Customer Segmentation for E-commerce

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Course: Data Mining and Warehousing

# 1. Introduction

Customer segmentation is a powerful technique that enables e-commerce businesses to group customers based on purchase behavior, demographics, and browsing history. This segmentation allows companies to tailor marketing strategies, provide personalized product recommendations, and improve customer satisfaction.

# 2. Problem Statement

Implement a system that clusters customers based on their behavior and demographics to provide personalized product recommendations.

# 3. Objective

- Group customers into clusters using data mining techniques  
- Analyze customer trends using clustering  
- Offer personalized product recommendations  
- Visualize the clustering result for business insights

# 4. Technologies Used

- Programming Language: Python  
- Libraries: pandas, scikit-learn, seaborn, matplotlib, streamlit  
- Algorithms: K-Means Clustering, Cosine Similarity, Minkowski Distance  
- Tools: VS Code, Streamlit for UI

# 5. System Workflow

1. Upload CSV file containing customer data  
2. Preprocess the data (e.g., encoding, scaling)  
3. Apply K-Means Clustering  
4. Visualize clusters and display similarity matrix  
5. Show recommendations based on cluster  
6. Option to download segmented data

# 6. Results and Outputs

The system successfully groups customers and provides personalized recommendations. Interactive visualizations and download options help business analysts extract meaningful insights.

# 7. Conclusion

This project demonstrates the power of clustering algorithms for e-commerce applications. By identifying customer segments, businesses can design better marketing campaigns, enhance user experience, and boost sales.

# 8. Future Scope

- Add prediction for new customers  
- Integrate real-time user tracking  
- Enhance UI with dashboards and analytics  
- Use Deep Learning for behavior analysis