**Case Study: Harrah’s Casino Lifetime Value Prediction Analysis**

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* **OVERVIEW**

This case study showcases a recent Harrah’s Casino Prediction Analysis of Customer Lifetime Value (CLV). CLV is value that helps create a prediction of how much a customer will spend over the long term. Harrah’s Casino is then able to utilize CLV to generate more profit for their casinos by creating plans to keep customers who spend more long term. These marketing plans including mailing, email, and rewards system programs. The more higher spending customers Harrah’s keep the more money that the Casino can generate. The source data from this project was data on customers over the last ten years from several higher populated Harrah’s locations which include: Las Vegas, Atlantic City, Florida, and Arizona. By reviewing this customer data records, Harrah’s Analytics team aspires to discover actionable insights to help develop high profiled marketing plans to keep our more profitable clients.

* **Business Understanding: Defining a Problem**

For our project, it took a collaboration of our Harrah’s Locations to create the dataset over the last ten years. For each customer records, Harrah’s generated customers markings of “H” for high-profile clients, “M” for Mid-Tier spending clients, and “L” for Low-Tiered Spending Clients. The overall goal is to solve our problem through Multiple Linear Regression to figure out the best indicators to predict high spending clients and then build a marketing program that will help them keep spending money at our resorts.

* **Defining the Target Variable**

For this case study the target variable would be the “Spending” variable. The variable will feature Y to represent Big Spending Customer and N to represent a customer that does not spends very much at the Casino. This Variable will be able to be converted to binary, so it can help with our regression model building.

* **Data Understanding**

Our Harrah’s data showcases many features that factors into determining a customer’s status of being a High Profiled Customer. Variables included in this project: Total Amount Spent, Total Member Years, Number of Hotel Rooms Purchased, Number of Meals Purchased, and Total Gambling Amount. We have provided each customer a CustomerID number to keep track within the whole dataset. Finally, as mentioned above it is good to know the data was collected over a total of ten years.

* **Data Preparation**

The dataset did not need as much data preparation as we originally had thought. Our first task was to remove any duplicate rows or columns from the dataset. This was needed so the data could not be skewed. There was also about less than 5% of the total data records that were missing from the dataset. As a team we decided to use imputation of missing data, which included various Gambling and Room Spending Amounts. Lastly, we need to adjust several categorical columns to 1s and 0s to assist with out linear regression model.

* **Modeling**

For the modeling portion, we needed to build our training and testing datasets. For our split we decided on 70:30 split of the data for the datasets. Our methods of prediction included for our analysis featured Multiple Linear Regression and K-Neighbor’s Classifier methods. Our other focus for our modeling portion was to remove bias. To do so we utilized Cross-validation split, along with a stratified split which prevent the bias from being present.

* **Model Interpretation**

For our model interpretation section, our team I s creating a way to discover different predictors that will let them know when they discover a customer that will help Harrah’s finically long term. Reviewing our models we have created from this project, we can then decide which model has the best accuracy and run it across our whole customer base as a whole. Our team has then utilized the ROC Curves for our model selection process. Once the best accuracy is confirmed we then can go on to model deployment.

* **Model Deployment**

After deployment has completed, Harrah’s Casino was able to increase the profits of the company by 6.9% percent over the last year. This is a great increase over the past couple years where we were dropping an average of 2 percent over the last 3 years. Additionally, now that we know that the model has brought success to the company after deployment we can then continue to build of our successful model to run it over each quarter rather than year. This will benefit Harrah’s in building in weak spots throughout the year, and provide more accurate results. Overall, our model was successful during the timeframe we have worked on it and help Harrah’s profit increase; however, we are no focused on improving the model even further to help reach new heights.

**References**

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