

Project Design Document

MilkBasket

Team Name: ByteWarriors

Goals:

The goal of this project is to generate innovative insights from the dataset provided by Milk Basket and also to increase the Average Order Value (AOV) by applying those insights and inferences. These insights include customer behaviour, patterns in the data and any repeated orders made by customers.

Average Order Value (AOV) is a metric that measures the average amount spent each time a customer places an order via website or mobile app. The simple formula for AOV is:

$$\text{AOV} = \text{Total Revenue} / \text{No. of Orders}$$

Outcomes:

This project has the following main outcomes:

1. Identify patterns from the given dataset which clearly define outlier customer behaviour
 1. Possible patterns are: Weekday vs Weekend ordering patterns, items that are frequently bought together across orders, products which are purchased in the highest amounts (product ID vs quantity), customers who have placed the maximum number of orders
 2. These patterns will give us a clear picture as to what kinds of products need to be pushed more to the customers, and which customers are eligible for potential loyalty programs
2. Apply these patterns to increase the Average Order Value (AOV) by increasing the number of products purchased per sale
 1. This is done by applying the patterns found above
 2. For example, if it is found that order numbers and frequency are flagging during the weekends, the system can specifically target customers who order frequently during the weekdays with customized products
3. Develop a simple, clean and user-friendly app that peruses the inferences from above to recommend products to customers and increase AOV
 1. This app will record a customer's orders and recommend products that will go well with the products that they have added to basket, or recommend products that are frequently bought together with their desired product(s)
 2. Doing so will increase the number of products sold per order, thus increasing AOV

Deliverables:

1. Machine Learning Model that shows increase in AOV
2. Android app for practical implementation of above model

Risks:

1. Wrong identification of patterns; the model assuming customer behaviour incorrectly and working off of that assumption
2. Increase in AOV at the cost of customer loyalty; customer may be put off by too many suggestions of cross-selling
3. Android application recommends products that are not of any relevance to the customer way too often; this runs the risk of making customers lose interest in the app

Constraints and Challenges:

1. Limited access to customer data leading to less-personalized product suggestions
2. From the dataset, it is challenging to determine the type of products that go together
3. Clustering within a cluster of products poses a recursive problem

Milestones: (achieved)

1. Primary identification of customer behaviour using graphs and K-Means Clustering
2. Gathering further insight into dataset and developing a model to find patterns
3. Calculation of current AOV from dataset

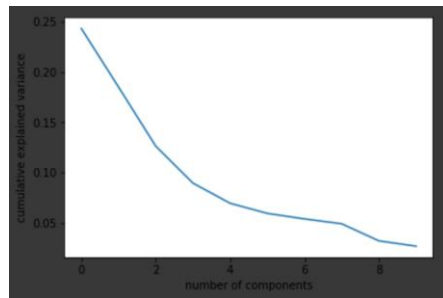
Milestones: (future)

1. Applying above patterns to increase AOV
2. Record new AOV
3. Develop Android application based on the patterns designed to increase AOV

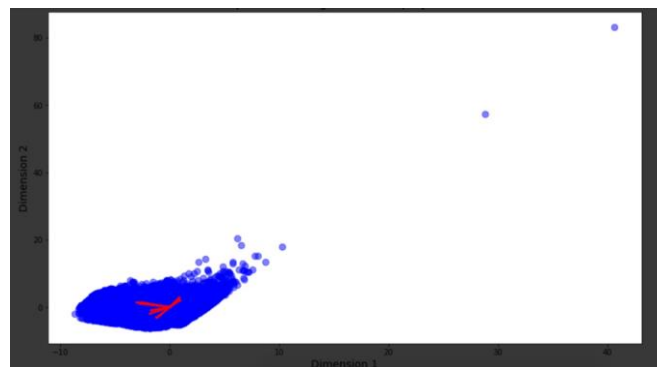
Visual Aids:

The following diagrams and pictorial representations will provide a bird's-eye view of the project and the concepts used to develop it:

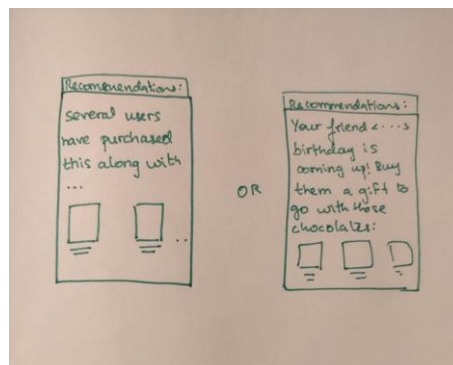
1. The elbow plot obtained for performing PCA (Principle Component Analysis); the plot shows that dimensionality can be reduced to 2 using PCA:



2. A biplot that indicates the relation between all features of the dataset after performing PCA:



2. Rough sketches of the recommendations page based on the ML model:



User Interface:

The Android app will function as the user interface for the application of the machine learning patterns. A brief overview of the app:

1. A home activity
2. A login activity where registered users may login and new users may sign up for an account
3. A main activity which displays products relevant to the user's location and past orders. Items that are most relevant to the user which have the potential to increase AOV are displayed first
4. A product activity (for each product) which displays product details and an option to add it to basket
5. An "In your Basket" activity which shows the products currently in user's basket, a "Remove" option for each product and an option to checkout all items in basket
6. A recommendations activity which recommends products that go well with the products that are being checked-out. This screen utilizes the machine learning patterns developed to increase AOV
7. A payment details activity
8. A payment portal

Inputs:

The inputs given by the developer are:

1. Dataset of past orders
2. Current user's data
3. Location data

Functional Requirements:

1. For machine learning model:
 1. Must be able to handle large amounts of customer data
 2. Must find relevant patterns in customer behaviour
 3. Must yield near-perfect predictions
2. For Android app:
 1. Must provide a user-interface that requires no external assistance to operate
 2. Must be able to process multiple orders from different customers
 3. Must offer relevant suggestions (cross-selling) upon checkout

Configuration:

An Android OS of minimum configuration of 8.0 (Oreo) will be able to run the application.