<u>Final Report: Effectiveness of financial institution telemarketing</u>

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Telemarketing calls, when unsuccessfully not only waste the time of the banking institutions but also of the call recipients while also diminishing the chance of the customer returning to the bank for its services. It increases operating costs with limited success. With a predictive model, selective targeting can be done, saving both time and money. The set of data that we have is from a Portuguese banking institution, based on real-world phone calls The data set provides us with 17 features and includes over 45000 instances. The data our our dataset was collected in 2017 – 2018 in Portugal, by a local financial institution.

<u>Hypothesis:</u> "Contact is the most effective for predicting the outcome of bank telemarketing."

All major financial institutions, including banks such as JP Morgan Chase, CitiGroup, Wells Fargo, BOC, etc. would all be interested in this type of research - if they already do not have something similar. This type of targeted advertising personalizes the banking experience while also cutting costs and saving time.

To solve the problem at hand we have gone through and utilized several training models to analyze each variable mentioned previously to gain the highest accuracy. By training a new model for each separate variable using logistic regression, multilayer perceptron network, and random forest regressor we can accurately compare each variable's effect on the results. In terms of results, the multilayer perceptron networks proved to be the most effective.

Alongside our training models, we also utilized an RFE fit to identify the most important features in our dataset. A correlation heatmap also helped in filtering the importance of certain features and created a basis for our analysis. Unfortunately though when attempting to use SMOTE to balance our data. Instead what happened is that the results were overfitted leaving it unusable.

With the help of the model algorithm, the predictor has almost 90% accuracy. This can be applied directly to financial institutions' telemarketing, saving both time and money for not only the institution but also the customers, as it provides a direct correlation between the success rate of the marketing call and the background factors to check before calling.