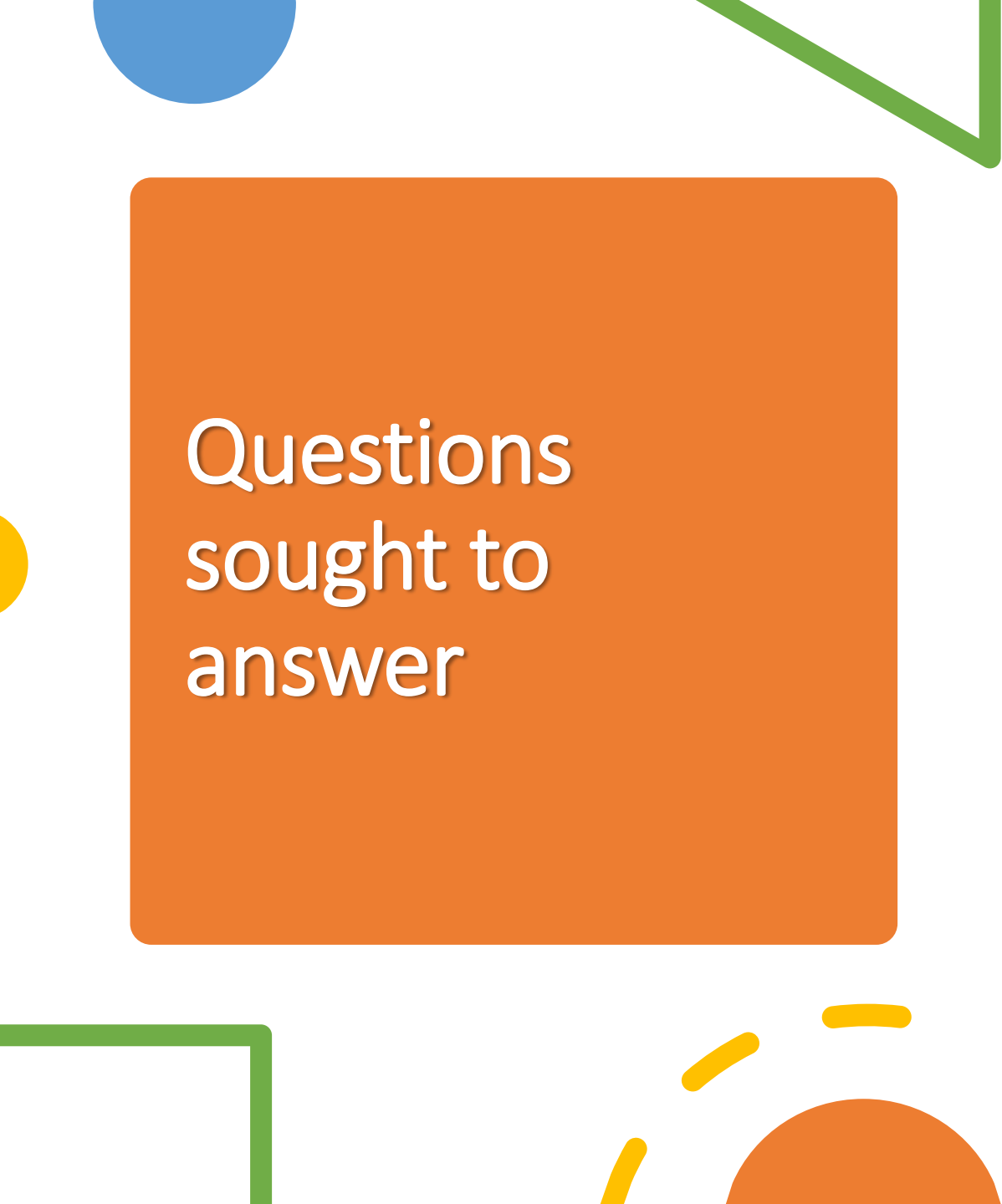




Product Recommendation System Using Association Rule Mining

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Questions sought to answer

- Through this project we intend to identify customer purchasing pattern by analyzing the items purchased in sequence to determine cross-sell. In this project we will consider data from multiple platform / store to get relevant interesting patterns for that store / platform.
- By Identifying this interesting pattern, we can increase the sales by optimizing the product placement, offer special deals and creating product bundle to encourage further sales of these combination.
- Popularly used in Amazon, Walmart, Target and many more.

Data preparation work

- Data Cleaning:
 - Remove redundant data items
 - Deal with missing data(Removing Data entries as replacing value will make unnecessary noise)
 - Reduce the dimension of dataset (Reducing to only important parameters after combining datasets)
 - Reformatting the item name
- Data Preprocessing:
 - Calculate md5 hash code based on item description
 - Rename attributes

Data preparation work

- Data integration:
 - Combining both datasets into a single dataset
- Data transformation:
 - Group entries with respect to invoice number and item Hashcode into a binary matrix

Classification / clustering applied

- Data mining
 - Apriori algorithm
 - Association rule mining
 - Product recommendation

Evaluation metrics

- Lift

$$\text{Lift}(\{X\} \rightarrow \{Y\}) = \frac{(\text{Transactions containing both } X \text{ and } Y) / (\text{Transactions containing } X)}{\text{Fraction of transactions containing } Y}$$

- Support

$$\text{Support}(\{X\} \rightarrow \{Y\}) = \frac{\text{Transactions containing both } X \text{ and } Y}{\text{Total number of transactions}}$$

- Confidence

$$\text{Confidence}(\{X\} \rightarrow \{Y\}) = \frac{\text{Transactions containing both } X \text{ and } Y}{\text{Transactions containing } X}$$




Tools

- Python
- Pandas
- Mlxtend
 - Apriori
 - Association rules




Knowledge gained

- Strong relationship rules between items bought by customers
 - Product recommendation with respect to lift, support, confidence
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How that
knowledge can
be applied

- We can increase the sales by optimizing the product placement, offer special deals and creating product bundle to encourage further sales of these combination.
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Thank You