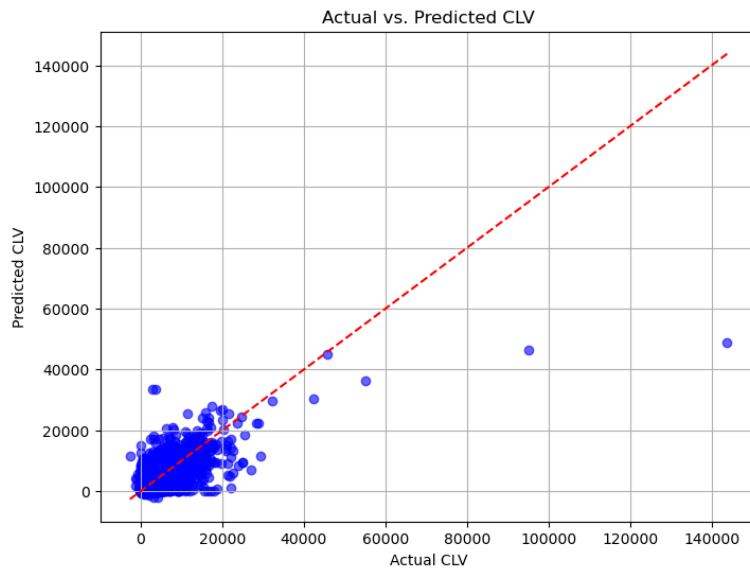


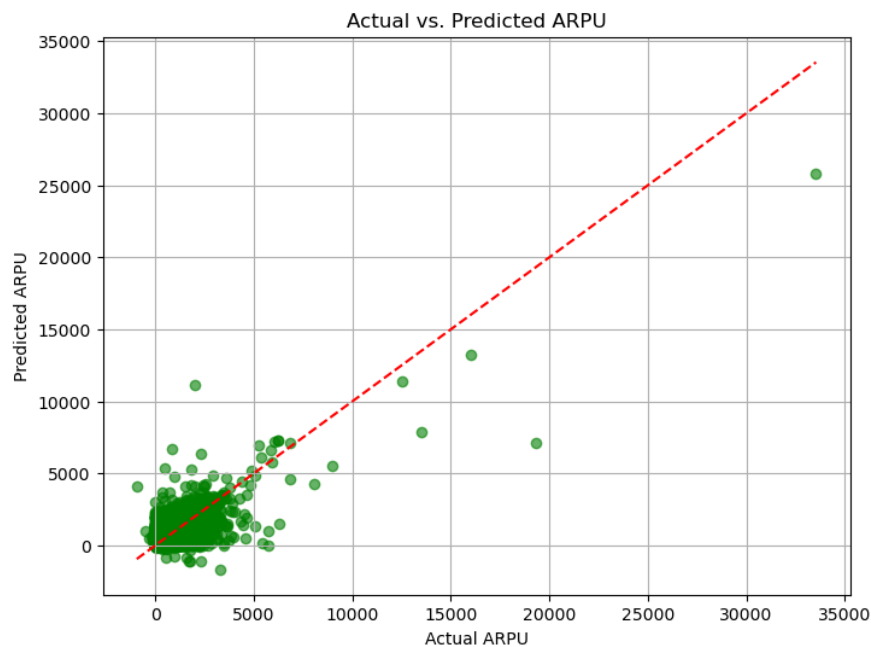
Visualization and Results

Actual vs. Predicted CLV



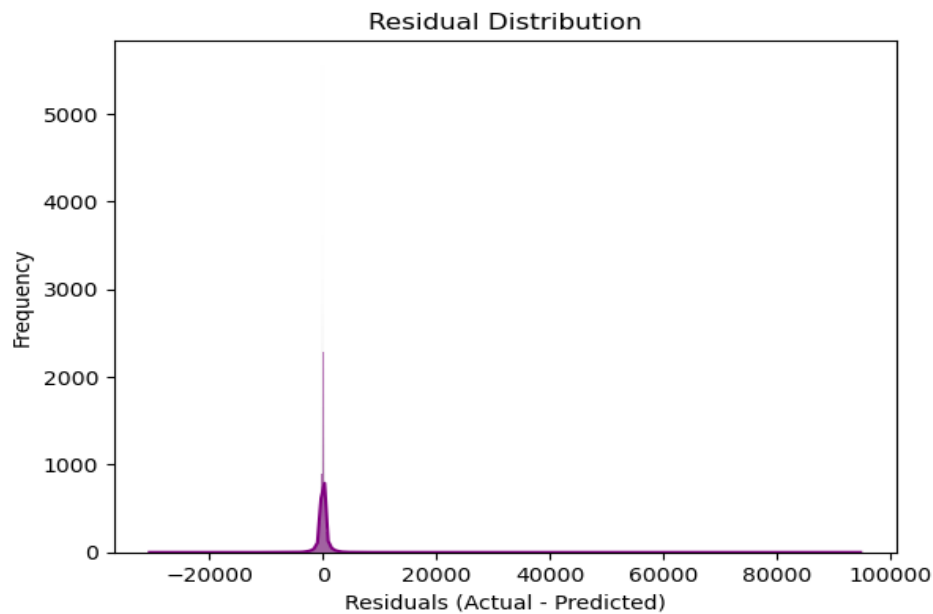
Findings: The scatter plot showcases the alignment between actual and predicted CLV scores with blue dots. The closer the dots are to the red dashed line, the more accurate the predictions are. This visual shows that the model has high accuracy with many points closely clustered around the ideal line.

Actual vs. Predicted ARPU



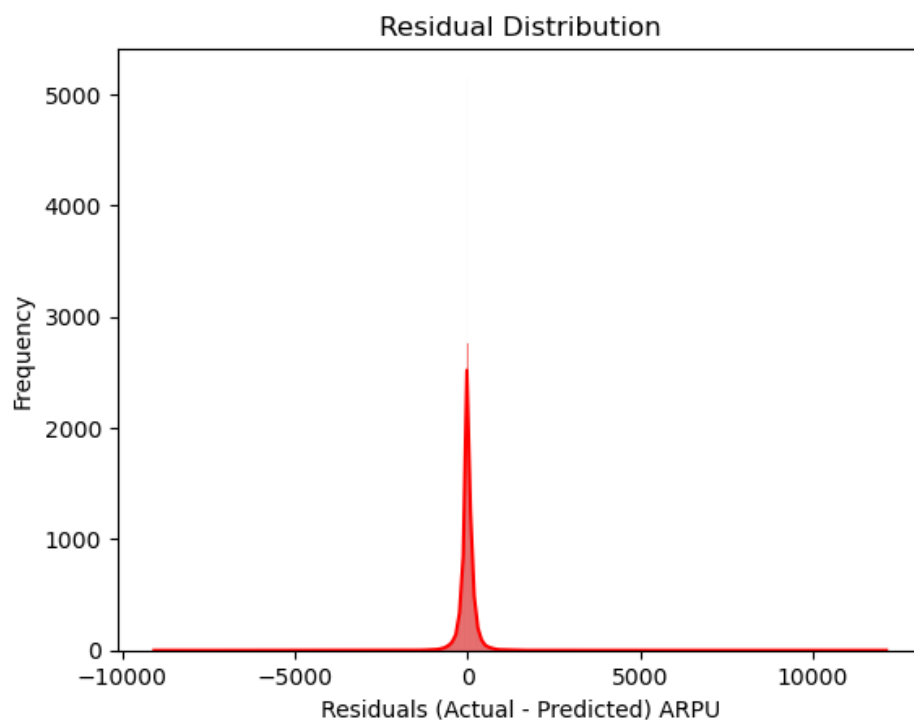
Findings: Similar to the CLV visualization, this scatter plot illustrates the relationship between actual and predicted ARPU values using green dots. The proximity of the dots to the red dashed line indicates strong predictive accuracy, with most predictions lying close to their actual values.

Residual Distribution (CLV)



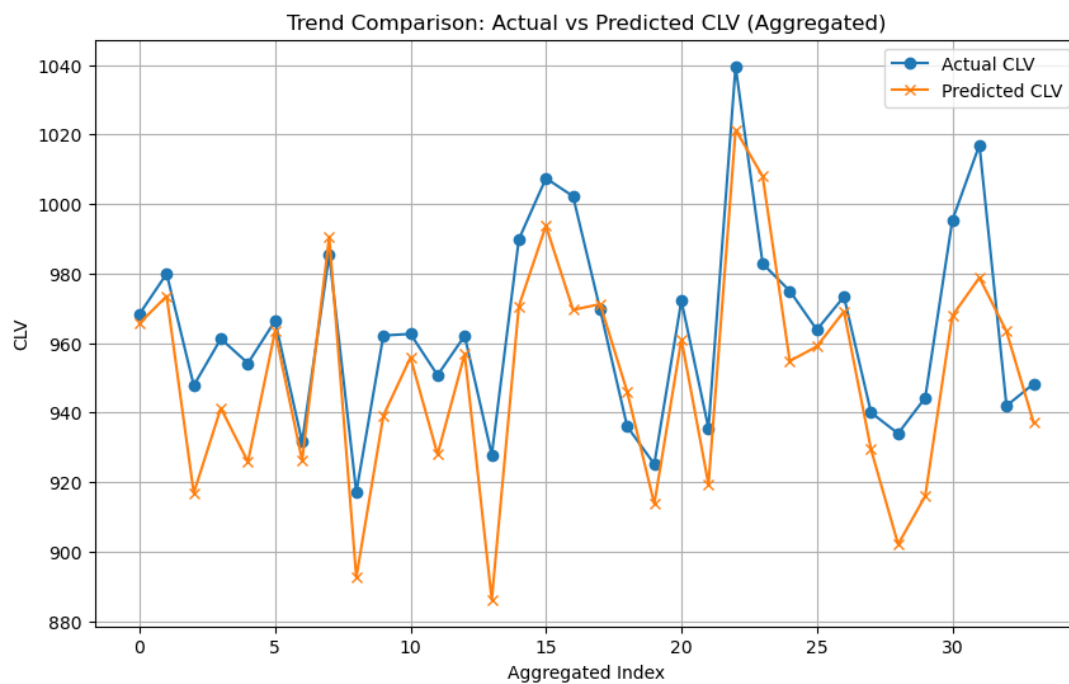
Findings: This histogram and KDE plot (purple) display the residuals or differences between actual and predicted CLV scores. A centered and symmetric distribution around zero indicates that the model's predictions are unbiased and accurate, with minimal error spread.

Residual Distribution (ARPU)



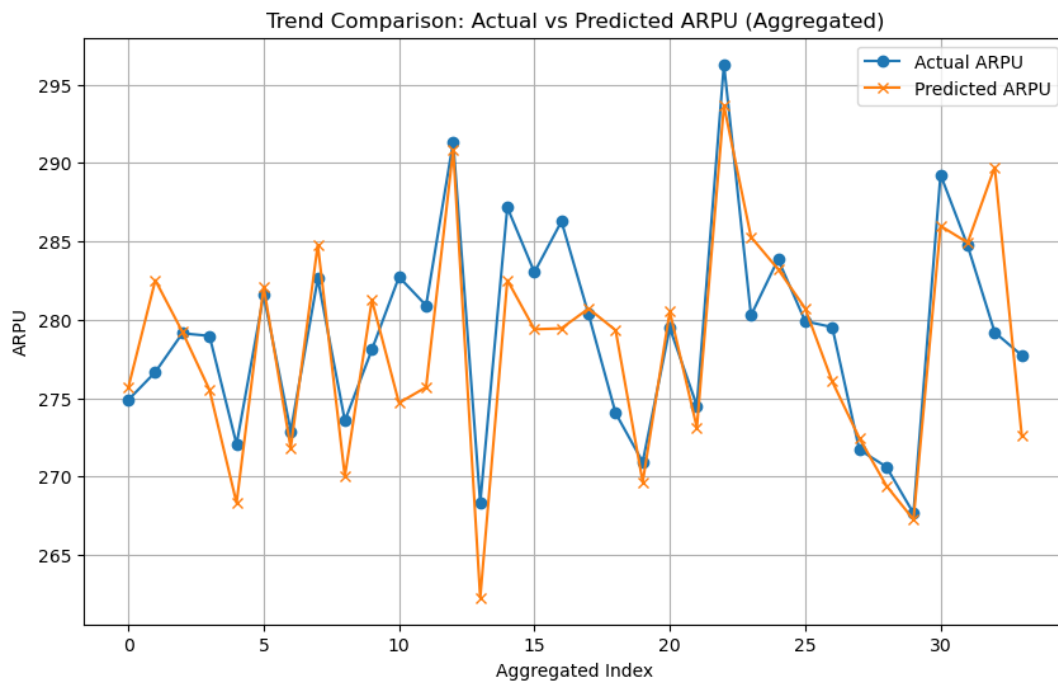
Findings: The red residual distribution plot represents the differences between actual and predicted ARPU values. The centered histogram around zero suggests minimal bias and high accuracy in the model's ARPU predictions.

Trend Comparison: Actual vs. Predicted CLV (Aggregated)



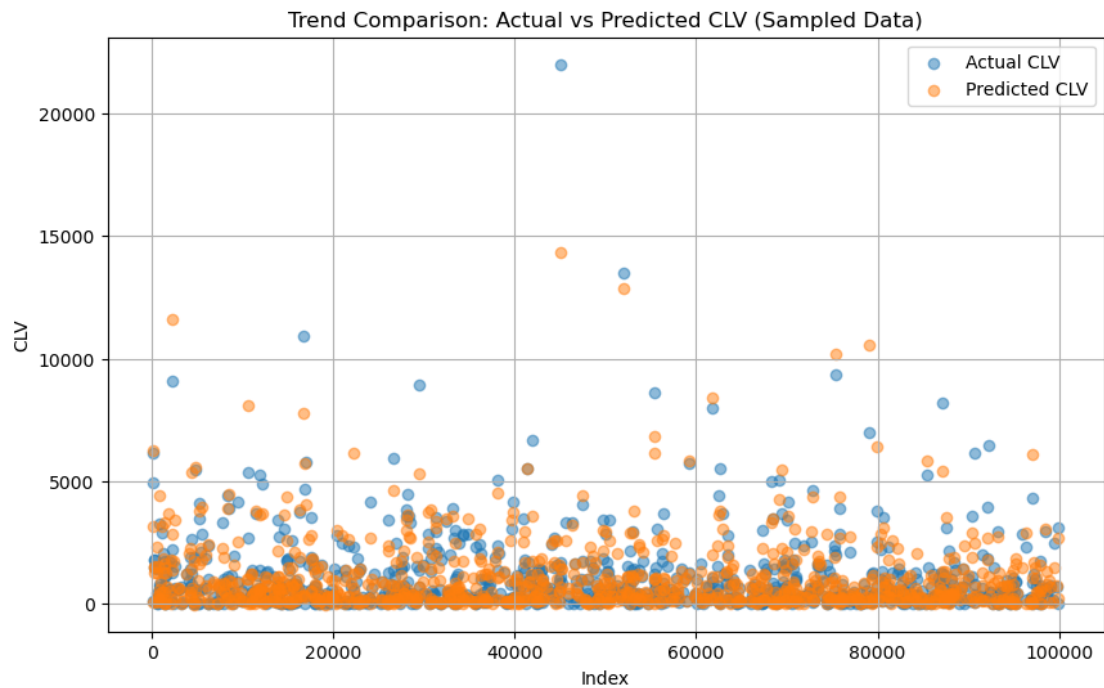
Findings: The aggregated trend line plot compares actual and predicted CLV for customer groups (aggregated 3000 customers). Both trends (blue for actual, orange for predicted) align closely, indicating that the model captures the overall trend accurately, even for more extensive data groups.

Trend Comparison: Actual vs. Predicted ARPU (Aggregated)



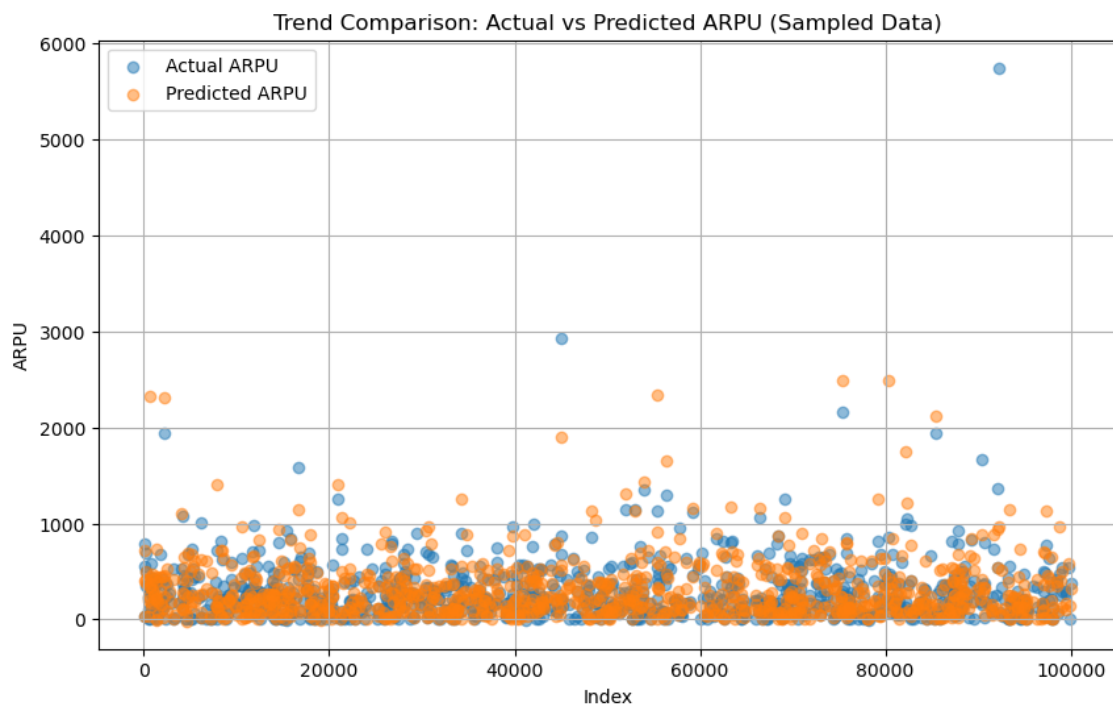
Findings: Similarly, the aggregated trend line plot for ARPU shows that the predicted values closely follow the actual values, demonstrating the model's ability to capture ARPU trends accurately for larger customer groups.

Trend Comparison: Actual vs. Predicted CLV (Sampled Data)



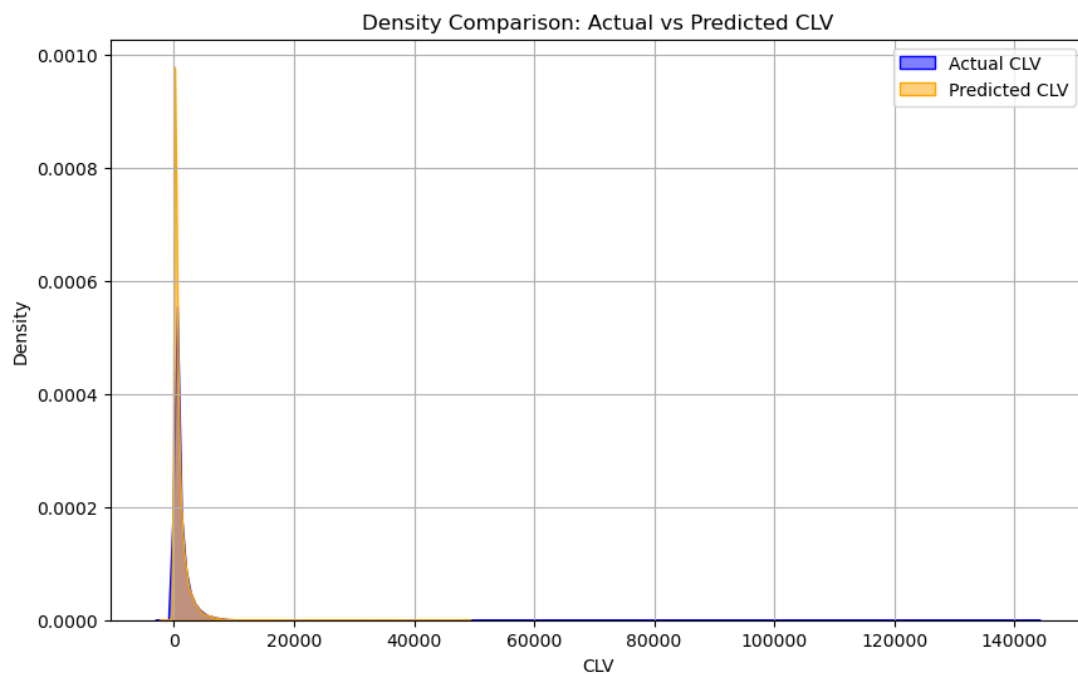
Findings: The scatter plot of sampled data (1000 random points) for CLV shows blue and orange dots representing actual and predicted values, respectively. Close alignment of these points indicates precise predictions, reflecting that the model maintains accuracy even on subsets of data.

Trend Comparison: Actual vs. Predicted ARPU (Sampled Data)



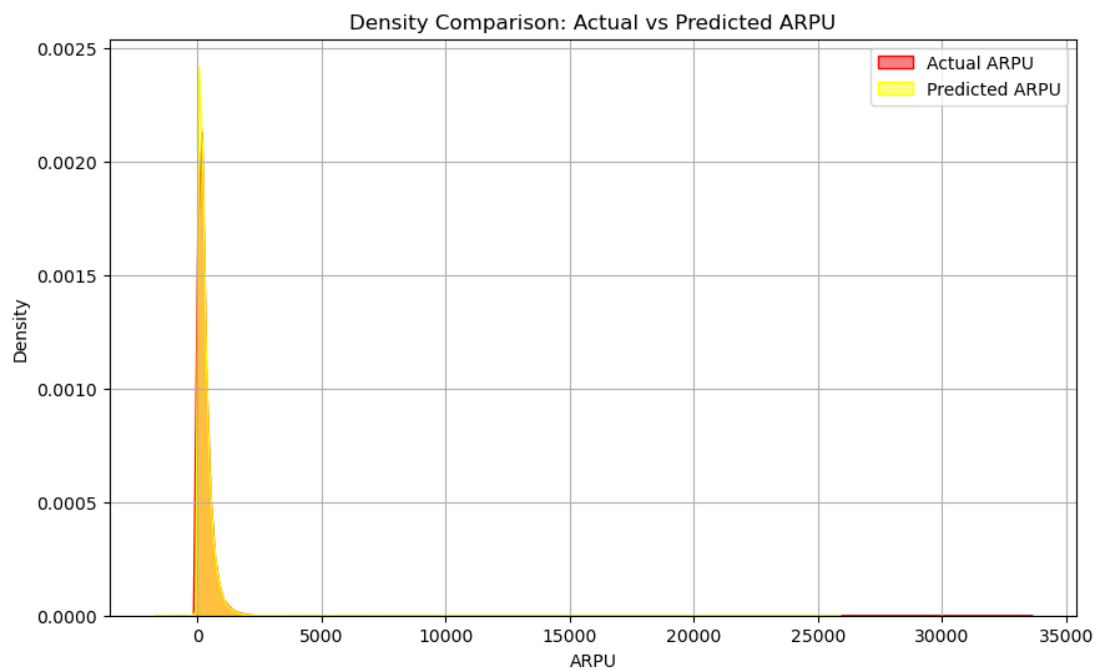
Findings: This scatter plot, focused on sampled ARPU data, highlights the close alignment between actual (blue) and predicted (orange) values, confirming the model's high prediction accuracy for sampled subsets.

Density Comparison: Actual vs. Predicted CLV



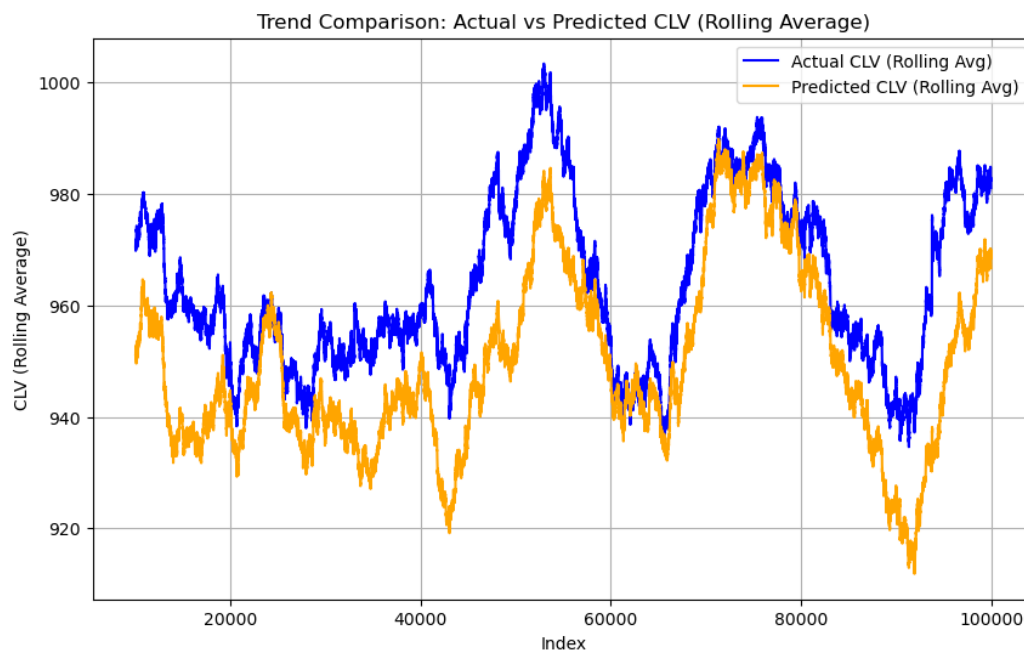
Findings: The blue and orange density plots compare the distributions of actual and predicted CLV scores. Significant overlap between these distributions further underscores the model's reliability and predictive strength.

Density Comparison: Actual vs. Predicted ARPU



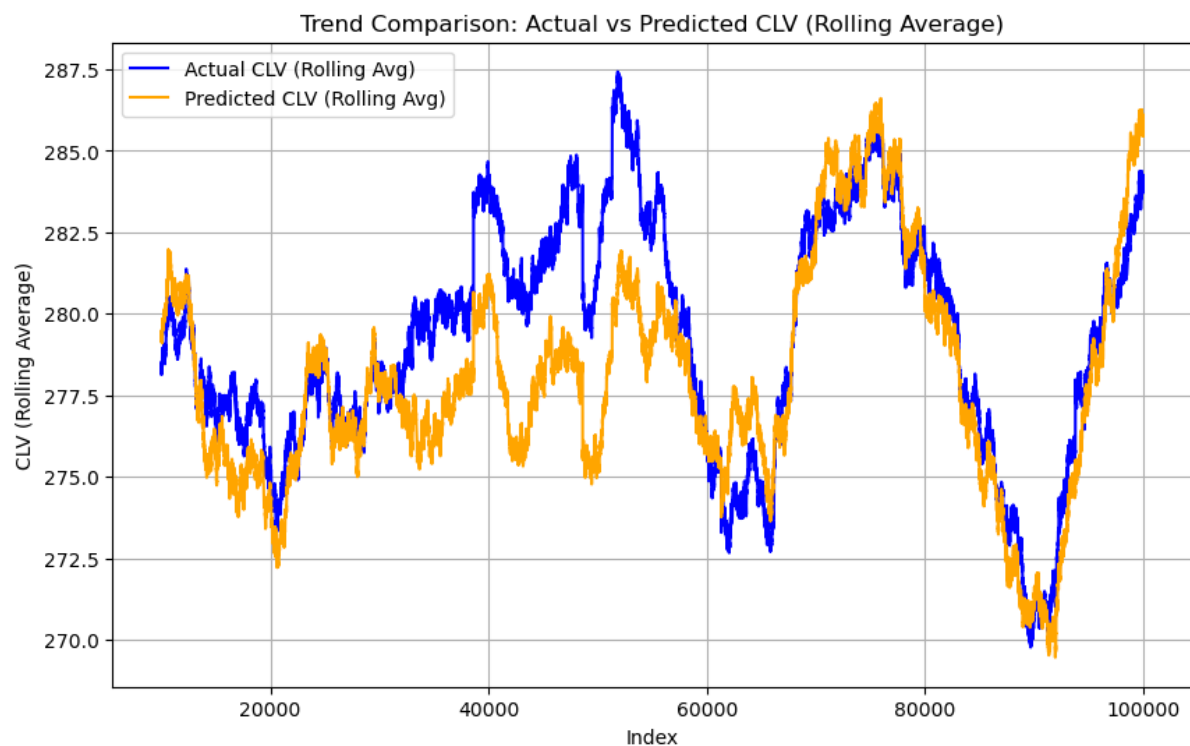
Findings: Similar to the CLV comparison, red and yellow density plots illustrate the distributions of actual and predicted ARPU. The high overlap between these densities indicates strong predictive accuracy.

Rolling Average Trend Comparison: CLV



Findings: The rolling average trend plot (using 9999 data points) for CLV shows that the predicted CLV (orange) closely follows the actual CLV (blue) trend over time. This suggests that the model is consistent here; the x-axis represents the individual customers.

Rolling Average Trend Comparison: ARPU



Findings: The rolling average trend plot for ARPU confirms that the predicted values (orange) align closely with the actual values (blue), indicating the model's stable performance here; the x-axis represents the individual customers.

