

CHARM&CHEER

**Retail Transaction Analysis and Predicting
Models**

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CHARM&CHEER

Charm&Cheer: Discover the Magic in Every Gift

Overview

Founded in 2009, Charm&Cheer (CnC) is a global retail leader, offering high-quality gifts, home decor, and seasonal products. With a presence in over 40 countries, CnC has become a trusted name for customers seeking unique and charming items.

CHARM&CHEER

Business Problem

To boost future sales, with the given data, the analysis will focus on:

- Sales Performance
- Sales Trends
- Product Performance
- Market Analysis

Charm&Cheer Transaction Insight in 2009 - 2011

Over 40 countries around the world C&C able to sold various charming products

With over 1 million transaction CnC gain more sales and customer everyday.

| | 2009 | 2010 | 2011 |
|-----------------|-------|-------|-------|
| Unit Sold | 418K | 518K | 481K |
| Total Sales | £788K | £9.1M | £9.0M |
| Unique Customer | 1041 | 4224 | 4233 |
| New Customer | 1041 | 3304 | 1532 |



1.78%

Avg. Canceled
Transaction per month

17,914

Canceled Transaction

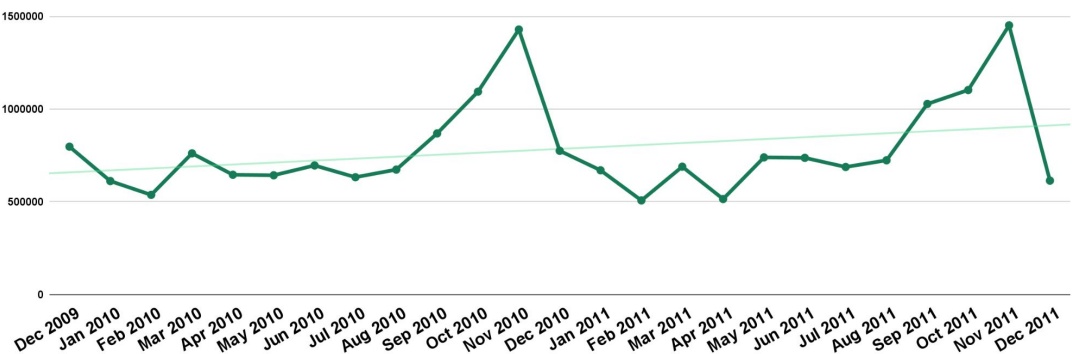
Most Canceled Product

- Regency Cakestand 3 Tier
- Baking Set 9 Piece Retrospot
- Strawberry Ceramic Trinket Pot

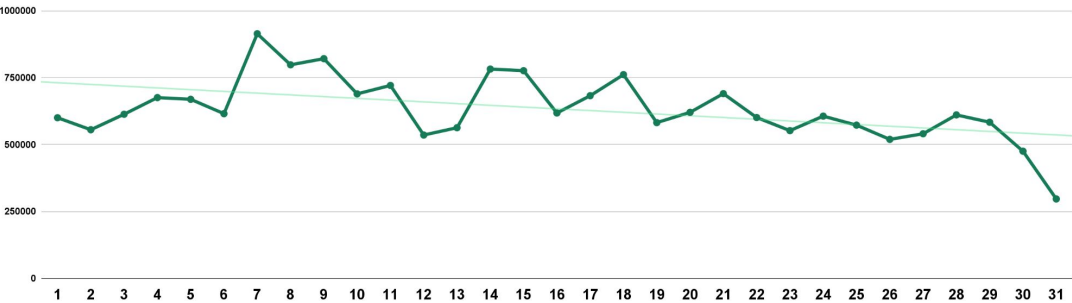
Sales Trend in 2009 - 2011

Sales increase

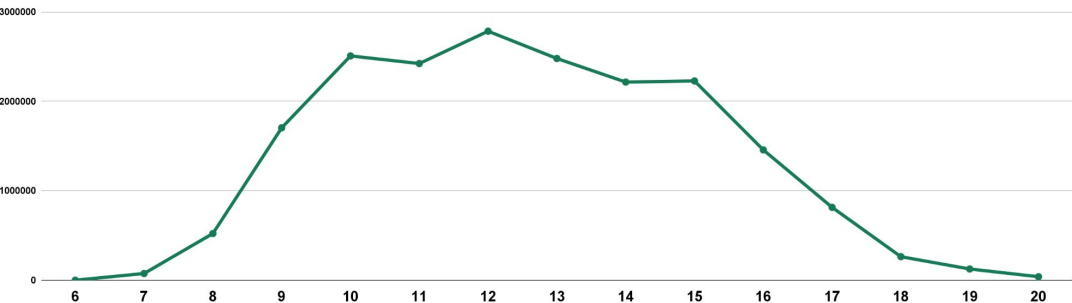
Monthly Sales Trend



Daily Sales Trend



Hourly Sales Trend

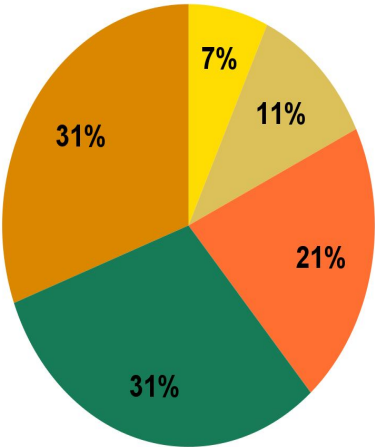


Product Performance

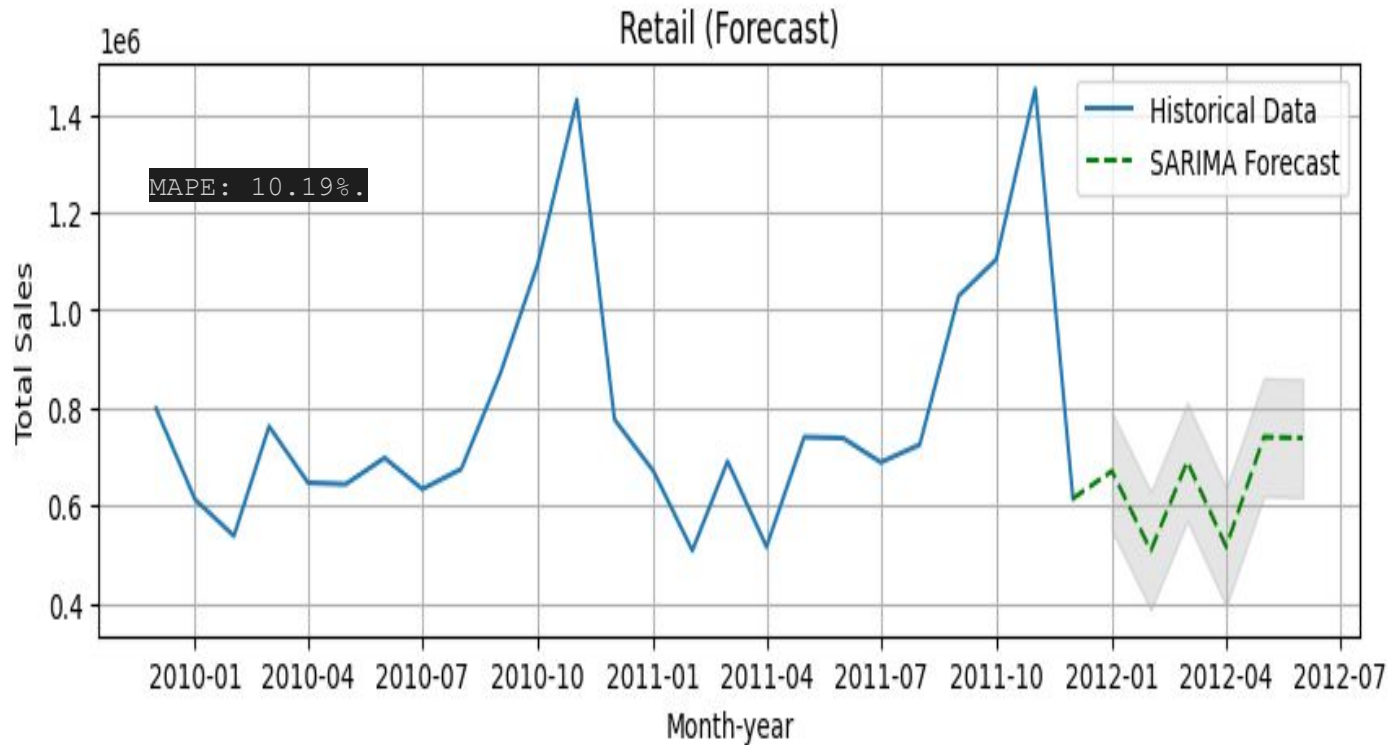
- Prestige Product: Regency Cakestand 3 Tier
- Moderate Sales Product: Party Bunting
- Favorite Product: World War 2 Gliders ASSTD Designs

Classification of Customer Segment

- Top Customer ● High Value Customer ● Medium Value Customer ● Low Value Customers
● Lost Customer



Analyzing using the SARIMA model because the data exhibits a seasonal pattern, SARIMA becomes the optimal model for seasonal patterns.



2012-01-01 670639.46 GBP

2012-02-01 508065.09 GBP

2012-03-01 690466.82 GBP

2012-04-01 515863.08 GBP

2012-05-01 740436.14 GBP

2012-06-01 738233.99 GBP

Evaluation metrics include RMSE: 104517 & MAPE: 10.19%.

WORLD WAR 2 GLIDERS ASSTD DESIGNS

IS ONE OF THE PRODUCT THAT NEED TO BE STOCK-UP IN THE FUTURE



Out of all the products, there are 2 that have consistently sold in high numbers over the past 2 years and are predicted to increase over the next 6 months.

After performing a specific forecast for these 2 products, they are also predicted to experience an increase:

For the product WORLD WAR 2 GLIDERS ASSTD DESIGNS:

Month 1 of 2012:

Upper bound: 234.638073

Lower bound: 5465.937434

Month 2 of 2012:

Upper bound: 194.717236

Lower bound: 5515.480007

2011-12-01 1367

2012-01-01 4132

2012-02-01 4132

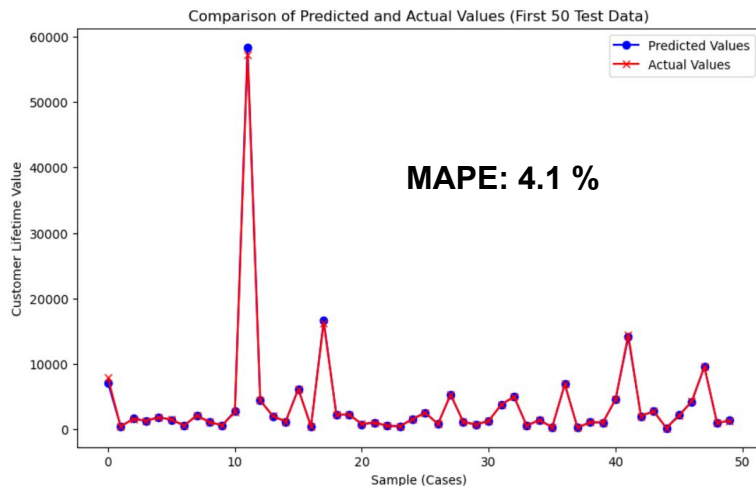
Customer Lifetime Value Predictive Model

Goals : Identify which of new customers are predicted to have a high value. By calculating the CLV on the already existing dataset we can create a Machine Learning model so when we acquire new customers, we can predict their value based on their characteristics.

Calculate CLV and Create New Dataset

| | customer_id | country | number_of_orders | average_order_value | recency | frequency | customer_lifespan | CLV |
|---|-------------|----------------|------------------|---------------------|---------|------------|-------------------|----------|
| 0 | 12346.0 | United Kingdom | 34 | 2281.072353 | 325 | 31.025000 | 1.095890 | 77556.46 |
| 1 | 12347.0 | Iceland | 253 | 22.266087 | 1 | 229.713930 | 1.101370 | 5633.32 |
| 2 | 12348.0 | Finland | 51 | 39.596078 | 74 | 51.422652 | 0.991781 | 2019.40 |
| 3 | 12349.0 | Italy | 175 | 25.306800 | 18 | 112.061404 | 1.561644 | 4428.69 |
| 6 | 12352.0 | Norway | 103 | 27.668350 | 35 | 105.603933 | 0.975342 | 2849.84 |

Prediction Result (Test Data)



By looking at the IQR 'upper-fence' of the new customers prediction result (1700 new customers), we have identified **162 customers** whose Predicted Customer Lifetime Value (CLV) is significantly higher than the other new customers.

Business Implications:

- Collect these 162 high value customers detail demographic data so the company can develop specific marketing strategies to retain and engage these valuable customers.
- Segment customers based on CLV to optimize resource allocation and strategic focus on high-value segments.
- Analyze purchasing behavior and preferences of these 162 customers to make personalized offer to these potential high value customers.

Customer Churn Predictive Model

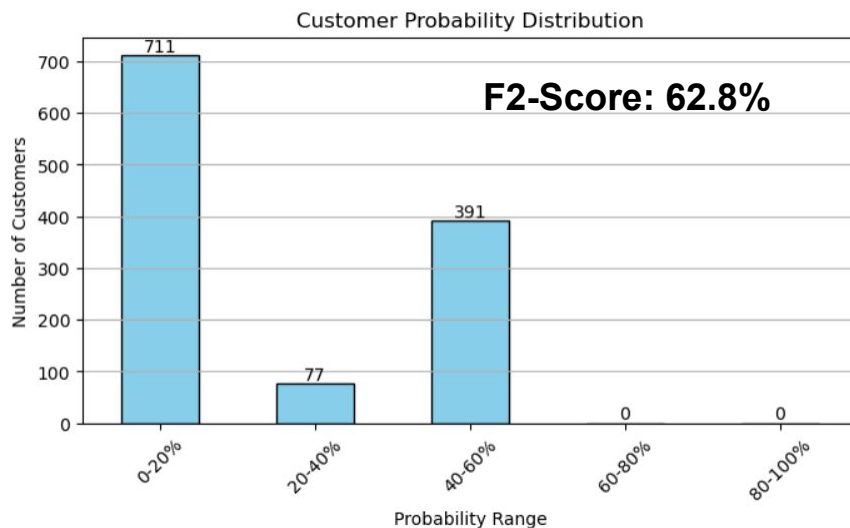
Goals : predict whether a specific customer is likely to churn. By leveraging this predictive capability, we aim to identify customers at risk of churning and proactively take preventive actions to retain them.

New Churn Dataset

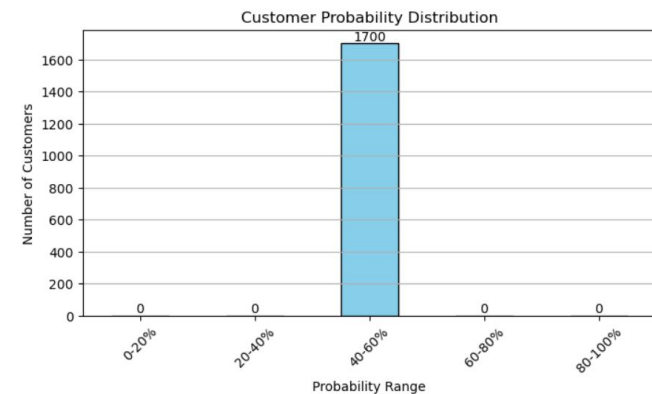
Churn: 1 Year without purchase

| | customer_id | favorite_product | customer_lifespan_days | average_order_value | churn | country |
|---|-------------|--------------------------------|------------------------|---------------------|-------|----------------|
| 0 | 12346.0 | MEDIUM CERAMIC TOP STORAGE JAR | 400 | 6463.038333 | 0 | United Kingdom |
| 1 | 12347.0 | ICE CREAM SUNDAE LIP GLOSS | 402 | 704.165000 | 0 | Iceland |
| 2 | 12348.0 | DOUGHNUT LIP GLOSS | 362 | 403.880000 | 0 | Finland |
| 3 | 12349.0 | SWEETHEART CERAMIC TRINKET BOX | 570 | 1107.172500 | 0 | Italy |
| 4 | 12350.0 | TEA BAG PLATE RED RETROSPOT | 0 | 334.400000 | 0 | Norway |

Prediction Result (Test Data)



New Customers Prediction



Which Product to Offer?

| | customer_id | favorite_product |
|---|-------------|--------------------------------|
| 4 | 12350.0 | TEA BAG PLATE RED RETROSPOT |
| 5 | 12351.0 | BLUE SCANDINAVIAN PAISLEY WRAP |
| 8 | 12354.0 | BLUE POLKADOT CUP |