

The background features a dark blue to purple gradient. Overlaid on this are several concentric circles of varying sizes and colors (white, light blue, and purple). A network of small, light blue dots is scattered across the background, with some dots connected by thin, faint lines, suggesting a data network or a complex system.

# Customer Segmentation

## Use of Unsupervised Learning Algorithms in Market Analysis

Susannah Bear Garlid

# Agenda

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



# Executive Summary

Existing Trends	Customer Profiles	Customer Segments for Future Marketing Activities
<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>

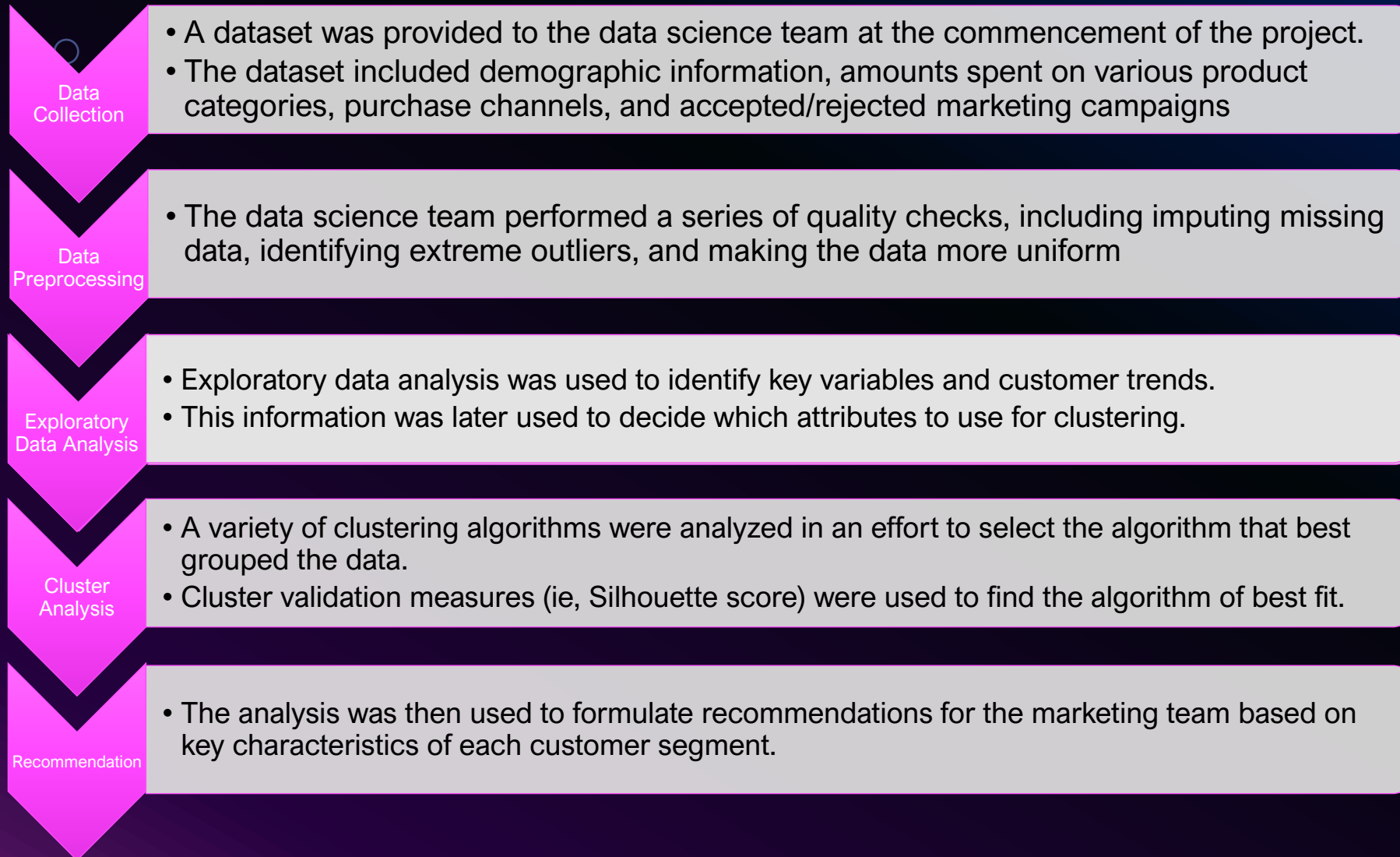
# Problem Statement

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 market specializes in a variety of fresh meats, fruits, sweets, wines and gold products. In 2014, there were 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.



Scientific findings

# 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
<b>K-Means</b>	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
<b>K-Medoids</b>	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
<b>Hierarchical Clustering</b>	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
<b>Density Based Spatial Clustering of Applications with Noise (DBSCAN)</b>	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
<b>Gaussian Mixture Model (GMM)</b>	“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

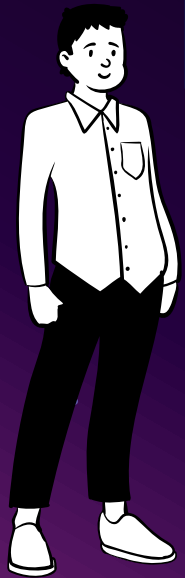


# Customer Personas

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



Scientific findings

## Cooking Enthusiasts:

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

## 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

## Wine Connoisseurs:

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





# 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: Website and Email Marketing

## 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



# Recommendations

Estimated costs of advertising to different segments

Segment #	Segment Name	# of Customers in Segment	Medium 1	Medium 2	Cost of Medium 1	Cost of Medium 2	Advertising Cost Per Segment Per Campaign (Both Mediums Included)
0	Budget-Conscious Shoppers	518	Website (Google Display Ads)	Email Marketing	\$0.67	\$0.04	\$367.78
1	Wine Connoisseurs	258	Magazine	Direct Mail	\$1.00	\$0.50	\$386.17
2	Cooking Enthusiasts	447	Email Marketing	Direct Mail	\$0.04	\$0.50	\$241.38
3	Convenience Seekers	584	Website (Google Display Ads)	Email Marketing	\$0.67	\$0.04	\$414.64
4	Foodie Adventurers	420	Website (Google Display Ads)	Email Marketing	\$0.67	\$0.04	\$298.20
Total Cost							\$1,708.17

# Q&A

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The background of the slide is a dark blue to purple gradient. It features several concentric circles of varying sizes and colors (white, light blue, and dark blue) that create a sense of depth and movement. There are also small, bright white dots scattered across the background, resembling a starry field or a digital network. The overall aesthetic is modern and tech-oriented.

# Thank you

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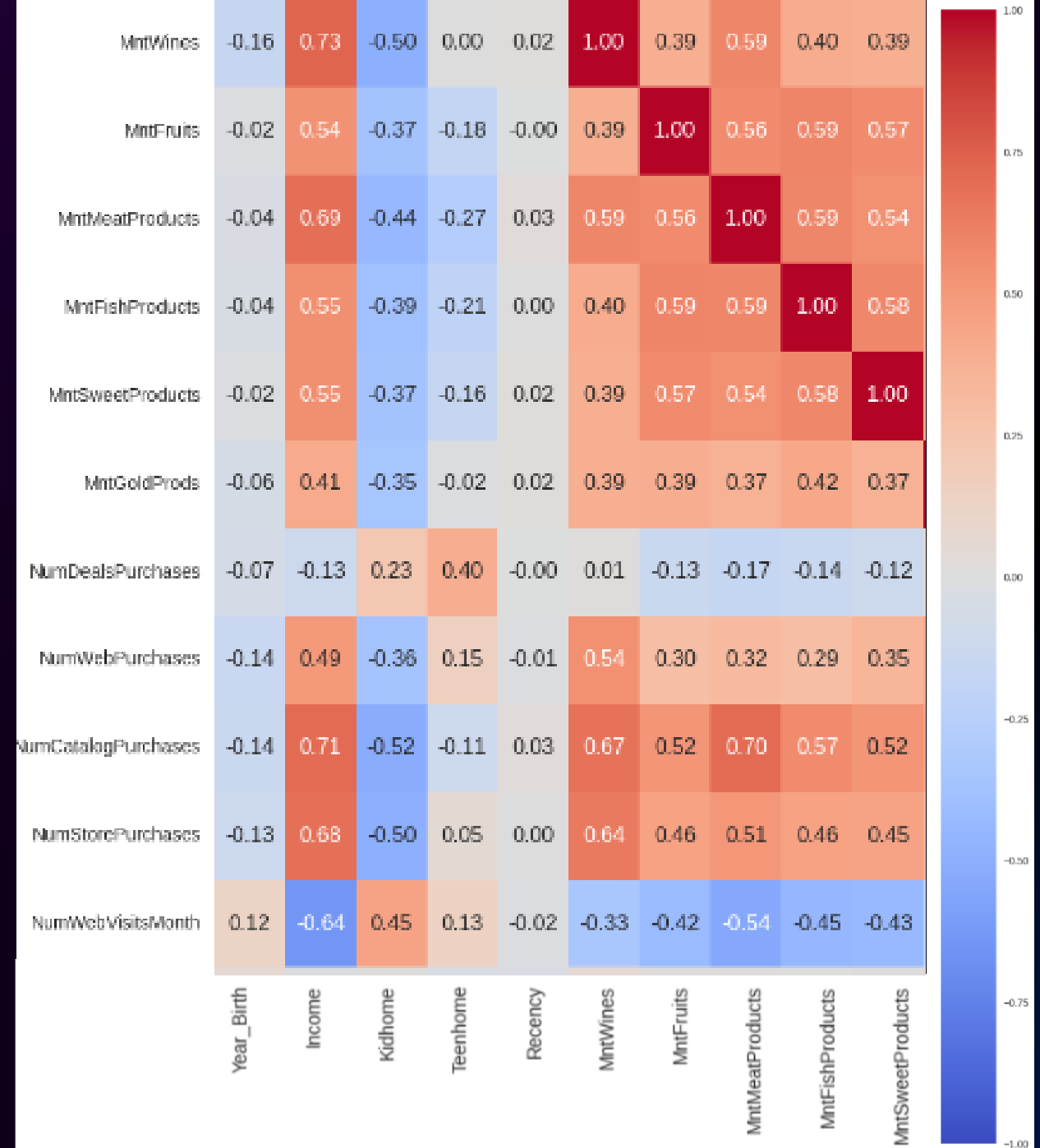


# Appendix

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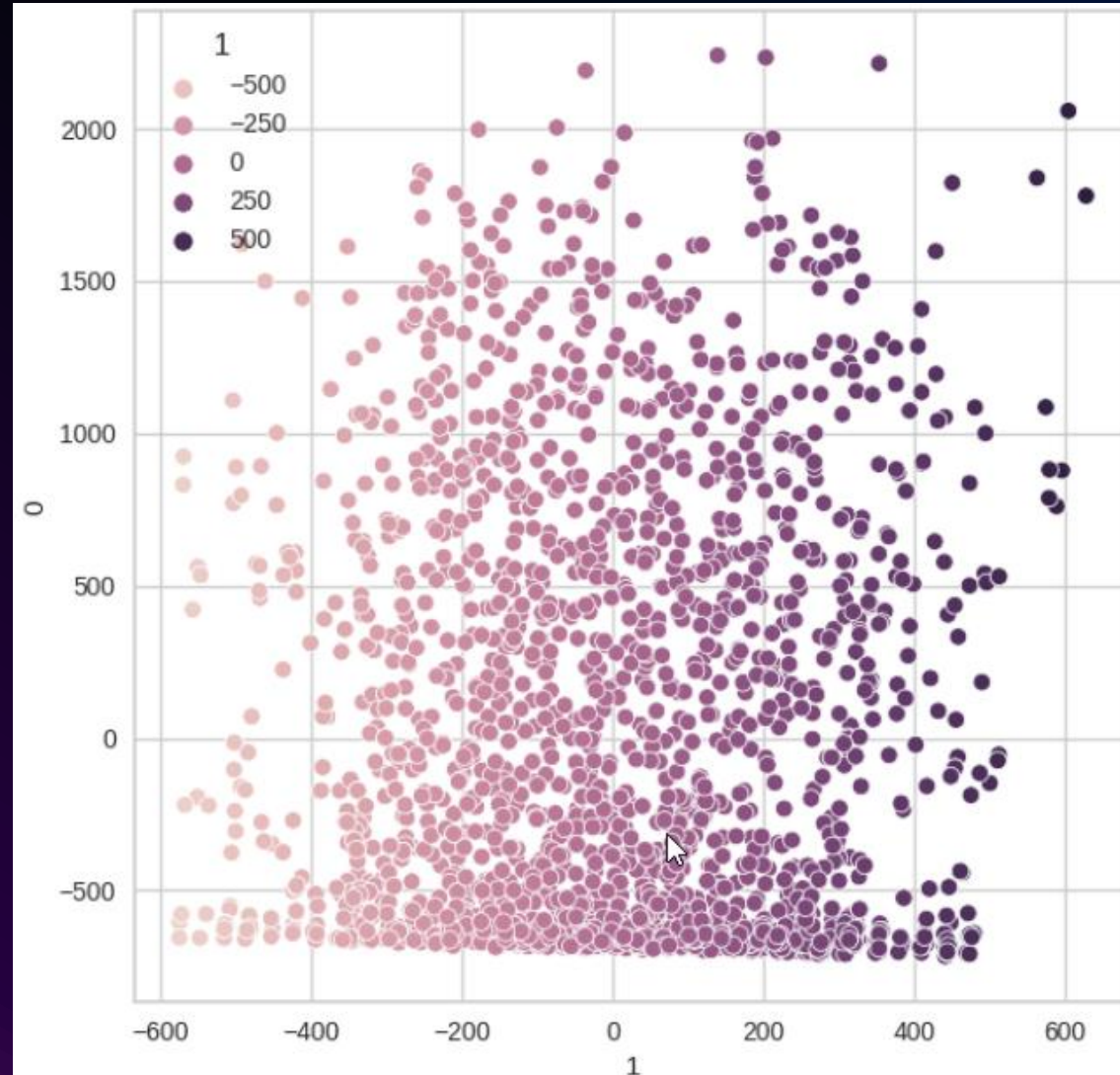
# Bivariate Analysis

The graphic on the right shows a portion of the correlation matrix for numeric features. We see strong positive correlations between amount spent on wine and meat, income and amount spent on products, etc. We also see negative correlation between Kidhome and amount spent on items, particularly wine.



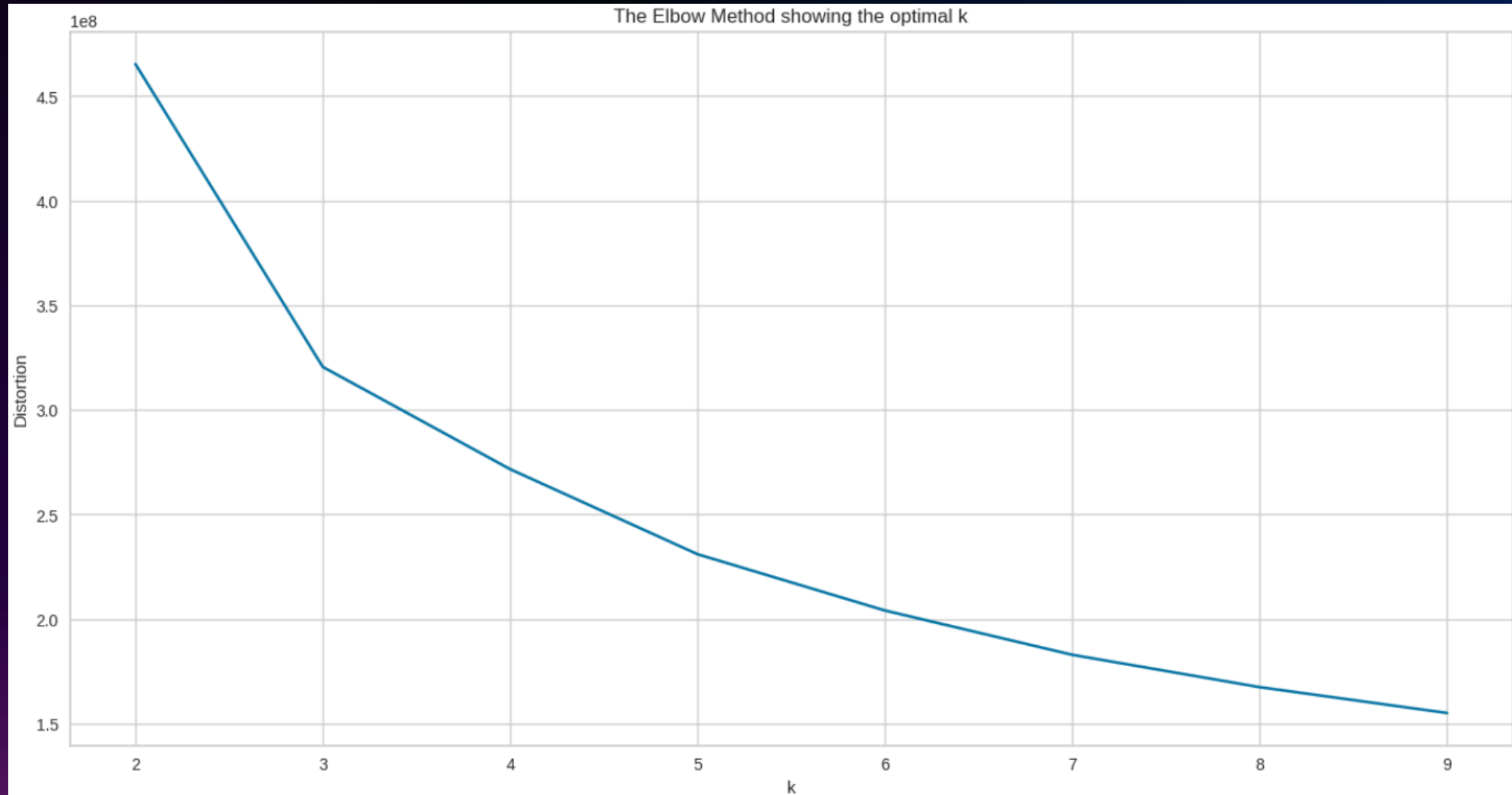
# Principal Component Analysis

2D Scatterplot of the first two principal components after performing PCA



# Elbow Method

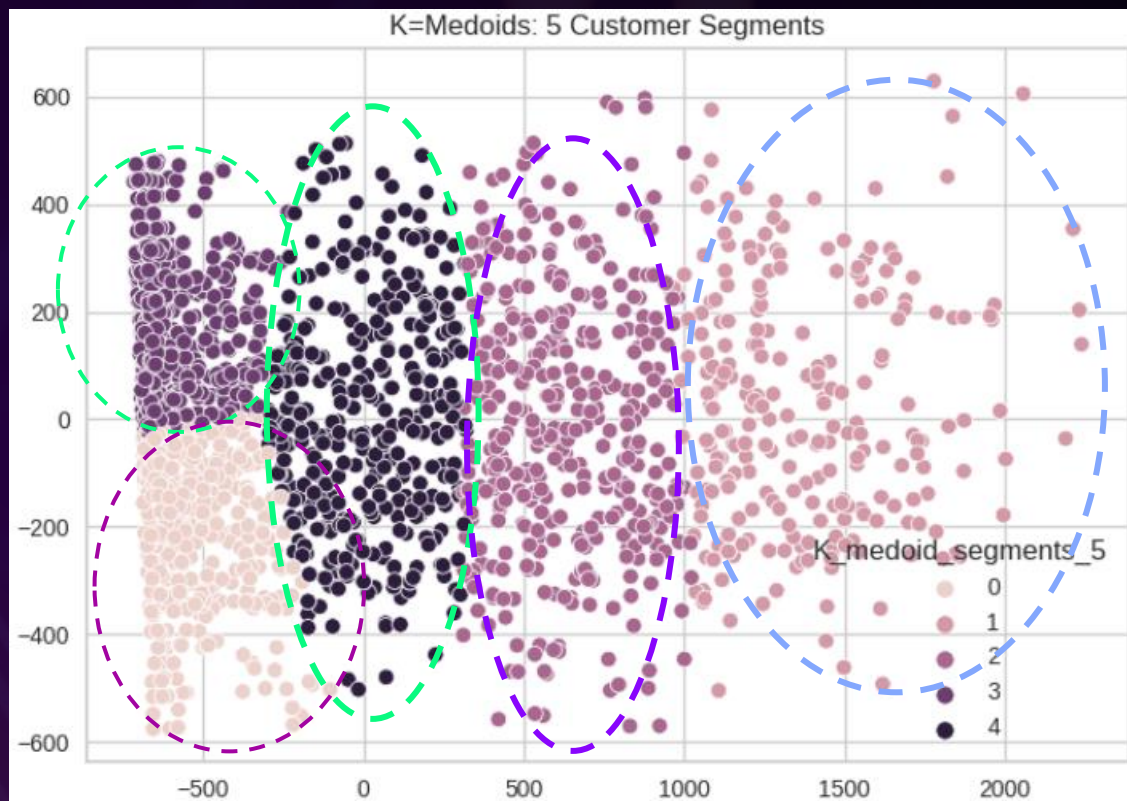
Identifying the optimal number of clusters in K-Means



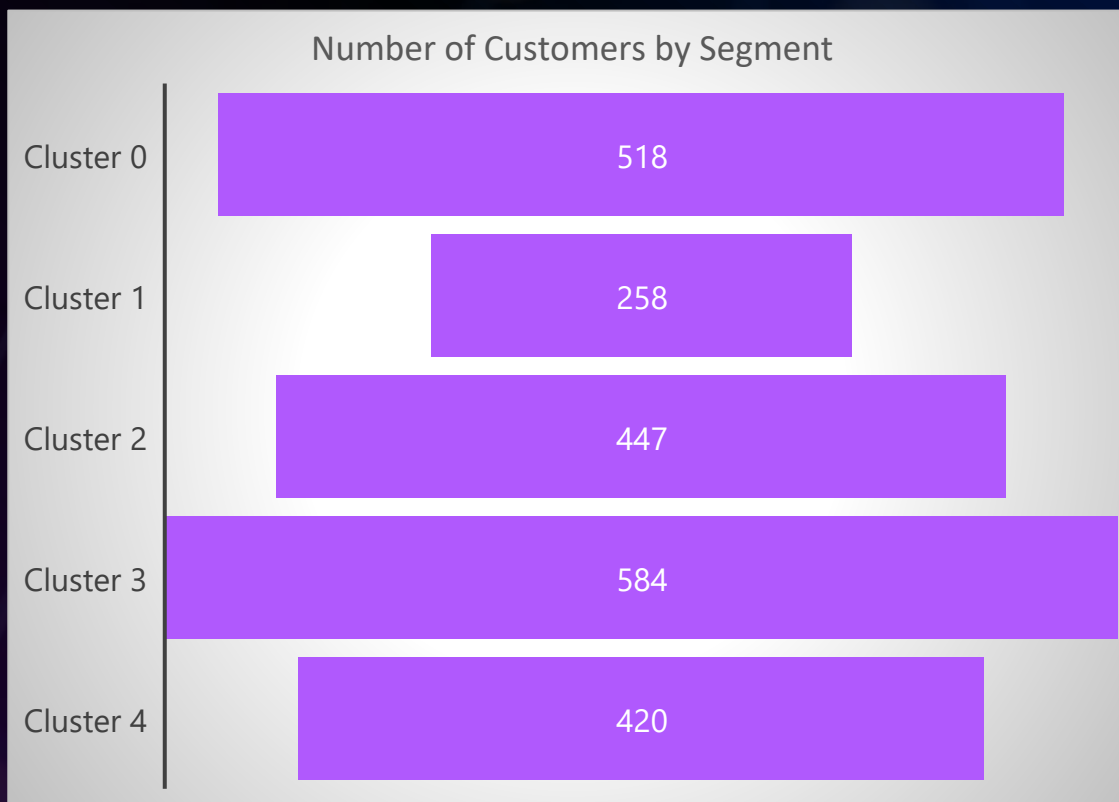


# Cluster Output

K-Medoids Cluster Output: 2D Plot



Funnel Chart Depicting # of Customers



# Works Cited

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