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Methodology statement: 2025 ArcGIS Tapestry

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Introduction

ArcGIS Tapestry is the third generation of Esri's geodemographic segmentation system, designed to classify almost 240,000 U.S. neighborhoods at the census block group level. These neighborhoods are grouped into 12 summary, or LifeMode, groups, which are then further classified into 60 distinct segments to create a model of lifestyle and life stage classifications.

This system integrates the latest demographic, socioeconomic, market preference, and consumer behavior information to present in-depth profiles for each segment. Neighborhoods with the most similar characteristics are grouped together, while neighborhoods with divergent characteristics are separated.

The Tapestry segmentation model is designed to differentiate segments along multiple dimensions, including population characteristics, household economics, housing type, and location attributes. The model is suitable for a variety of applications including but not limited to consumer marketing, site selection, audience targeting, and analytical efficiency.

Methods

Tapestry combines traditional statistical techniques of cluster analysis with data mining methods to segment U.S. neighborhoods. Data sources include Esri Updated Demographics, the 2020 decennial census, the American Community Survey, and national consumer surveys from MRI-Simmons. These surveys include responses to over 4,000 products, services, and behaviors across more than 40 categories, including consumer products, finance, media, internet usage, psychographics, restaurants, and more.

Esri employs partitioning methods that assign observations in a dataset directly to clusters, with each iteration updating the mean of data points (or centroid) in the cluster. It is the design of initial clusters that determines the outcome of the model. Initial clusters or seeds can be randomly assigned or pre-determined. In lieu of depending on randomization to choose the final array of starting values, Esri conducts a multistage clustering approach to establish initial seeds. This proprietary method for seed selection builds robust starting values that minimizes the influence of outliers.

The Tapestry model employs the partitioning algorithm of k-means clustering, where k represents the number of clusters, and then uses Euclidean distance to measure the similarity between clusters and data points. The challenge in using a k-means approach is selecting the value of k. This is where an a posteriori discovery process is used. The review of summary statistics generated from Monte Carlo simulation models helps identify a range of k values that should be tested given the structure and dimensionality of the dataset.

Segmentation process

Each decade, the variable selection process begins with Esri's demographers reviewing descriptive statistics and correlation matrices to explore relationships in the data, identify outliers, and evaluate variables that need standardization. Principal component analysis (PCA) is conducted to create a set of uncorrelated variables that retain most of the variation in the data.

Selection of the variables used to identify segments begins with data that include household and housing characteristics such as family type, income, relationships (married, multigenerational), tenure, home value or rent, and type of housing (single-family, apartment, townhouse, or mobile home) as well as population traits such as age, sex, education, employment, and marital status.

To maintain stability with previous generations of Tapestry and to capture recent sociodemographic shifts, Esri's list of input variables captures a broad range of demographic, socioeconomic, housing, and locational statistics. This approach combines historically effective inputs with new variables to account for technology usage, insurance and benefits profiles, and more narrowly defined household structures and home values.

Several iterations of the model are run, varying the data inputs and incrementing the number of segments to establish the most stable solution. The optimum solution is selected based on the stability and quality of resulting clusters rather than attempting to force a specific number of segments.

Esri employs several methods to assess a solution's viability, including Canonical Discriminant Analysis, which evaluates the within-cluster and between-cluster dispersions and exploratory data analysis to quantify the differences in solutions. In addition, stability is gauged against the previous generation of Tapestry; equipped with the knowledge that most neighborhoods do not change significantly over time and accounting for demographic churn, it is expected that many of the previous segments are still valid in the new system.

For the current generation of Tapestry, variable selection was narrowed to about 80 attributes to identify and cluster U.S. neighborhoods into 60 segments. An additional cluster is identified as unclassified and captures areas with few or no households; these areas tend to be business districts, unpopulated areas, or those with large group quarters populations.

Validation

Esri takes both qualitative and quantitative approaches to validate the effectiveness of the ArcGIS Tapestry segmentation system. The verification process ensures segment validity by examining the full set of sociodemographic characteristics beyond those used in generating the segments. Crossreferencing of this data with consumer behaviors and attitudes data ensures stability in the linkage of two independent sources of predictive behaviors. Esri adapts statistical bootstrapping techniques commonly used for marketing applications to assess the performance of Tapestry to differentiate consumers.

LifeMode groups

For a broader view of consumer markets, the 60 residential segments are combined into [12 LifeMode groups](#) (with an additional segment/group identified as unclassified) established with a k-means clustering process with key measures of lifestyle and life stage as inputs. Adjustments are made to the resulting groups to ensure minimum and maximum group size criteria are met.

To further aid in analysis and understanding, LifeMode groups can also be categorized into three broader [LifeStage groups](#) defined by age milestones and life phases: Contemporary Households, Family Portraits, and Mature and Retired Living. LifeMode groups are not comparable to the previous generation of Tapestry.

Segment profiles

Once segments are established, a comprehensive review of each segment is conducted to understand and describe the characteristics of the residents and the neighborhoods they live in. Esri employs an analytical approach that evaluates thousands of data points from various sources to build detailed profiles for each segment. Descriptive statistics capturing demographics, socioeconomic status, housing information, geographic location, and consumer preferences are compared against U.S.-level data and similar segments to highlight the most prominent and unique features of each segment.

To provide users with additional objective insights about each segment, Esri provides segment-level data on hundreds of sociodemographic and housing characteristics. The incorporation of annually updated segment-level data ensures a current representation of segment characteristics for analytical purposes. Similar analyses and descriptions are also created for LifeMode groups.

For more information, including profiles and descriptive statistics for Tapestry segments and LifeMode groups, see [Introduction to LifeMode groups](#).



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