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ANALYSIS AND AI-ML / SCIKIT-LEARN PROJECT

E-Commerce Product Recommendation

This project will lead to product analysis with ML/AI toolkits performing assistance. All recommendations will be about given dataset insights and analytics.

ABOUT PROJECT

In this project, I'll share my analysis and ML/AI toolkit ability to create data-driven insights and recommendations for an e-commerce company. It's very crucial to predict some future insights with some internal datasets from e-commerce companies. Many times, companies working on online retail services struggle with inventory and sales strategies. It's very important to automate product recommendations for these companies.

Additionally, these project helps out to reveal some business values in the following details specifically:

- Provides insights into product affinities and buying patterns
- Boosts conversion rates and customer retention
- Improves customer experience with personalized suggestions
- Increases average order value through cross-selling

WHAT IS THE KEY POINTS AND RECOMMENDATIONS FOR E-COMMERCE COMPANIES THROUGH ONLINE RETAIL SERVICES?

Nowadays, e-commerce companies are growing much bigger than ever. At this point, some of them either small sized or medium sized companies have common difficulties on supply chain, inventory back-up, and finding the right targets at marketing strategies. Giants like Amazon, Ebay or Aliexpress have had solutions to these problems for over a decade, with data-driven recommendations and efficient future sales strategies predictions.

MARKET BASKET ANALYSIS IMPORTANCE AND METRICS

Analysis projects often seek for accurate insights from current customer relationships between transaction tables and purchase details tables. Market basket analysis enables us to strengthen purchase and customer behaviour connection to understand how future recommendations will help the company.

Project objectives can be listed as:

1. Market Basket Analysis
2. Customer Segmentation
3. Simple Recommendation Engine
4. Testing & Act

PROJECT WORK PLAN / GENERAL SCOPE

1. Data Preparation & Exploration

For this project, I will use the Brazilian E-commerce Public Dataset from Kaggle. Basically, the dataset will be prepared for a quick explanatory analysis to understand purchase patterns and customer behaviours with products.

2. Market Basket Analysis

I will implement Apriori algorithm to discover product associations and generate rules showing which products are frequently purchased together.

3. Customer Segmentation

After analysis is about to complete, I will conduct RFM analysis to group customers based on purchase behavior. Also there will be applications on clustering algorithms to identify natural customer segments.

4. Recommendation Engine Development

Finally I will try to build collaborative filtering components based on similar customers' purchases. Furthermore, it will be developed for content-based recommendations using product attributes from the dataset.

5. Evaluation & Testing

Lastly, I will try to measure recommendation quality using precision, recall, and diversity metrics and try to compare different approaches and fine-tune for optimal performance.

TOOLS / METHODS

The following tools and methods will be used in this project.

- Python with pandas, matplotlib, and seaborn for analysis.
- SQL / PostgreSQL
- Excel or Tableau for visualization.
- Eventually scikit-learn for basic predictive modeling.
- AI Toolkit / Claude 3.7 Sonnet / DeepSeek R1
- Kaggle Public Datasets