

CUSTOMER CLASSIFICATION FOR DIRECT BANK MARKETING

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Problem Statement

European Banks were under pressure to increase their financial assets due to the :

- 1 Internal competition
- 2 financial crisis

They offered long term deposits with good interest rates to the people using **direct marketing strategy**, but contacting many people is



time consuming



low success rate



Our goal to build a Machine Learning model that learns the unknown patterns and predicts whether customer will subscribe (yes/no) a term deposit that helps:



increasing campaign efficiency



selecting high value customers



Data Understanding

This data based on direct marketing campaigns of a Portuguese banking institution.

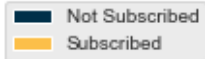
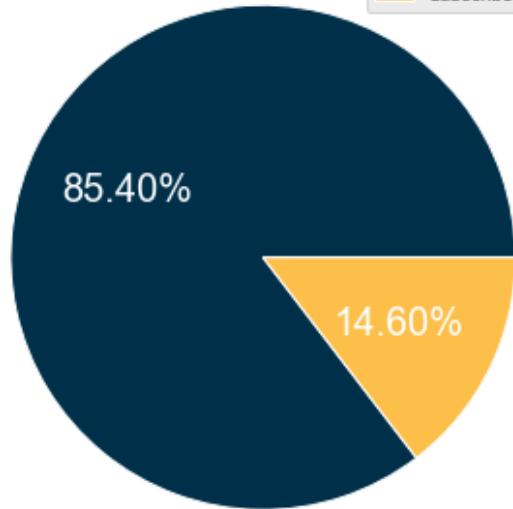
The marketing campaigns are based on phone calls, which occurred from *May 2008* to *November 2010*.



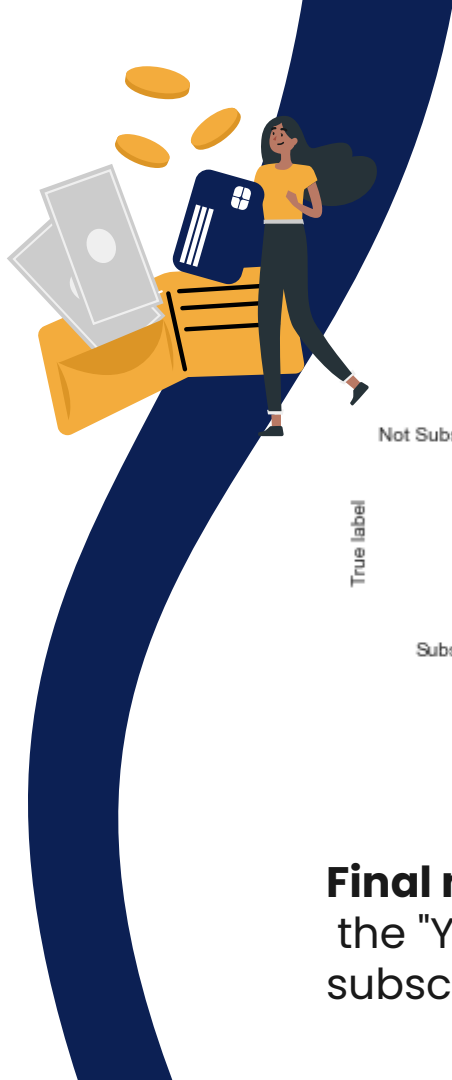
Class Distribution



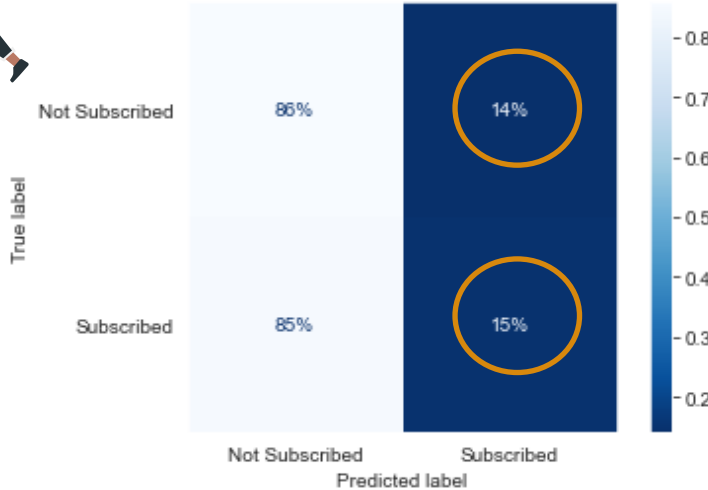
target



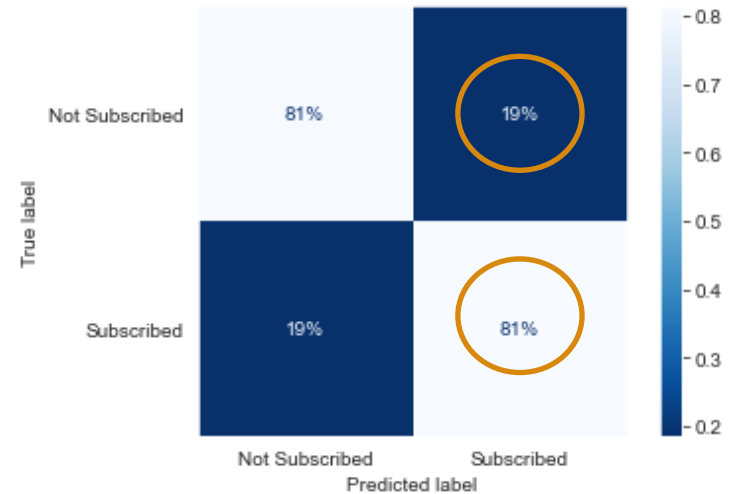
Results/Conclusion



Baseline Model



Final Random Forest Model



Final model can perform 81% correctly classifications of the "Yes" class or potential clients that are willing to subscribe a term deposit

Classification Report for Training:

	precision	recall	f1-score	support
0	0.97	0.82	0.89	21124
1	0.44	0.85	0.58	3600
accuracy			0.82	24724
macro avg	0.71	0.83	0.73	24724
weighted avg	0.89	0.82	0.84	24724

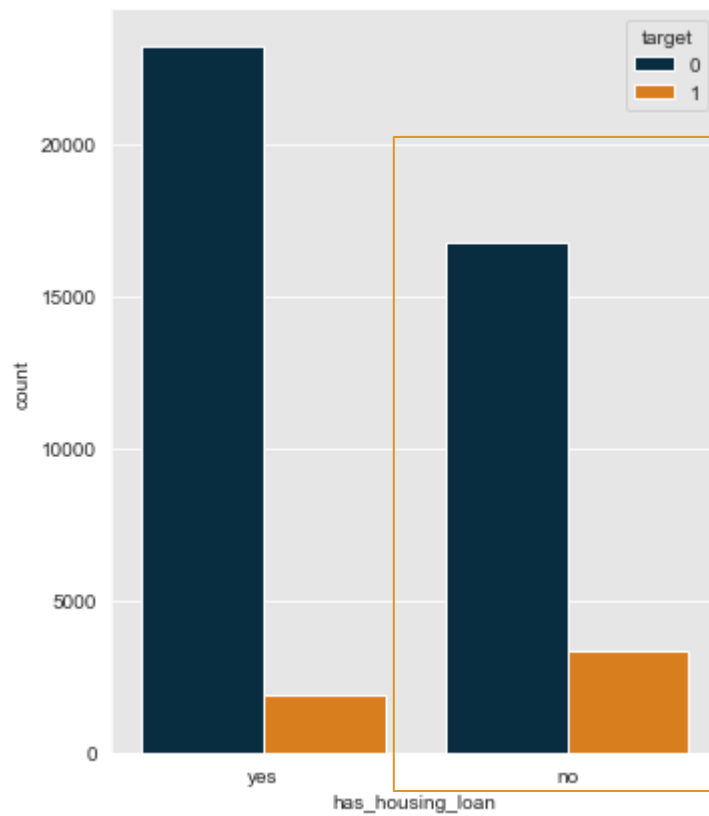
Classification Report for Testing:

	precision	recall	f1-score	support
0	0.96	0.81	0.88	5268
1	0.43	0.81	0.56	913
accuracy			0.81	6181
macro avg	0.69	0.81	0.72	6181
weighted avg	0.88	0.81	0.83	6181

Testing Recall Score of Random Forest Classifier : 81.38%

feature: age, importance: 0.04
feature: job, importance: 0.00
feature: marital, importance: 0.02
feature: education, importance: 0.06
feature: has_credit, importance: 0.01
feature: balance, importance: 0.01
feature: has_housing_loan, importance: 0.45
feature: has_personal_loan, importance: 0.02
feature: contact, importance: 0.05
feature: day, importance: 0.03
feature: month, importance: 0.00
feature: duration, importance: 0.01
feature: campaign, importance: 0.00
feature: pdays, importance: 0.00
feature: previous, importance: 0.00
feature: prev_campaign_outcome, importance: 0.00
feature: target, importance: 0.00

Recommendations

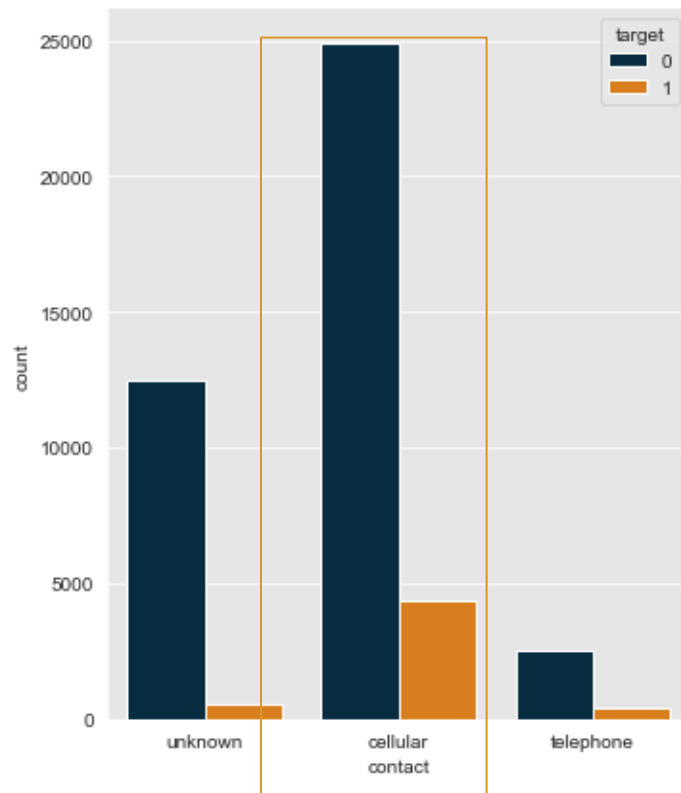


- House Loans and Balances

Potential clients in the average and high balances are less likely to have a house loan and therefore, more likely to open a term deposit. Lastly, the next marketing campaign should focus on individuals of average and high balances in order to increase the likelihood of subscribing to a term deposit



Recommendations

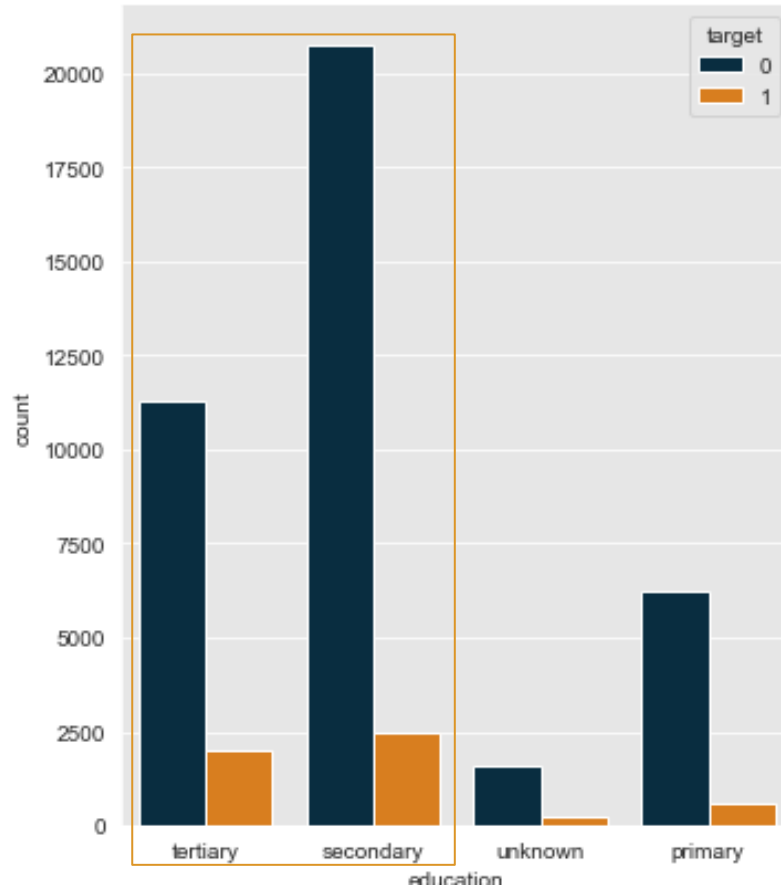


- Effective contact and communication:

I would suggest to come up with a communication strategy such (*email notifications, quality support team, digital marketing*) that mixes different channels of communication and enable the customer to choose the appropriate one for their unique needs.



Recommendations



- Education Level

Education improves credit scores, and dramatically reduces the probability of declaring bankruptcy or suffering foreclosure during the financial crisis. Similarly, it can bring them to make more educated guesses and smart decisions while making a deposit.



We highly suggest to take into the account those customers with *secondary* and *tertiary* education.

Future Considerations

More descriptive features can be useful here for example interview summary. In that case natural language processing will give better results.



THANK YOU!

Do you have any questions?

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