

# Banco Federal de Finanças

## Marketing Campaign Analysis

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## Problem and Objectives

Previously, Banco Federal de Finanças had done a marketing campaign to find and identify which of their customers would sign up to a term deposit. They reached out to many of their clients via phone call throughout their campaign but did not have much success (roughly only 11% of contacted clients were interested). They found that they were spending too much time calling clients that did not have any interest in the service. Once again the Bank President, Sr. Miguel Ferreira, would like to run a marketing campaign to his clients to get them to subscribe to a term deposit, still contacting them by phone. Deciding, this time, to use data science and machine learning to look through information on his clients and information from the previous campaign to find which clients will be the best to contact in order to save the most amount of time and to get the most amount of clients to subscribe for a term deposit.

The main objective is to analyse the given data and find the best clients to contact in order to get the maximum amount of subscriptions.

## Research and Recommended Solutions

The given data had a variety of information including the customers education, job, marital status, loans and defaults, and also information from the last campaign showing when they were contacted.

With this we tested what sets of data would be most useful for finding what would be the best clients to contact.

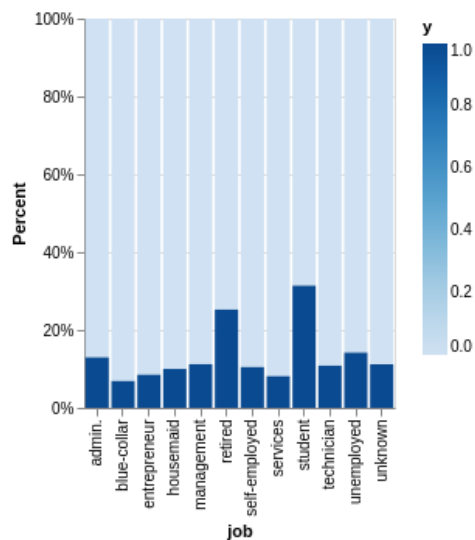


FIG 1

Here (Fig. 1) we found which professions were most susceptible to subscribing in the previous campaign. As shown, students and retirees were most likely to subscribe.

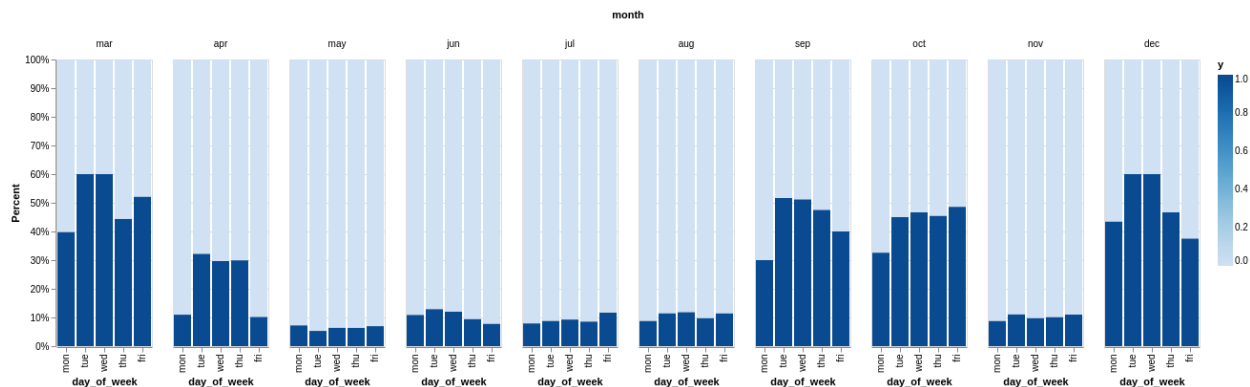


FIG 2

We also were able to find which days and months were the best for contacting these clients. As shown in Fig. 2, March, September, October, and December (and partially April) were the best months. It also shows that in these months the best days would be in the middle of the week, but even then they all seem to perform similarly.

Another correlation we've found is that, as was asked by Miguel Ferreira, are we contacting people too many times? That answer would be yes, up to a point. In figure 3 below, you can see that the returns are diminishing for each time you contact an individual.

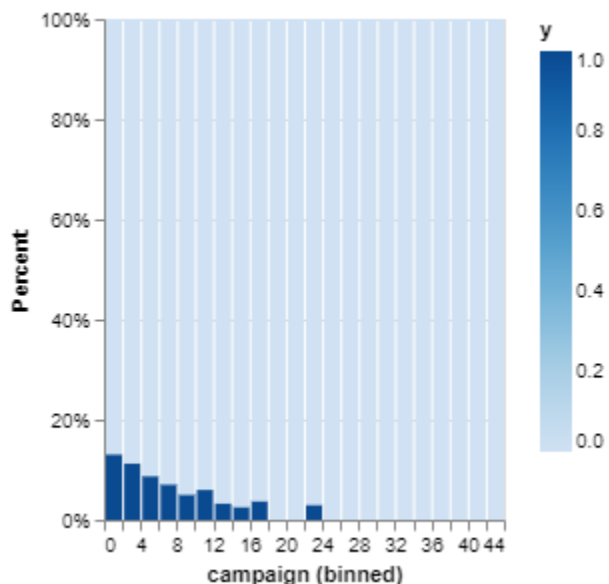


FIG 3

With this, and other found information, we decided on a few tests. The first being a group where we just used their age, job, contact month and previous response. The second test with

education and loans as well. For the third we added their 3 month euribor rate. And for the fourth test we include their marital status and some standard economic indicators.

F1:	precision	recall	f1-score	support
0	0.85	0.93	0.89	4553
1	0.77	0.61	0.68	1843
accuracy			0.84	6396
macro avg	0.81	0.77	0.79	6396
weighted avg	0.83	0.84	0.83	6396

FIG 4

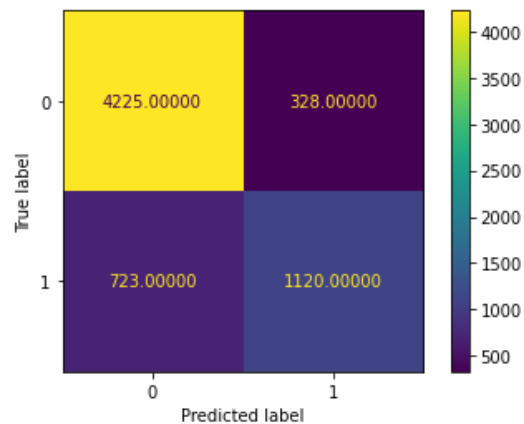


FIG 4

This final (fourth) test gave us a weighted average of 83%. Using this model, we can accurately identify the people who would subscribe to a term deposit 89% of the time. On the other hand, we can also identify those who would not subscribe 68% of the time. These figures show a classification report and confusion matrix.

## Solutions Value and Conclusion

Our findings, once in use, should see a drastic change in the results from the previous marketing campaign. We believe we can now contact more people that are willing to subscribe for a term deposit, saving us time and getting more of our clients to subscribe without having to waste valuable time and resources on clients who will not be interested.

# Links

Final: Nathan W.

Brandon W:

<https://colab.research.google.com/gist/bwareing/1730c477d5170a964f6129c7668db2b1/untitled2.ipynb>

Nathan W:

[https://gist.github.com/Natosphere/eebe0d01d0a19bf94b3a0b9e925dd547#file-nathanwheelwright\\_module2\\_targetedmarketing-ipynb](https://gist.github.com/Natosphere/eebe0d01d0a19bf94b3a0b9e925dd547#file-nathanwheelwright_module2_targetedmarketing-ipynb)

Alex B:

[https://colab.research.google.com/gist/desertalex/2d9fa6f8ebdceb86a344d09c627bf2e5/copy-of-starter\\_bank.ipynb](https://colab.research.google.com/gist/desertalex/2d9fa6f8ebdceb86a344d09c627bf2e5/copy-of-starter_bank.ipynb)

Avery R:

[https://github.com/jarreed0/school\\_stuff/blob/main/official.ipynb](https://github.com/jarreed0/school_stuff/blob/main/official.ipynb)