



Amazon Ads- Optimizing Targeted Audience



Team 3 : Awesome Analysts of Albers (AAA)

Agenda

Introduction

Overall Recommendations

Data Cleaning and Profiling

Model approaches and results

Insights

New to Brand Reach and Optimal Bidding Strategy



Introduction

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Developing audience targeting strategies that can significantly boost advertisers' reach and engagement, leading to more effective and efficient marketing efforts.



Goal

- Maximize Viewable Impressions and Clicks
- Maximize New To Brand Reach
- Optimal Bidding Strategy

Overall Recommendations

- **Prioritize Weekends & Specific Months**
 - Amongst Feb, Mar, Apr, May focus on advertising campaigns on weekends and during February and March
- **Refine Audience Targeting for maximum Reach**
 - Categories : Women's Running Shoes, Foundation Makeup, Sheet and Pillowcase Sets
 - Slots: Desktop and mobile app.
- **Refine Audience Targeting for maximum NTB (New-to-Brand) Reach**
 - Categories : Women's Running Shoes, Foundation Makeup, and Sheet and Pillowcase
 - Slots : Mobileapp / Mobileweb
- **Monitor & Adapt (monitor campaign performance)** for any changes in future.
- **Limitations**
 - There could be changes in optimal bidding and campaign performance based on external factors like economy, future target audience likings, future and historical data.

Data cleaning And Profiling

- **Dataset Integration:** Merged datasets, removed duplicates by date.
- **Numerical Features:** Filled missing sales/orders with 0.
- **Categorical Features:** Filled missing 'vertical'/'sub_vertical' with 'Unknown', applied one-hot encoding to extract features.
- **Date Feature:** Extracted 'Month' and 'Day' from 'hit_day_utc'.

Note: Data is from Feb to May (we don't have complete data for month of May)

Model And Evaluation Metrics Used

Evaluation Metrics

- 1. Mean Absolute Error (MAE)** - Average error between actual vs predicted
- 2. Mean Squared Error (MSE)** - Like MAE, but squares errors before averaging.

1. Evaluation Metric R-squared (R^2)-

How well our predictions match the actual data between 0 to 100%

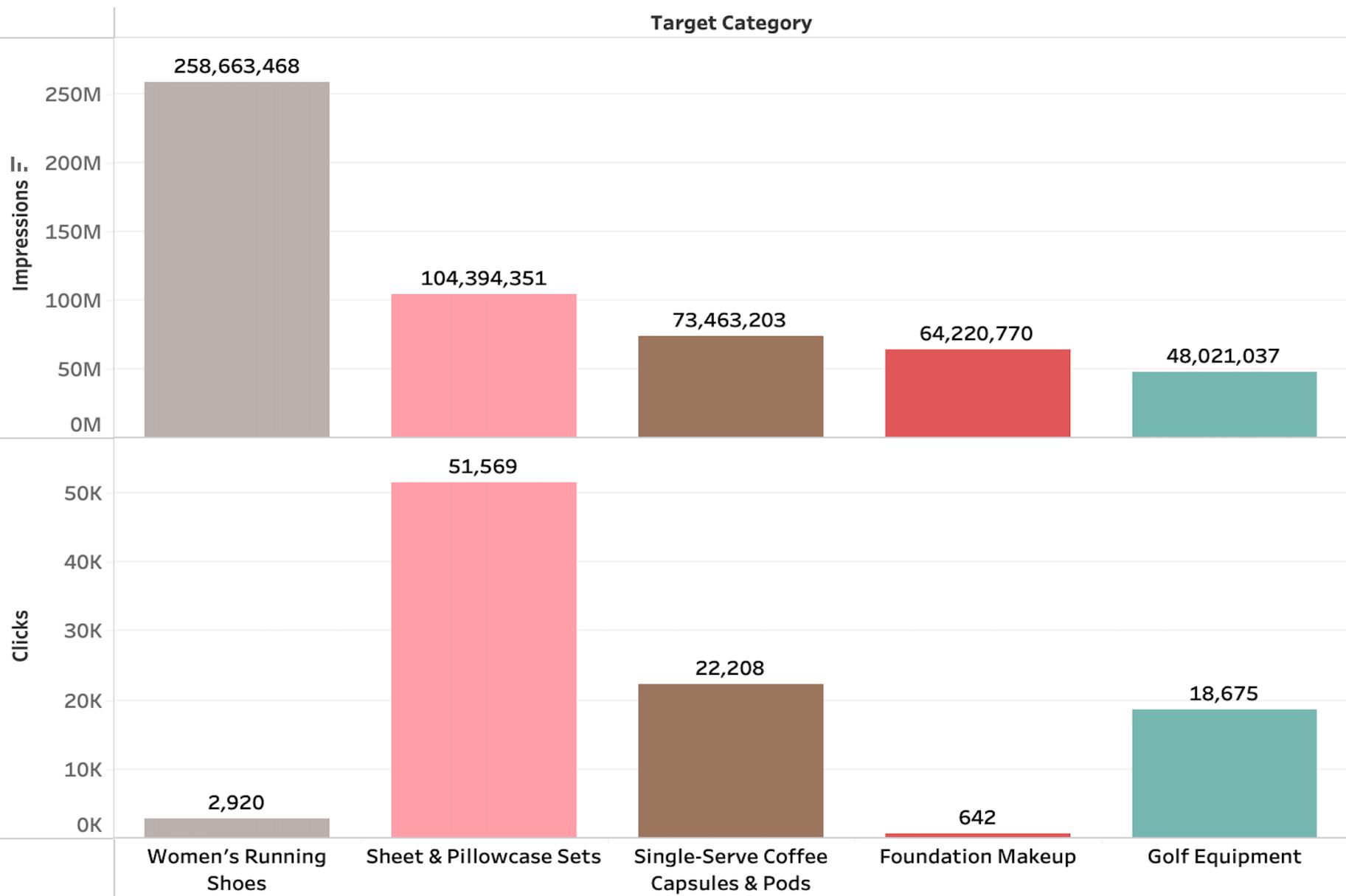
Model Approaches

Gradient Boosting Regressor - Adds new decision models to correct errors made by existing models

Random Forest Regressor - Builds multiple decision independently on random subset and averages

Preliminary Analysis

Click and impressions



IMPRESSIONS

Targeting for maximum Impressions: Approach

Objective:-

- Predicting features influencing Impressions on whole dataset

Model Selection:-

- **Model Used:** Gradient Boosting Regressor

Parameters used and Target variable:-

- **Filter criteria:** None
- **Target:** Impressions
- **Features:** clicks, placement slot, targeting secondary, vertical, sub vertical, month, day

Targeting for maximum Impressions

<u>FEATURES</u>	<u>Feature Importance Results(In decreasing order)</u>
Placement slot	Offsite mobileapp Offsite Desktop
Targeting category:(Top 5)	<ol style="list-style-type: none">1. Women's Running Shoes2. Foundation Makeup3. Soap Opera4. Sheet and Pillowcase Sets5. Single-Serve Coffee Capsules & Pods
Month	<ol style="list-style-type: none">1. March2. February
Day of the Week	<ol style="list-style-type: none">1. Sunday2. Saturday
Model Results	R-sq = 64.45% MAE = 1,252.09 MSE = 5,092,641.23

Optimized targeting for viewable Impressions

	<u>Approach 1</u>	<u>Approach 2</u>
Objective	Predicting features influencing impressions where some products were sold from views	Predicting features influencing impressions where there has been some clicks
Model Selection	Random Forest Regressor (better R-sq and less error) than Gradient Boosting	Random Forest Regressor (better R-sq and less error) than Gradient Boosting
Dataset Filter	<code>view_attributed_units_sold > 0</code> (blanks treated as 0)	<code>clicks > 0</code>
Target	Impressions	Impressions
Features	clicks, placement slot, targeting secondary, month, day	clicks, placement slot, targeting secondary, month, day

Optimized targeting for viewable Impressions

Feature Importance Results(In Decreasing order)

<u>FEATURES</u>	<u>Dataset with View attributed units sold > 0</u>	<u>Dataset with Clicks > 0</u>
Placement slot	Mobile App Mobile Web	Offsite Desktop
Targeting category: (Top 5)	1. Women's Running Shoes 2. Foundation Makeup 3. Soap Opera 4. Sheet & Pillowcase Sets 5. Home & Kitchen	1. Sheet and Pillowcase Sets 2. Women's Running Shoes 3. Kid's Electronics 4. Single-Serve Coffee Capsules & Pods 5. Foundation Makeup
Month	1. February 2. March	1. February 2. March
Day of the Week	1. Sunday 2. Saturday	1. Sunday 2. Saturday
Model Results	R-sq = 84.60% MAE = 733.30 MSE = 3,243,257	R-sq = 92.22% MAE = 542.57 MSE = 1,748,221



CLICKS

Optimal targeting for maximum Clicks: Approach

Objective:-

- Predicting important features influencing clicks

Model Selection:-

- **Model Used:** Gradient Boosting Regressor

Parameters used and Target variable:-

- **Filter criteria:** click are at least 1(58674 records)
- **Target:** Clicks
- **Features:** impressions, placement_slot, targeting_secondary, vertical, sub_vertical, month, day

Optimal targeting for maximum Clicks

<u>FEATURES</u>	<u>Feature Importance Results(In decreasing order)</u>
Placement slot	Offsite desktop Offsite mobile web
Targeting category:(Top 5)	1. Sheet and Pillowcase sets 2. Single-Serve Coffee Capsules & Pods 3. Pipe Fittings & Pipes 4. Golf Equipment 5. Bed Pillows & Positioners
Month	1. February 2. March
Day of the Week	1. Saturday 2. Sunday
Model Results	R-sq = 74.15% MAE = 1.22 MSE = 3.98

Key Insights: Top features for better reach

Below are the features to focus to maximize impressions and clicks based on previous approaches

Placement Slot

Offsite Desktop

Offsite mobile app

Targeting Categories

Impressions:

Women's Running Shoes
Foundation Makeup
Soap Opera
Sheet and Pillowcase Sets
Kid's Electronics

Clicks:

Sheet and Pillowcase sets
Single-Serve Coffee Capsules & Pods
Pipe Fittings & Pipes

Seasonality

Month:
March, February

Day of week:
Sunday and Saturday

NEW TO BRAND REACH

Maximizing “new to brand” reach: Approach

Objective:-

- Predicting 'New To Brand' reach through impressions where some NTB products have been sold

Model Selection:-

- **Models Used:** Random Forest and Gradient Boosting Regressor
- **Model Selected:** Random Forest Regressor (less error and better R-sq)

Parameters used and Target variable:-

- **Filter criteria:** ntb_view_attributed_units_sold is not ‘0’ and not in blank
- **Target:** ‘impression’
- **Features:** targeting_secondary, placement_slot, month, day

Maximizing “new to brand” reach

Feature Importance Results

<u>FEATURES</u>	<u>Feature Importance Results(In decreasing order)</u>
Placement slot	Offsite mobileapp Offsite mobileweb
Targeting category:(Top 5)	<ol style="list-style-type: none">1. Women's Running Shoes2. Foundation Makeup3. Sheet and Pillowcase Sets4. Home & Kitchen5. Oral Care Products
Month	<ol style="list-style-type: none">1. March2. February
Day of the Week	<ol style="list-style-type: none">1. Sunday2. Saturday
Model Results	R-sq = 79.24% MAE = 904.47 MSE = 4,553,859

OPTIMAL BIDDING

Optimal Bidding Strategy: Approach

Objective:-

- Predicting features for optimal bidding through maximum impressions with at least one click.
- Increased bidding on a combination of these top features based on importance and applied on Adjusted Cost to see difference

- **Model:** Random Forest Regressor
- **Filter criteria:** Click is > 0
- **Target:** Impressions
- **Features:** 'Clicks',
'targeting_secondary', 'placement_slot',
'month', 'day'

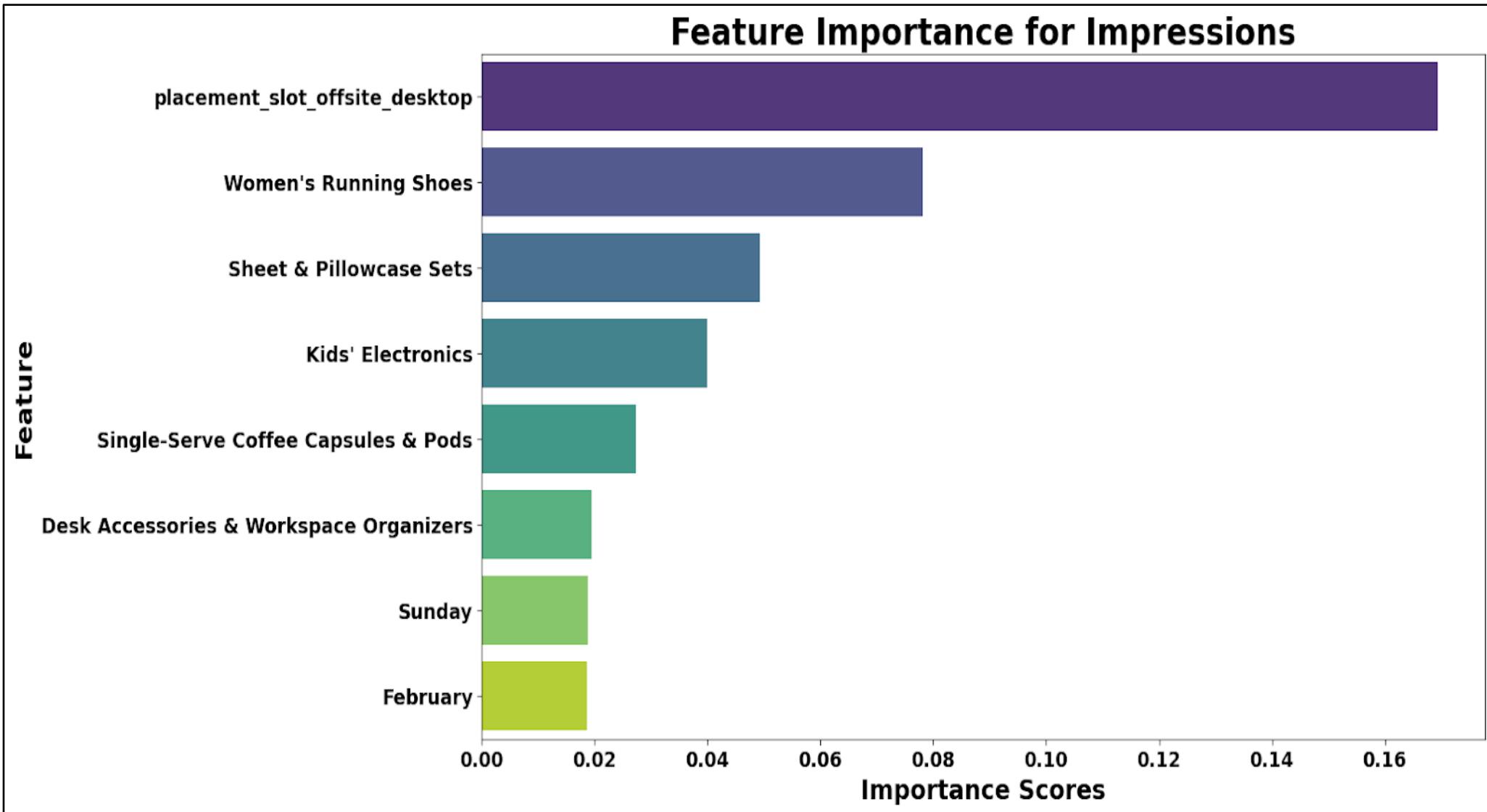
Results:

R-sq = 92.18 %

MAE = 542.57

MSE = 174,221

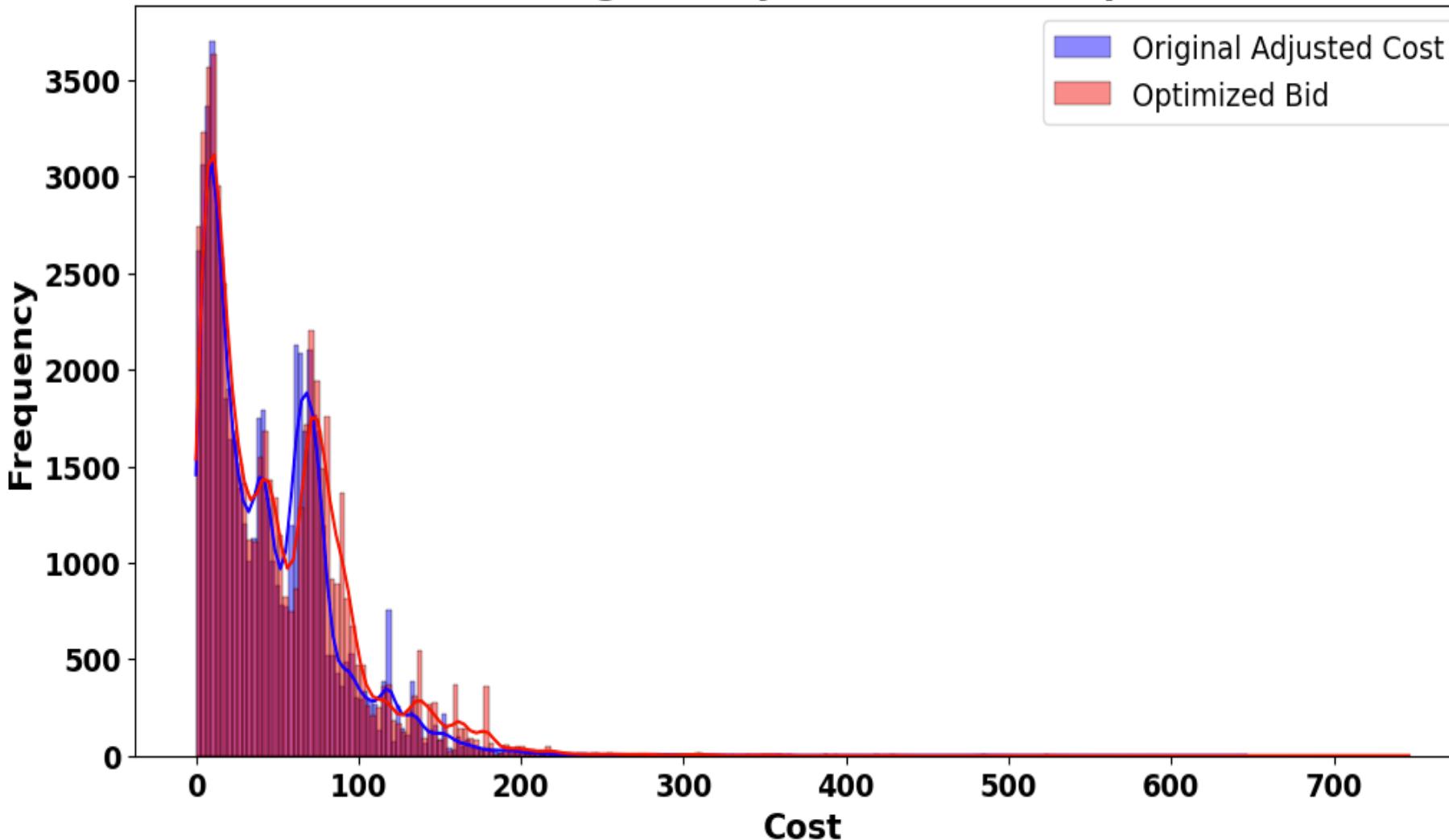
Features To Consider for Bidding



Note: For detailed analysis consider checking the documentation in Appendix

Bidding Strategy Implementation

Distribution of Original Adjusted Cost vs. Optimized Bids



- Incrementing Adjusted Cost based on feature Importance:
 - Placement Slot: +10% for offsite desktop
 - Top 5 Categories: +5%, 4%, 3%, 2%, 1%
 - Month: +5% for February
 - Day: +5% for Sunday



Thank you!
Q & A

Appendix

- Submitted document and code in Assignment to supplement this presentation.
- [Documentation link](#)