

# Segmentation Modeling

## *Deepen Customer Understanding*

There is an infinitely wide gamut of human behavior, interests and characteristics to account for as a modern business operating in the online marketplace. To understand consumers, there are tools that exist to “ballpark” the kind of people visiting your site, clicking ads, and buying products. However, the relevancy of these broad consumer categorizations is largely abstract making it difficult to extract meaningful business insights.

Segmentation modeling, or more specifically cluster analysis via unsupervised machine learning, answers the exact consumer grouping questions relevant to your business needs. Given performance metrics, consumer characteristics, or key performance indicators the analysis can determine the naturally occurring groups that appear within the data, allowing a more nuanced view of the market landscape. The resulting analysis provides straightforward and pertinent information that allows media professionals and business executives the necessary insight to grow market share and boost sales.

The objective of this document is to provide an overview of cluster analysis, the benefits it provides, and the potential use cases of segmentation modeling in a marketing context.

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## Applications & Benefits

The science behind segmentation is powerful and can be broadly applied to many business scenarios. Some of these applications include:

- Given media and sales performance metrics, cluster analysis can determine the types of customers that bring value, and those that don't.
- Presented with personal characteristics such as location, age, interest, and key performance indicators, clustering can determine the exact kind of customer that presents the biggest opportunities for growth and identify core customer groups.
- Advanced applications include using natural language processing outputs in conjunction with media metrics to determine the value of search keywords. Providing significant value to both paid and organic search professionals.

Cluster analysis can allow media professionals to quickly identify key target markets, and recognize areas of opportunity for continued prospecting, thereby advancing the success of initiatives aimed at growing aspirational consumer segments over time. Segmentation can reduce waste by focusing on the most valuable customers and improving LTV and consumer valuation metrics.

The resulting customer value allocations can be applied to CRM and media data alike, to precisely inform business and media professionals of their customer base. Furthermore, keyword data can be used pinpoint high value SEO keywords and improve organic site performance. Anticipation and proper prediction of consumer purchasing behavior can inform optimal design of promotional offers and targeting, accelerating consumer value enhancement strategies.

In short, the ability to properly classify customers based on the data they produce can lead to new insight, efficiencies and numerous positive externalities that come with a deeper understanding of a customer base.

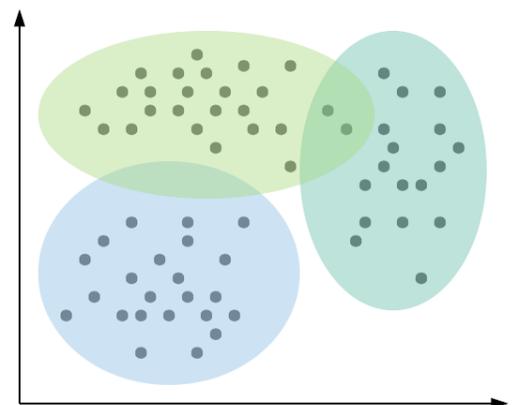
*“Anticipation and proper prediction of consumer purchasing behavior can inform optimal design of promotional offers and targeting, accelerating consumer value enhancement strategies.”*

## Cluster Analysis

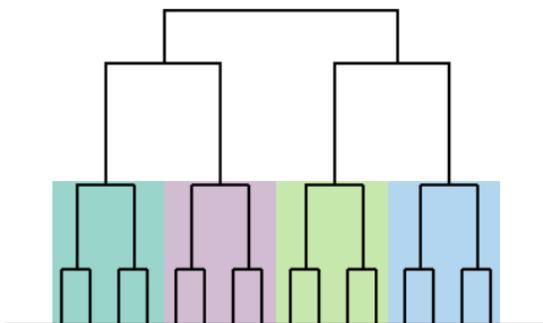
Segmentation is the ability to identify similar types of customer groups based on their individual characteristics. The various modeling methods aim to have customers within groups be as similar as possible, while the characteristics between groups to be as dissimilar as possible. The ability to properly identify customer segments can result in increased budget efficiencies, consumer opportunities, and insight to inform hyper-targeted marketing initiatives. There are two methods to accomplish this via unsupervised machine learning: k-means and hierarchical clustering.

**K-means** begins by selecting all the variables of interest and putting them into a multi-dimensional space, where each resulting data point perfectly represents its relationship to all other variables. Our team of data scientist then determines the number of groups that best explains the data with the fewest amount of clusters needed. Some tuning and normalization may then be necessary to properly determine groups of data. This gives proper cluster analyses the reputation of being as much of an art as a science.

**K-Means Cluster Analysis**



**Hierarchical Cluster Analysis**



**Heirarchical clustering** takes an entire set of variables to be clustered, assigning each variable to its own cluster. Then, based upon similarity, it begins to merge similar clusters in a heirarchical nature until it becomes one single cluster. The results are visualized and determined via a dendogram (*left*). Heirarchical clustering also works backwards from one to many clusters based on dissimilarity.

K-means and heirarchical clustering each have their own strengths and weaknesses. K-means has an oversensitivity to outliers, while heirarchical clustering can be more difficult to determine where exact splits need to be made. Nevertheless, both analyses do a fantastic job of classifying messy data in a way that grows in accuracy as the algorithm encounters more information, which is the essence of machine learning.

## Analysis Delivery & Next Steps

Our streamlined process involves a requirements gathering session for our team gain an understanding of media practices, technology capabilities and data resources. Segmentation modeling is initially delivered on an ad hoc basis with a full report and analysis presentation. During which, we will discuss the actionable insights and the business case for automated reporting of the machine learning results into the future.

## Contact Us

Schedule Requirements Session:

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Learn More:

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## About Us

We are a team of data science professionals focused on superlative computational mathematics and advanced data product solutions. The sole intention of our work is to serve our clients with actionable insight and honest transparency using genuine scientific practices.