Predictive Model for Customer Product Purchase
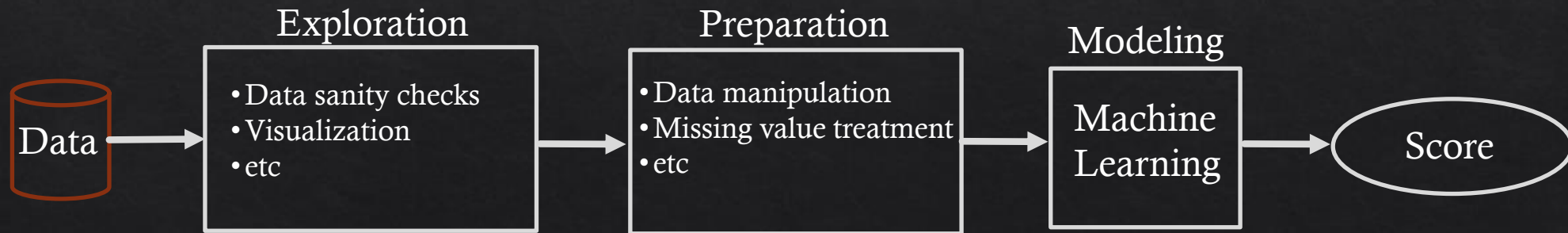
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Aims

◆ Predict potential customer's propensity to purchase products from bank

◆ Understand important customers' characteristics driving purchasing behaviour

Methodology overview

◈ Following steps were performed in order to map data to appropriate propensity score:

◈ Data exploration: appropriate sanity checks on data followed by visualizations to ensure quality of data

◈ Data preparation: appropriate data manipulation techniques were used including missing value replacements to prepare data for the modeling stage

◈ Data modeling: multiple machine learning models were tested on data and the best performing one was picked for score generation. Models were validated properly to ensure precision on new production data.

Data

Exploration
- Data sanity checks
- Visualization
- etc

Preparation
- Data manipulation
- Missing value treatment
- etc

Modeling

Machine Learning

Score

Machine learning solution

◈ Best performing machine learning model was a tree-based technique.

◈ This method essentially works like a complicated multiple if-else statements to divided data into meaningful combinations and eventually turn them into scores.

◈ The machine learning model was properly validated using standard techniques in the field to ensure its accuracy and bias-free performance.

◈ Model was further used to study features that are highly impactful in generating the scores

◈ Recommendations were made based on those highly-relevant features
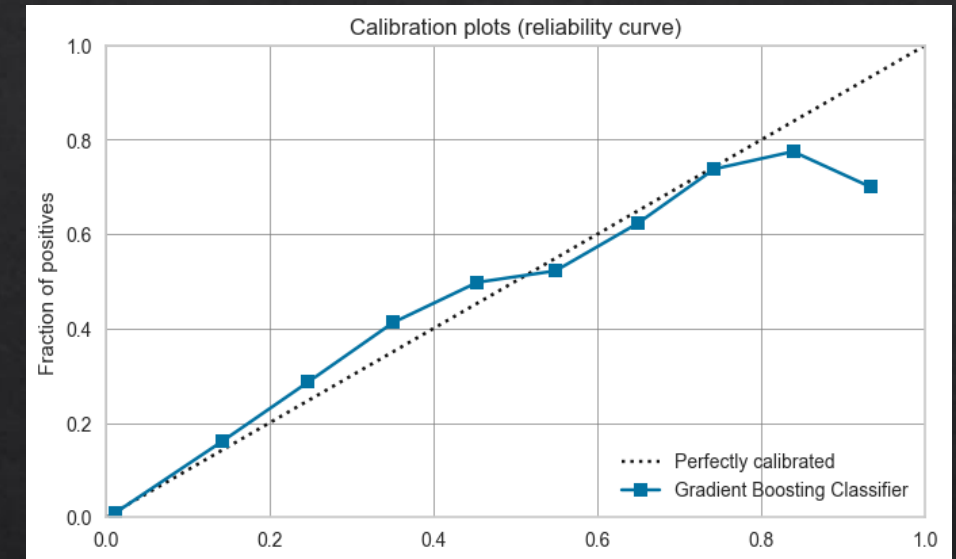
Calibration plot; showing quality of scoring.
y-axis shows the proportion of true outcomes, and x-axis is the mean predicted probability.

Top predictive features

◈ Figure shows what impact each feature has towards scoring customers. High or low values of each feature impacts the way model scores a customer.

◈ Based the plot, following features are important to consider: month, job, call duration, type of contact, age, has credit in default, has house or personal loans, socio-economic contributions and marital status.
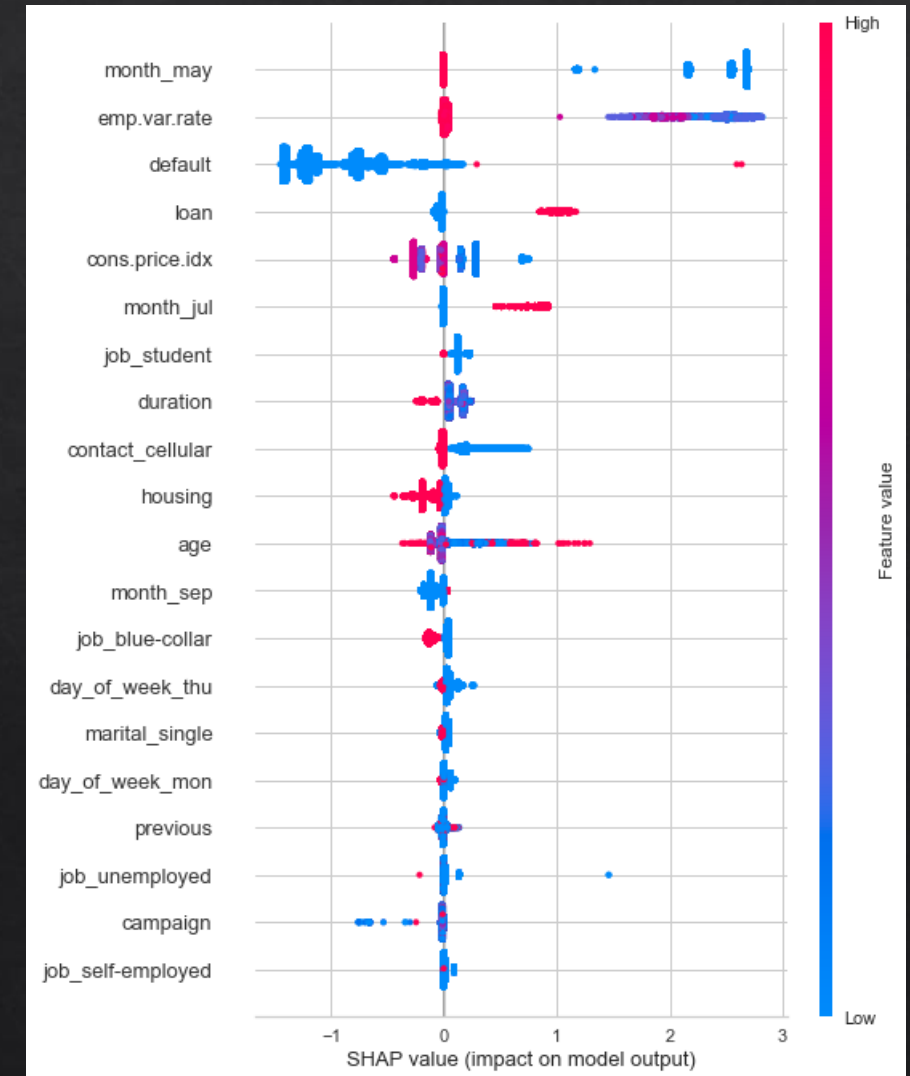
Recommendations

◇ Below are some of the recommendations to increase sales to potential customers:

  ◇ Time:

    ◇ Months of May and September are probably not a good time to approach customers while July is the best

    ◇ Monday and Thursday are not a good time to approach customers

  ◇ Customers who don't have house loans and/or have personal loans and/or have not been defaulted on other credits will more-likely purchase a product

  ◇ Approach those customers whose jobs might make them in need of some of the products like students, self-employed, etc

  ◇ Try to avoid contacting customers to their cellular phones

  ◇ Customers at their middle ages are less likely to purchase products while those who are younger or elder will more likely purchase

  ◇ Duration of calls should be minimized as much as possible and avoid very long calls

  ◇ Focus more on those customers who have more stable employment rates (emp.var.rate) and those who have lower consumer price index (probably more in need of banking products to boost up their consumption)