

Advanced Market Segmentation Using Deep Clustering

1. Start

Begin the segmentation process.

2. Data Collection

Gather raw customer data from various sources:

- CRM Systems
- Website/App Analytics
- Social Media
- Transaction Records
- Surveys

3. Data Preprocessing

- Data Cleaning: Handle missing values, remove duplicates/outliers
- Data Transformation: Normalize, one-hot encode
- Feature Engineering: Derive meaningful variables like average spend or visit frequency

4. Dimensionality Reduction (Optional)

Reduce complexity while preserving data structure:

- PCA
- t-SNE
- Autoencoders

5. Deep Feature Extraction

Use deep learning models to extract high-level features:

- Autoencoders
- CNNs (image data)
- RNNs (sequence data)

Output: Latent representations of customers

6. Clustering on Deep Features

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Cluster the deep features using:

- K-Means, DBSCAN, GMM
- Deep Clustering: DEC, DeepCluster, IDEC, VaDE

7. Evaluate Cluster Quality

Assess using:

- Silhouette Score
- DaviesBouldin Index
- Elbow Method

8. Label and Interpret Segments

Analyze and assign labels to each segment:

- Define personas
- Interpret dominant characteristics

9. Business Application

Apply segmentation results:

- Personalized Campaigns
- Product Recommendations
- Customer Retention Strategies

10. Monitor & Refine Model

Continuously improve the system:

- Collect new data
- Retrain models
- Adjust based on business feedback

11. End

Segmentation cycle complete. Use outputs for business strategies.