

1. Customer Segmentation (Personalized Targeting 🎯)

👉 **Goal:** Group customers based on behavior, demographics, and engagement for better ad targeting.

♦ Approach:

- **Clustering (K-Means, DBSCAN, Hierarchical Clustering)** – To segment users based on common attributes.
- **RFM Analysis (Recency, Frequency, Monetary Value)** – To identify high-value customers.
- **Autoencoders & Variational Autoencoders (VAEs)** – For high-dimensional behavioral data segmentation.

♦ Impact:

- ✓ Personalized ad campaigns → Higher conversion rates
 - ✓ Budget optimization → Reduce ad spend waste
 - ✓ Improve retention strategies → Target the right audience
-

2. Sentiment Analysis (Understanding Customer Reactions 💬)

👉 **Goal:** Analyze customer feedback, reviews, and social media sentiment to improve marketing strategies.

♦ Approach:

- **Lexicon-Based Analysis (VADER, TextBlob)** – For quick polarity classification.
- **Traditional NLP Models (TF-IDF + SVM, Naïve Bayes)** – For basic sentiment classification.
- **Deep Learning (LSTMs, BERT, GPT Models)** – For contextual sentiment understanding.
- **Aspect-Based Sentiment Analysis (ABSA)** – To detect sentiment on specific ad components (e.g., price, design).

♦ Impact:

- ✓ Understand customer sentiment → Improve ad messaging
 - ✓ Real-time feedback on campaigns → Adapt & optimize in real-time
 - ✓ Brand reputation management → Detect negative trends early
-