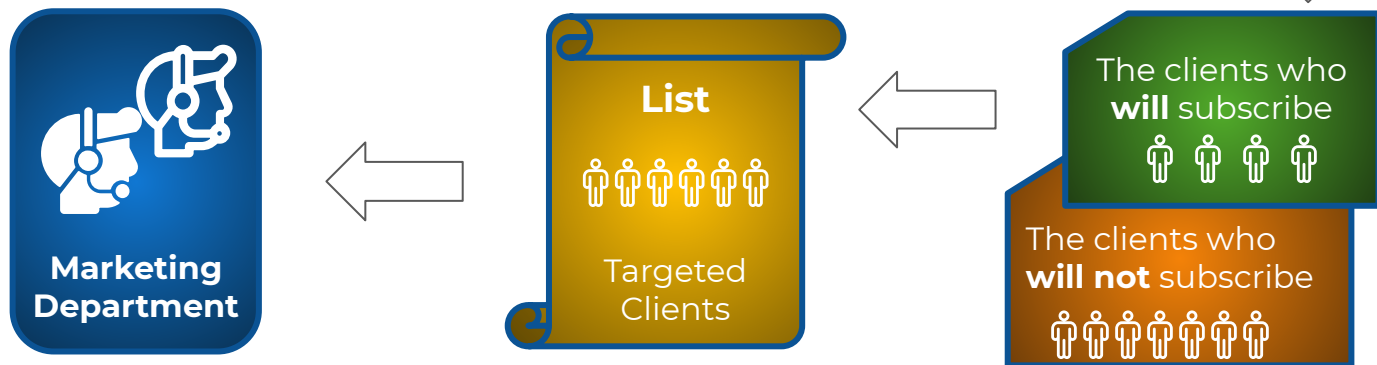
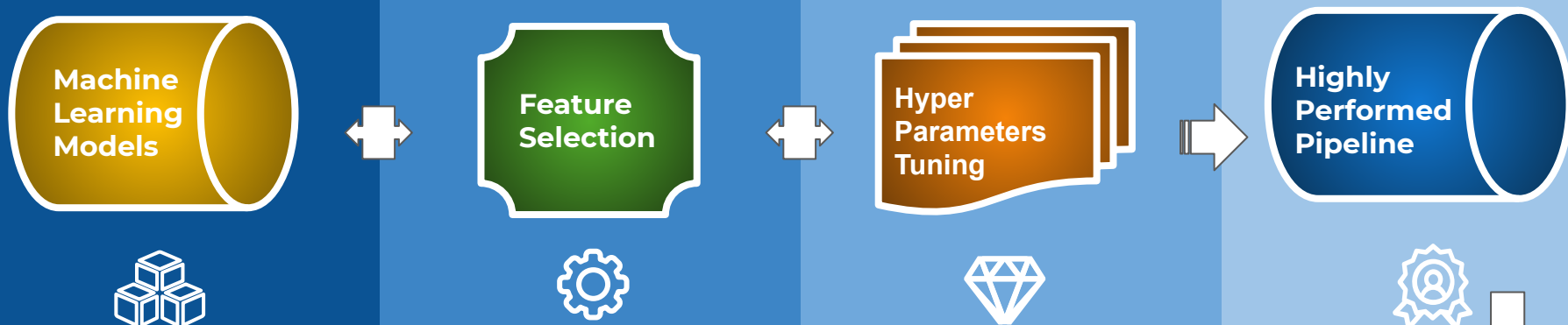
## 2. Targeting potential clients

Advice will be provided to the campaign on:

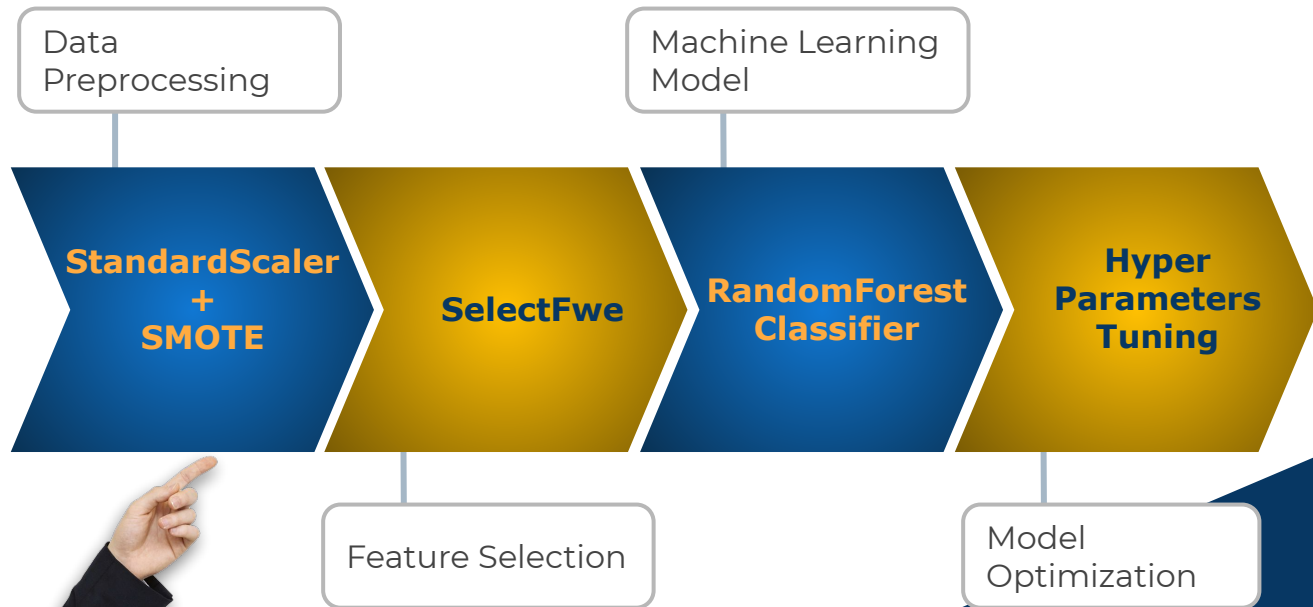
- what kind of people more tend to subscribe the term deposit?
- What factors influence people's decision on the subscription?



# TARGETING EXISTING CLIENTS



# Pipeline





# MODEL PERFORMANCE

## Key Metrics

### Precision

(How accurate the model predict )

0.67

0.51

### Recall

(How well the model detect positive sample )

0.50

0.89



### F1-Score

(How balance the model is)

0.57

0.65



### AUC

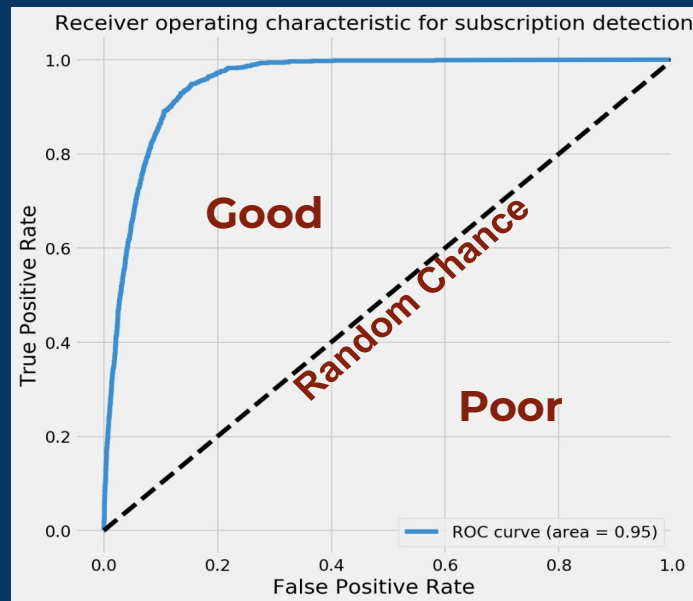
(Overall performance of the model)

0.73

0.89



## ROC curve



# VALUE TO BUSINESS

Random Call

9.1 Calls



1 subscription

VS

Targeted Call

1.1 Calls



1 subscription

Save 88%  
Workforce



# FLEXIBILITY TO SUIT DIFFERENT BUSINESS NEEDS

If the business priority is to launch the campaign with a limit budget, we can classify the client as “will subscribe” only when probability larger than 50% or higher. This will decrease false positive rate so there won't be too many extra calls to make.

Instead, if the business priority is to get as many subscriptions as possible, we can set the probability threshold to a lower number such as 10%. This will make sure almost all the clients who will subscribe be detected.

**Less Cost**



**More Sales**



Adjust the predicted probability threshold to meet different business needs

	predicted_subscribe	predicted_not_subscribe
will_subscribe	1008	121
will_not_subscribe	979	7917

	predicted_subscribe	predicted_not_subscribe
will_subscribe	1072	57
will_not_subscribe	1426	7470

	predicted_subscribe	predicted_not_subscribe
will_subscribe	1111	18
will_not_subscribe	2194	6702

## 2. TARGETING POTENTIAL CLIENTS



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PICTURING  
POTENTIAL  
CLIENT

“

**What kind of people  
more tend to subscribe  
a term deposit? ”**

# IMPORTANT FACTORS

**Marital**

**Education**

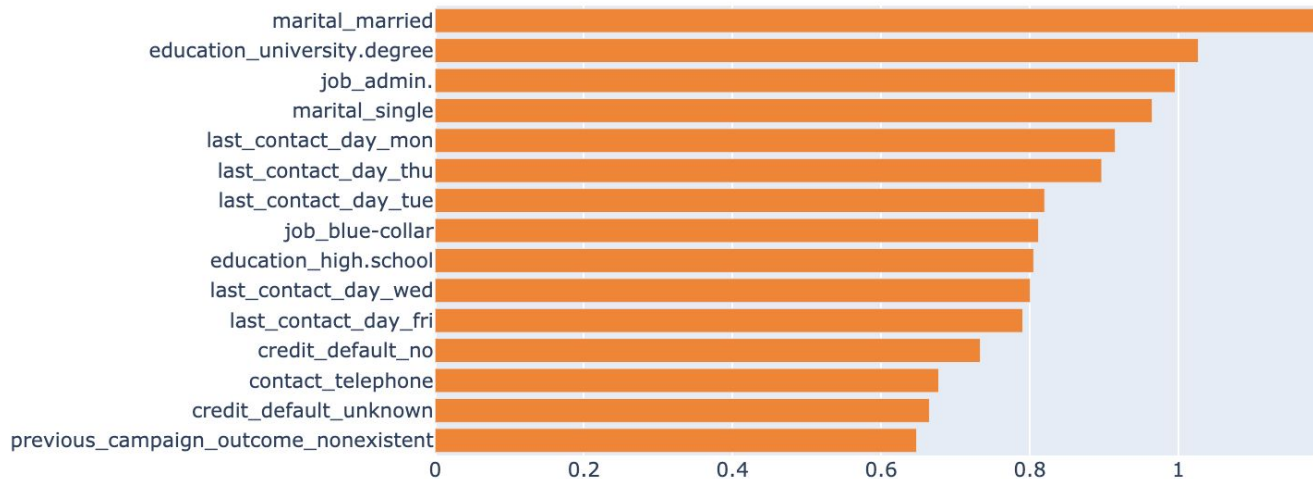
**Job**

**Contact**

**Credit Default**

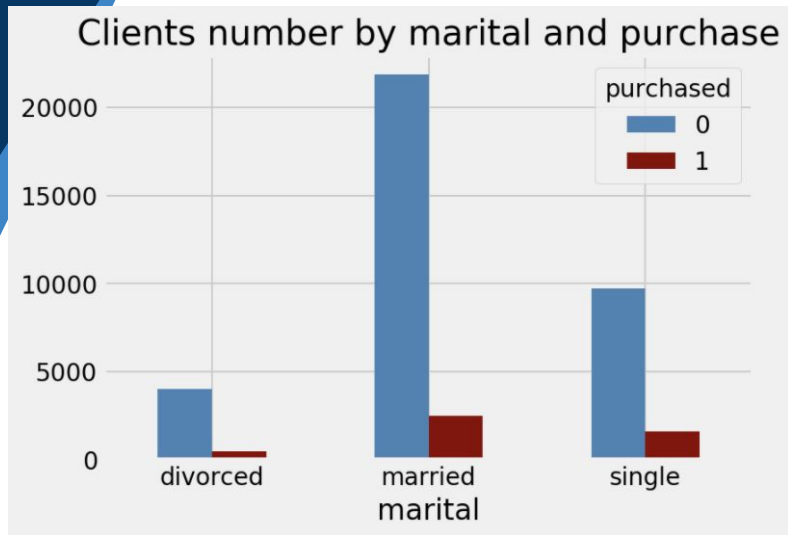
**Contact Method**

Overall Importance:  
Mean Absolute Score





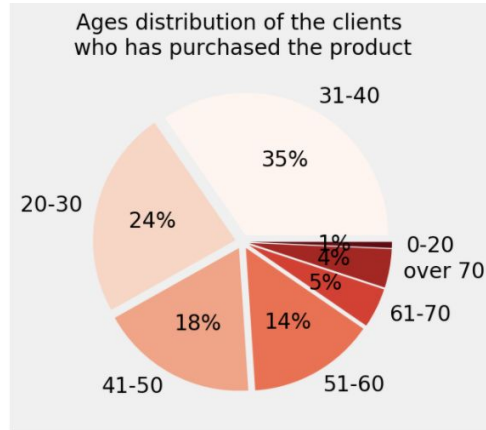
# FEATURE ANALYSIS - MARITAL



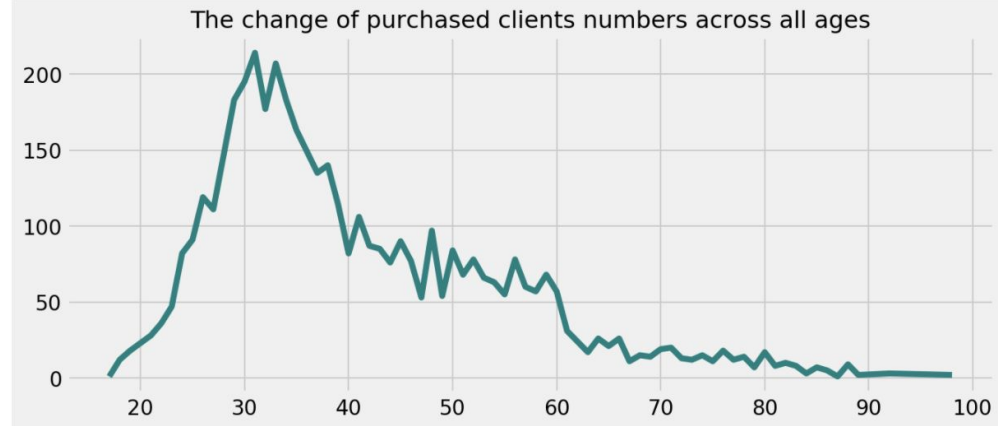
Single: 14% purchased  
Married: 10% purchased  
Divorced: 10% purchased



# FEATURE ANALYSIS - AGE



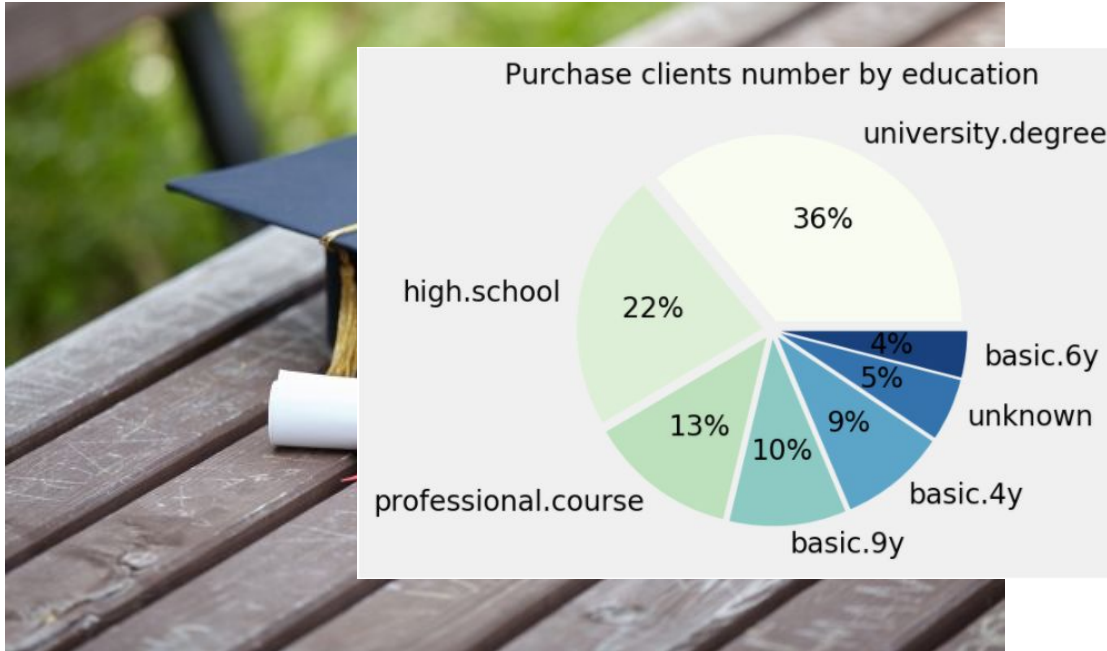
Around 70 % of purchasers were age from 25-45



The number of purchased clients increased quickly before age 31, and then dropped down after that.

# FEATURE ANALYSIS - EDUCATION

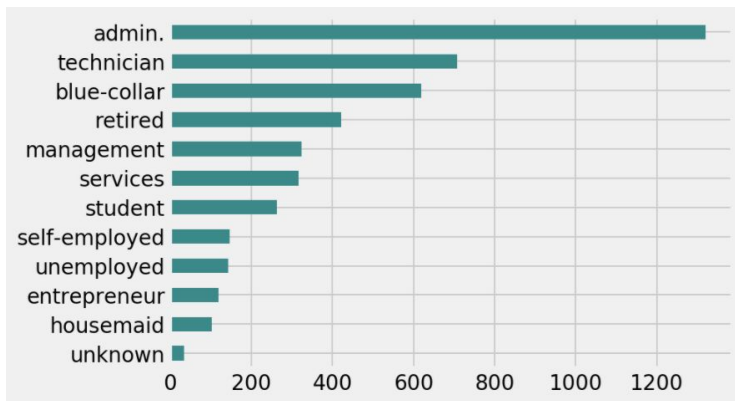
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Highly educated people more tend to purchase term deposit

# FEATURE ANALYSIS - JOB

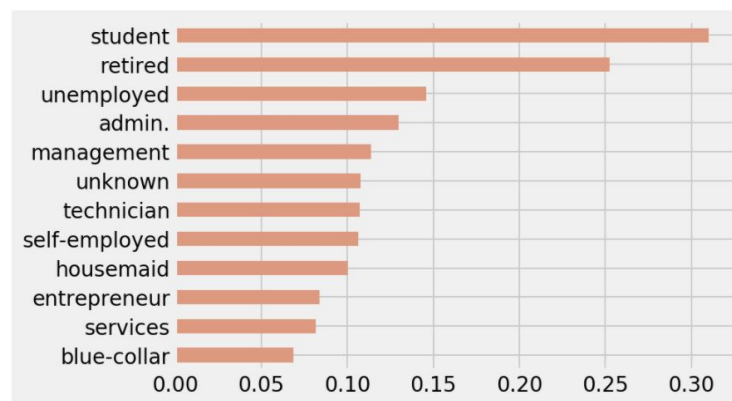
Absolute number of purchases by job



Top 3 (Absolute No. )

Admin,  
Technician  
Blue-collar

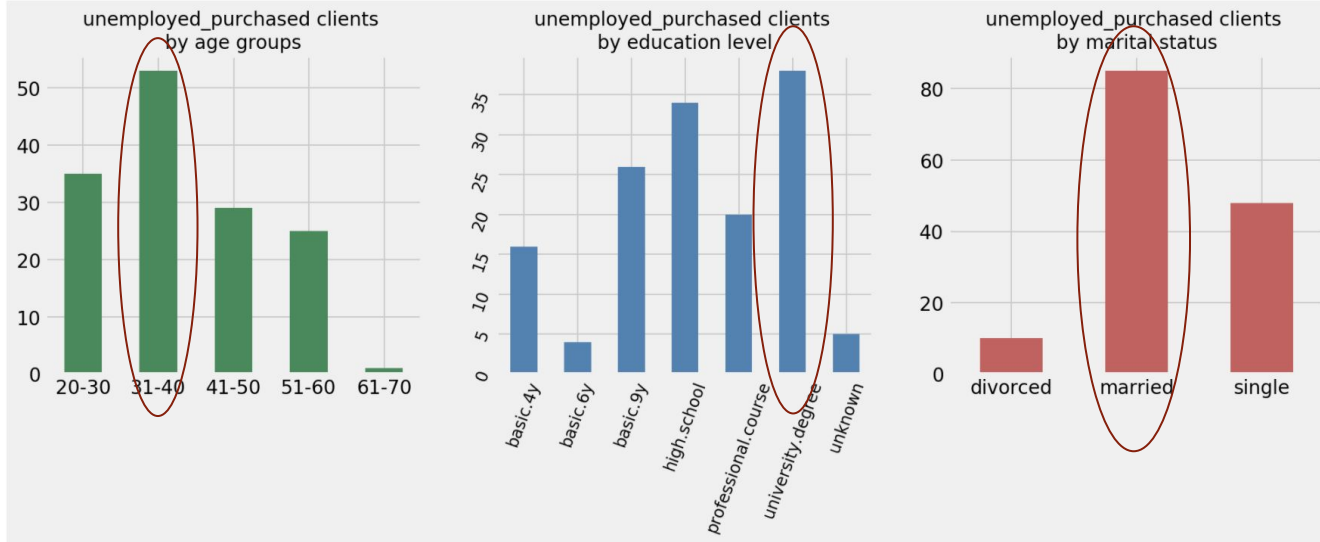
Percentage of purchases by job



Top 3 (Percentage )

Student  
Retired  
Unemployed

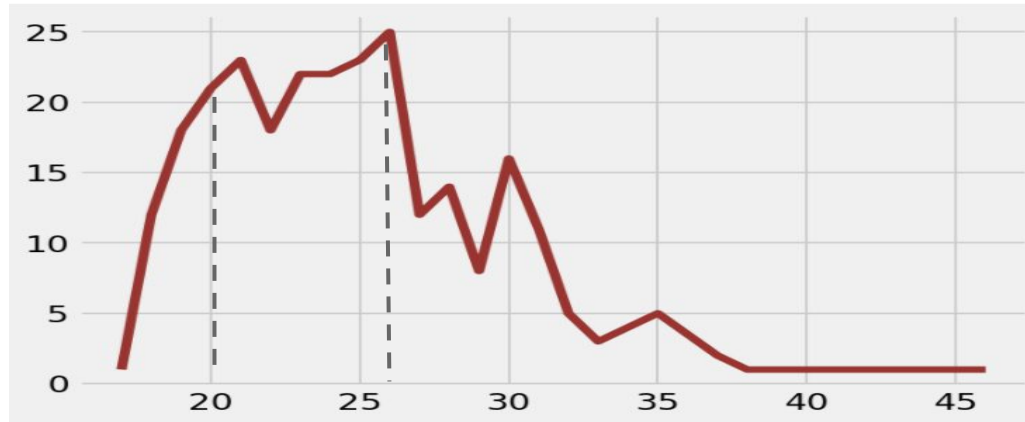
# FEATURE ANALYSIS - JOB(Unemployed)



Interesting Fact: Term deposit was popular among the unemployed people who married, age between 31 to 40, and had university-degree of education.

# FEATURE ANALYSIS - JOB(Student)

Student purchases by age

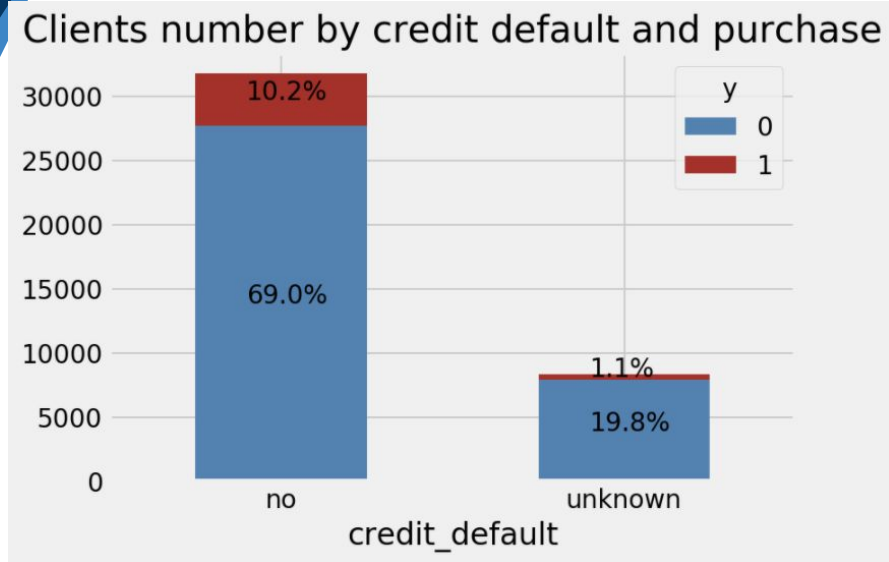


Interesting Fact: Over 30% of the student clients had purchased term deposit.

Possible Reasons: Students aged 20-26 usually are studying at university. They might have received financial support for their education and living from their parents. They might tend to put their unused fund into a term deposit for a higher interest rate.



# FEATURE ANALYSIS - CREDIT DEFAULT

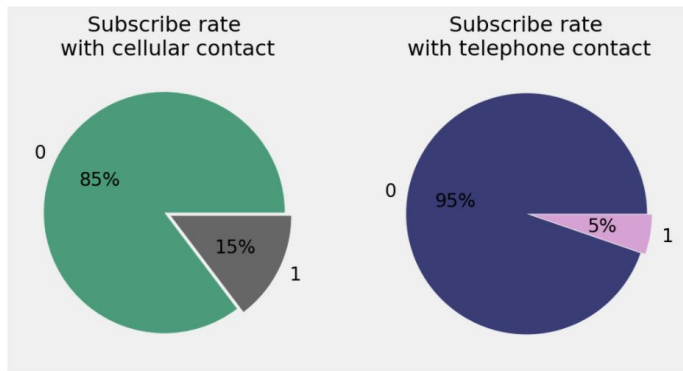


People without credit default was **9 times** more possible to subscribe a term deposit compare to people whose credit default was unknown .

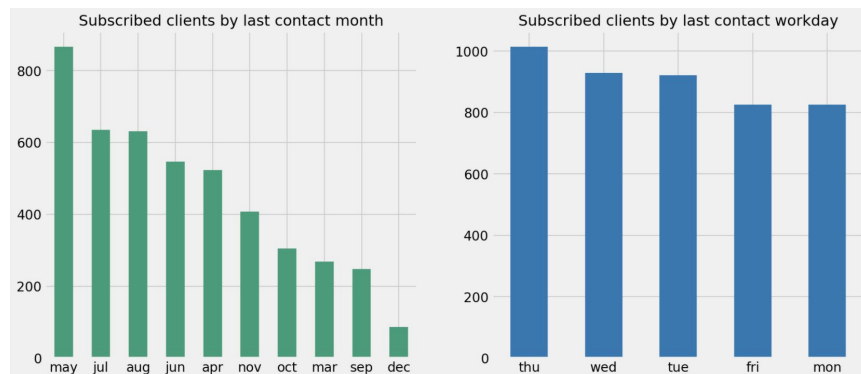


# FEATURE ANALYSIS - CAMPAIGN CONTACT

- Contact via **cellular** had **3 times** higher chance of success than contact via telephone.



- Timing for launching the campaign:  
**Month:** April to August were good.  
**Weekday:** Thursday was the best.



# PICTURING POTENTIAL CLIENT

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**Age 25-45**

**University education**

**Admin, Technician or Blue collar**

**Has no credit default**

**Has no personal loan**



# CAMPAIGN RELATED FACTORS TO CONSIDER



## CONTACT METHOD

Cellular over Telephone

## LAUNCHING MONTH

May is the best  
April to August are good  
Avoid the 4th quarter

## WEEKDAY TO CALL

Thursday is the best  
Avoid Monday and Friday

# Thanks!

Do you have any questions?

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