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# ShopSculpt : Crafting Your Cart with Intelligent Ingenuity

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ABSTRACT

In the present world from small companies to giant company's product recommendation system plays a very major role, also people are very much interested in online shopping these days, so Recommendations are utilized to make the customer's job easier and faster. The majority of these recommendations are made based on their previous transaction history and association rules generated from it. Apriori Algorithm is the most widely used method for generating association rules based on frequent product sets. But it has a drawback, while generating association rules it uses the whole transactions list and frequent product sets, ignoring the seasonal transactions for generating rules. Hence seasonal transactions are not considered for mining rules, if a person is buying a cake for Christmas, it's very likely that recommender system recommends birthday balloons, birthday caps as recommendations. But actually, it should recommend Christmas related products for recommendation. To solve this problem, we proposed a model using chi square test with improvised Apriori algorithm.

This research paper introduces ShopSculpt, an innovative automated shopping cart system designed to enhance the user shopping experience by leveraging intelligent algorithms. ShopSculpt employs a multifaceted approach, considering user shopping interests, patterns, seasonal trends, and current weather conditions to provide personalized and context-aware product recommendations. The aim is to create a dynamic and responsive shopping environment that adapts to individual preferences and external factors, thereby optimizing the user's shopping journey.

Keywords: Apriori Algorithm, Chi-Square Test, Association Rule.

## I. INTRODUCTION

The modern retail landscape is undergoing a profound transformation, with e-commerce platforms becoming increasingly vital in meeting consumer demands. Among the sectors experiencing this shift, the grocery retail industry has witnessed a surge in online shopping, driven by convenience-seeking consumers. In response to this trend, our final year project introduces a ground

breaking grocery store website that seamlessly integrates cutting-edge technology to enhance the shopping experience for both retailers and customers.

The grocery retail industry faces unique challenges, particularly in the realm of inventory management and customer engagement. Retailers must continually update their product lists, reflecting seasonal changes and customer preferences. Simultaneously, customers seek efficient and personalized shopping experiences, where product recommendations align with their preferences and needs. Our project addresses these challenges head-on, with a dual focus on retailer efficiency and personalized customer experiences. We aim to simplify the life of retailers by offering an intuitive platform where they can create and manage monthly product lists with ease. This platform automates the process of carrying forward existing lists to the next month, allowing retailers to concentrate on adding or removing items as needed. Moreover, our project incorporates a powerful recommendation system that analyses customer behaviour and preferences to provide tailored product suggestions. This not only enhances cross-selling opportunities but also elevates user satisfaction.

Key features of our grocery store website include real-time inventory management to ensure accurate product availability, seamless mobile optimization for a user- friendly experience on all devices, and secure checkout options for customers peace of mind. Additionally, we offer flexible delivery and pickup options, catering to the diverse needs of our user base.

## II. METHODOLOGY AND ALGORITHMS

### A. ALGORITHMS

#### 1. Apriori Algorithm

The Apriori Algorithm is a classic algorithm used for association rule mining in data mining and machine learning. Support and Confidence (as given in eq 1 and 2) are important parameters while generating association rules. So, if we follow these according to the size of data and some parameters, we will get some good recommendations.

$$\text{Support}(X) = \frac{\text{Transactions containing X}}{\text{Total Transactions}}$$

$$\text{Confidence}(X \rightarrow Y) = \frac{\text{Support}(XUY)}{\text{Support}(X)}$$

#### 2. Association Rule Mining

Association rule mining is a data mining technique that identifies interesting relationships, pattern or associations among a set of items in large dataset.

Association rule mining is widely used in various domains, including retail, market basket analysis, web usage mining, bioinformatics, and more. Association rule mining finds repeated items in a set of transactions as frequent patterns.

#### 3. Chi-Square Test

The chi-square test is a statistical test used to determine if there is a significant association between two categorical variables. It is commonly employed to analyse the independence of two variables by comparing observed frequencies with expected frequencies. The test is named after the Greek letter "$\chi^2$" (chi-square), which is used to represent the statistical distribution of the test.

### B. METHODOLOGIES

#### 1. User Profiling

ShopSculpt begins by creating detailed user profiles, capturing their historical shopping data, preferred product categories, and browsing behavior. Machine learning algorithms analyze this data to identify patterns and establish a comprehensive understanding of individual shopping preferences.

#### 2. Seasonal and Weather Considerations

To enhance recommendation accuracy, ShopSculpt integrates seasonal and weather considerations. By aligning product recommendations with the current

season and weather conditions, the system ensures that users receive suggestions that are contextually relevant and timely.

3. Dynamic Cart Adjustment

ShopSculpt's dynamic cart adjustment feature continuously refines its recommendations based on real- time user interactions, ensuring that the shopping cart evolves as user preferences and external factors change. This adaptability is crucial for delivering a personalized and engaging shopping experience.

## III. PROPOSED WORK

In this work we propose a model using Apriori algorithm and chi-squared test to find the seasonal transaction patterns such as festival transactions which tend to appear only on that particular day every year. So, by using chi-squared test we get to know if there exists a seasonal transaction that day, else we can proceed to recommend products based on the traditional apriori algorithm. For finding such transactions what we would want to check is how often two products occur together in transactions list more than separately. The null Hypothesis H0 would be that there is no much association between the two products when they are not together in the transactions list. We use chi-squared test assuming the data would not be having normally distributed probabilities. In this we find and compare the observed frequencies for the two products and expected frequencies for non-dependence of the two products and if this difference is very large, we can reject the null Hypothesis H0 else accept H0.

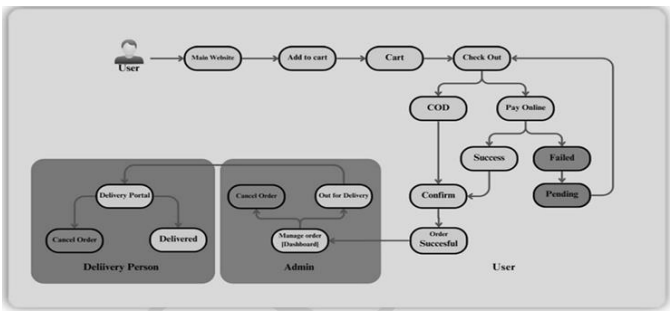


Fig.1 System architecture

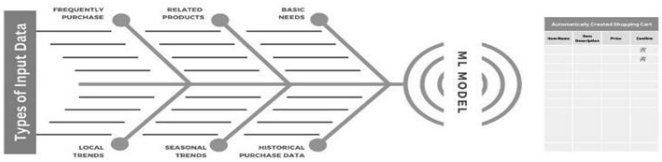


Fig. 2 Automatic Grocery Cart ML System Diagram

## IV. RESULTS AND DISCUSSION

1. Retailer Dashboard:- A dedicated dashboard for retailers that allows them to create, edit, and manage their monthly product lists effortlessly. This includes an intuitive user interface with features for adding, removing, and updating products.

2. Product List Carry-Forward:- A unique feature that automatically carries forward existing product lists to the next month, simplifying the process for retailers and saving them time.

3. Recommendation Engine:- An advanced recommendation system that provides personalized product recommendations to customers based on their browsing history, purchase behaviour, and preferences. The recommendations should be accurate and tailored to each customer.

4. Real-Time Inventory Management:- The system should provide real-time updates on product availability to both retailers and customers, reducing instances of out-of-stock items and ensuring accurate product listings.

5. Data Analytics Dashboard:- A data analytics dashboard for retailers that provides insights into customer behaviour, popular products, and sales trends. This can help retailers make informed decisions.

6. Geolocation Services:- Integration of geolocation services to determine customer locations for delivery purposes and to offer store locator features.

## V. CONCLUSION

This project presents a transformative solution to streamline the grocery shopping experience. By introducing an automated carry forward list and a

personalized recommendation system, our project aims to save users time and enhance their satisfaction. The automated carry forward list eliminates the need to recreate shopping lists each month, while the recommendation system empowers users with product suggestions tailored to their preferences. Design a system that allows users to mark items they frequently purchase as "recurring" or "carry forward" items. Create a mechanism that carries these items forward to the next shopping list or cart automatically. User should have the option to review and modify the carry forward list for each month, adding or deleting items as needed.

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