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To operate an ideal customer service, it is important to analyze the main users of the company's products and services. The companies would devise marketing strategies, change product development, and set financial goals accordingly. Customer complaints are ways of knowing how the companies are doing in providing the service. In addition to the complaints, knowing the customers' purchase behavior would help understand how the complaints may have arisen. The customer personality analysis provides comprehensive data about the customers and their purchase histories.

Can we predict the types of customers that would likely file complaints?

Since the complaints may have been made due to multiple factors, such as the product and the customer's history with the company, non-linear models would perform better than linear models in predicting whether the customers would likely file complaints.

Before explaining the models used, this study utilized recall as a metric for comparison with other models. Since it is important to capture all true positives, sensitivity should be prioritized. The false positives may be potential customers who may file complaints. Thus, the company must formulate a plan to prevent the complaints from happening. To do so, the threshold for logistic regression and SVM have been adjusted.

The customer personality analysis has 26 features. Considering all the features, logistic regression, support vector machine, and decision trees have been tested. To prevent overfitting, the logistic regression has been tested with and without L1 penalty. The logistic regression with L1 penalty has shown to perform better than without the penalty. However, the support vector machine with a nonlinear kernel performed better. This supports the hypothesis that approaching the data nonlinearly would best predict the people who may file complaints. The SVM showed better prediction according to the AUC curve.

The visualization method for confusion matrix and ROC curve was given by Dr. Marcos Quinones-Grueiro from CS/DS3262 from Spring 2024 semester.