



# Customer Segmentation

Use of Unsupervised Learning Algorithms in  
Market Analysis

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# Agenda

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- Executive Summary
- Problem Statement
- Approach
- Process Flow
- Clustering Output
- Recommendations

# Executive Summary

Existing Trends	Customer Profiles	Campaign Design ○
<ul style="list-style-type: none"><li>• From 2013 to 2014, the following trends were identified:<ul style="list-style-type: none"><li>• Diminishing revenue (dipped by 61% from 2013 to 2014)</li><li>• Dropping customer acquisition (dropped by 47% from 2013 to 2014)</li><li>• Poor marketing campaign conversion rates</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Customer segmentation has been non-existent for this fine foods company</li><li>• Historically, the company has used ATL marketing activities, including:<ul style="list-style-type: none"><li>• Mass emails</li><li>• Outdoor advertising (billboards)</li><li>• Mass printed fliers</li></ul></li></ul>	<ul style="list-style-type: none"><li>• An unsupervised machine learning algorithm was utilized to identify 5 major customer segments:<ul style="list-style-type: none"><li>• 1. Budget –Conscious Shoppers</li><li>• 2. Wine Connoisseurs</li><li>• 3. Cooking Enthusiasts</li><li>• 4. Convenience Seekers</li><li>• 5. Foodie Adventurers</li></ul></li></ul>



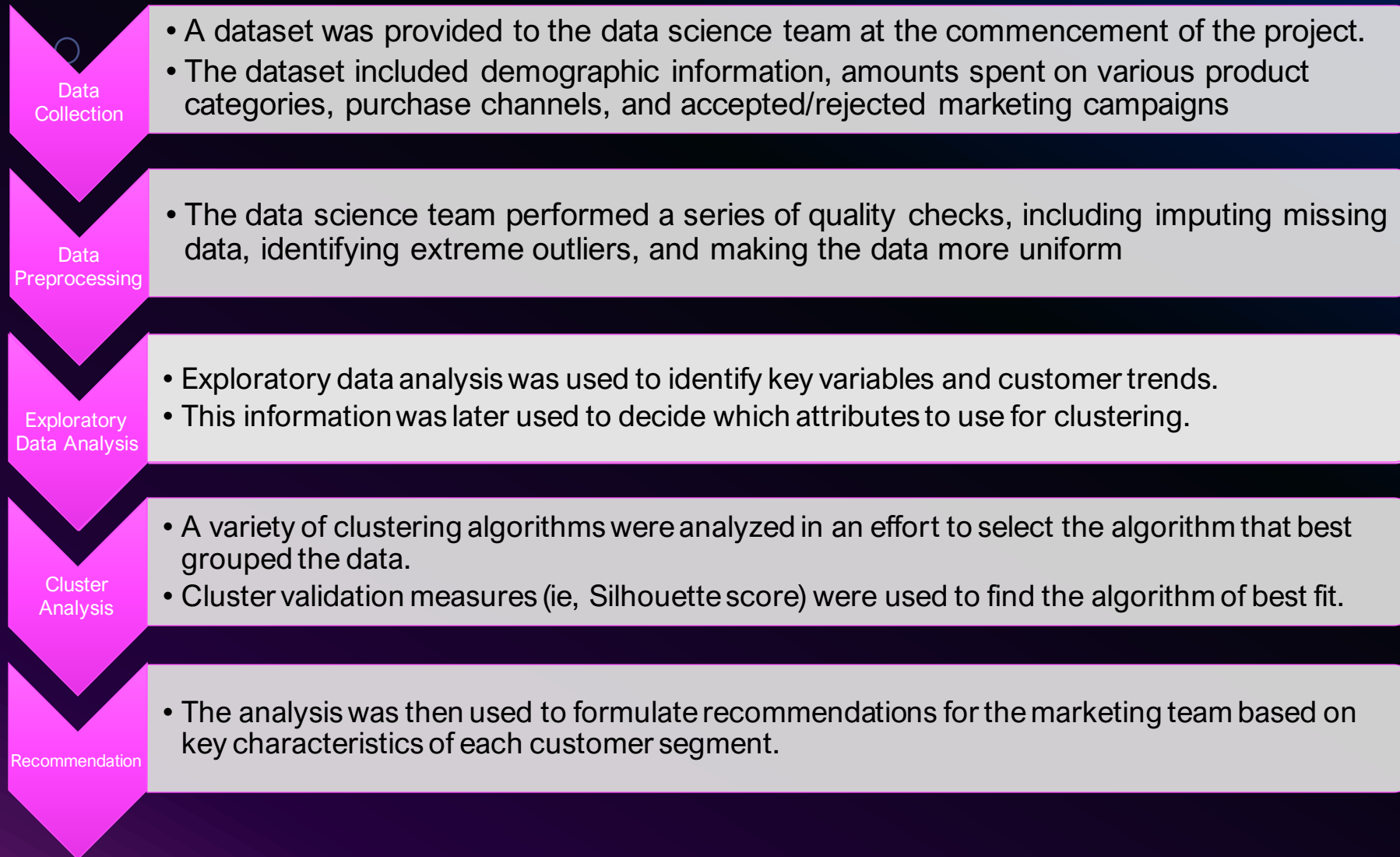
# Problem Statement

Our fine foods market aims to improve customer acquisition, retention, and revenue for the next fiscal year by employing customer segmentation and personalized marketing campaigns for existing customers.

Current State	Gap	Future State
<ul style="list-style-type: none"><li>• Our fine foods store specializes in a variety of fresh meats, fruits, sweets, wines and gold products. We currently have about 2,240 registered customers who purchase items in store, online and via catalog.</li><li>• Both revenue and customer acquisitions rose from 2012 to 2013 and dropped from 2013 to 2014<ul style="list-style-type: none"><li>• Revenue sunk from 2013 to 2014 by 61.8%, from \$715,425 in 2013 to \$273,294 in 2014.</li><li>• Customer acquisition dipped from 1189 to 558 from 2013 to 2014, respectively</li></ul></li><li>• Campaign conversion rates reveal conversions from the past 5 campaigns to be around 5.6%, which is less than the recommended 10%-11.45% that some marketing consultants recommend (Berry).</li></ul>	<ul style="list-style-type: none"><li>• Customer segmentation has been non-existent for the company, but with the advent of machine learning and personalized marketing strategies currently employed by competitors, it has become necessary to utilize the same technology to stay afloat in today's competitive marketplace.</li></ul>	<ul style="list-style-type: none"><li>• Customer segmentation and personalized marketing have been reported to grow revenue by 6-7 times. We will use customer segmentation and personalized marketing to achieve our goals for the next fiscal year, which are:<ul style="list-style-type: none"><li>• Increase customer campaign conversions by 5%-7%</li><li>• Increase customer retention by 5%</li><li>• Increase revenue by 10%-15%</li></ul></li></ul>

# Process Flow

The data science team utilized a five-step process to identify customer segments for the fine foods market.



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## Data Collection

A dataset was provided to the data science team at the commencement of the project. The dataset included demographic information, amounts spent on various product categories, purchase channels, and accepted/rejected marketing campaigns

## Data Preprocessing

The data science team performed a series of quality checks, including imputing missing data, identifying extreme outliers, and making the data more uniform

## Exploratory Data Analysis

Exploratory data analysis was used to identify key variables and customer trends. This information was later used to decide which attributes to use for clustering.

## Cluster Analysis

A variety of clustering algorithms were analyzed in an effort to select the algorithm that best grouped the data. Cluster validation measures (ie, Silhouette score) were used to find the algorithm of best fit.

## Recommendation

The analysis was then used to formulate recommendations for the marketing team based on key characteristics of each customer segment.

# Cluster Output

The K-Medoids clustering algorithm was the least sensitive to outliers and produced the most compact segments observing the highest silhouette score.

Clustering Algorithm	Definition	Number of Segments	Silhouette Score
K-Means	A clustering method that aims to group a dataset into a selected number of clusters, where each data point belongs to a different group with the nearest mean.	5	0.328
K-Medoids	A variation of K-Means that uses the most centrally located data points (“medoids”) instead of the means for cluster representation. It is less sensitive to outliers than K-Means.	5	0.339
Hierarchical Clustering	Agglomerative clustering method that creates a hierarchy of clusters by using a dendrogram to iteratively merge or divide clusters until a hierarchy is formed.	5	0.312
Density Based Spatial Clustering (DBSCAN)	Clustering method that groups together data points that are close to each other and have a sufficient number of nearby neighbors. Excellent for data with arbitrary shapes and lots of noise.	5	0.177
Gaussian Mixture Model (GMM)	“Soft” clustering method that uses a Gaussian distribution to identify a customer’s probability of belonging to one cluster.	5	0.102

# Key Characteristics of Customer Segments

Customer Segments		Demographic Averages			Purchase Averages		Purchase Channel Preferences	
Segment #	Segment Name	Age	Income	Family Size	Total # of Purchases	Purchase Amount	Product Most Purchased	2nd Most Preferred Channel
0	Budget-Conscious Shoppers	45	\$33,631	2.9	9	\$12.44	Gold	Web
1	Wine Connoisseurs	48	\$77,802	1.8	1778	\$92.91	Wine	Catalog
2	Cooking Enthusiasts	50	\$69,836	2.2	1145	\$54.84	Most Goods	Web
3	Convenience Seekers	46	\$37,434	2.9	97	\$10.82	Gold	Web
4	Foodie Adventurers	50	\$58,281	2.7	611	\$30.62	Fish	Web



# Customer Personas

Based on key characteristics of customer segments, the data science team has created personas for each segment This will help give marketing an idea of who they are targeting.

## Budget-Conscious Shoppers:

Low-income parents who appreciate fine foods but who can't afford fine foods without deals

## Cooking Enthusiasts:

Empty-nesters with just enough money to spend on ingredients to satisfy any hobby-chefs cooking dreams

## Wine Connoisseurs:

Wealthy, childless couples who enjoy (and can easily afford) fine foods, especially wines

## Convenience Seekers:

Busy parents who seek markets in which they can purchase items for the whole family rather than items only mature palettes would enjoy

## Foodie Adventurers:

Always on the hunt for fresh meats and exotic fruits, these middle-aged parents seek deals so they can enjoy fine foods without blowing the budget



# Recommendations

Customizing both marketing content marketing medium may help the company to achieve the desired future state

## Budget-Conscious Shoppers

Marketing Content: Deals & discounts on wine, meats, and gold products

Marketing Medium: Internet advertisements, ie, advertisements on the market's website or social media ads

## Wine Connoisseurs

Marketing Content: New wines and high-end meats

Marketing Medium: Printed advertisements, such as mailers or ads in the newspaper

## Cooking Enthusiasts

Marketing Content: Wines, meats, fish, and fruits and discounts on these items.

Marketing Medium: Both internet advertisements and printed advertisements

## Convenience Seekers

Marketing Content: Easy-to-prepare foods for the whole family to enjoy

Marketing Medium: Internet advertisements

## Foodie Adventurers:

Marketing Content: New, different, or adventurous wines, meats, fish, fruits and sweets

Marketing Medium: Internet advertisements



# Q&A

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# Thank you

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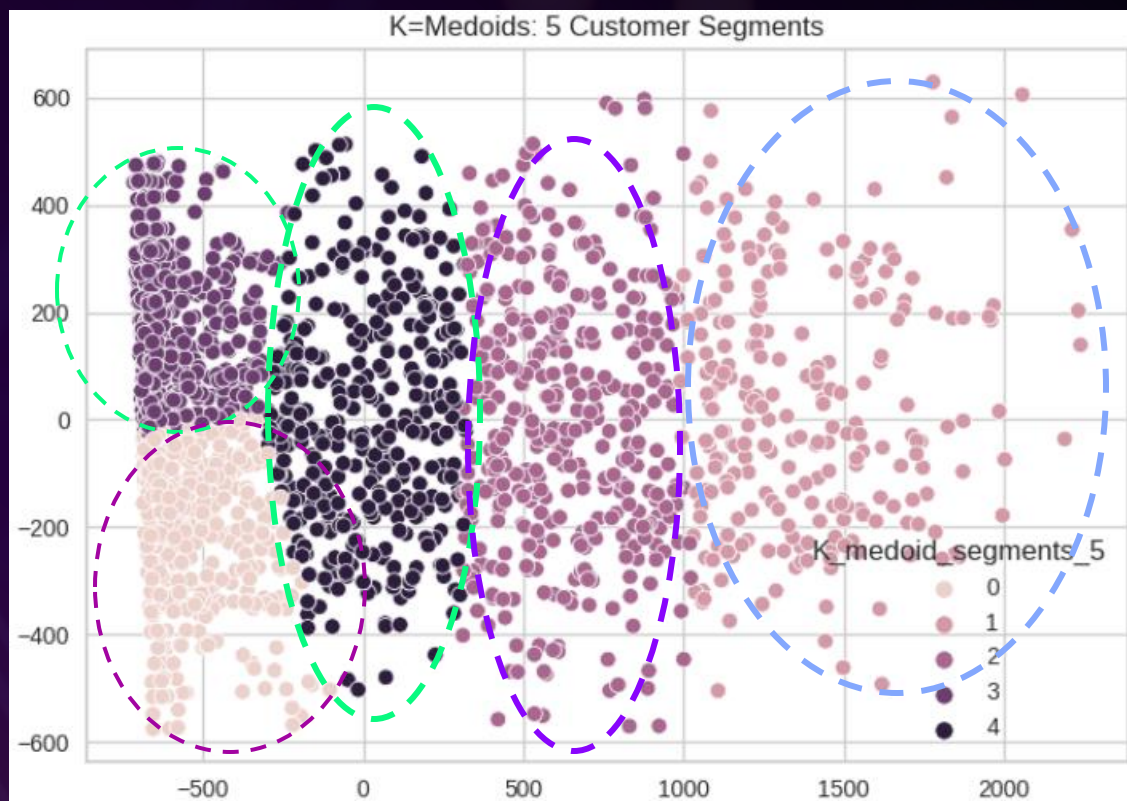


# Appendix

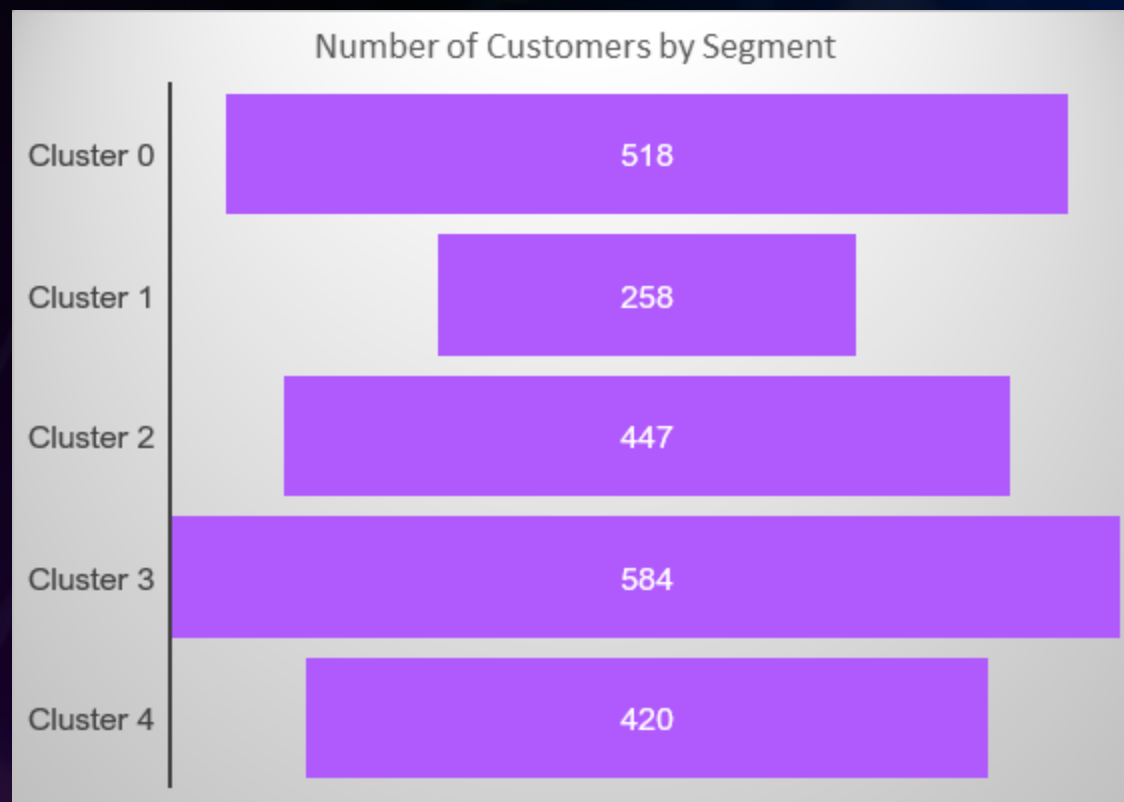
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# Cluster Output

K-Medoids Cluster Output: 2D Plot



Funnel Chart Depicting # of Customers



# Works Cited

Berry, Sarah. "What Is a Good Conversion Rate? (And How Does Yours Compare?)." WebFX, 6 April 2023, <https://www.webfx.com/blog/marketing/what-is-a-good-conversion-rate/>. Accessed 3 December 2023.