

A Review on Online Supermarket Models And Customer Interpretations

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Abstract: The processing on huge amount of text is performed by information system and that's why it becomes an important part of our daily routine. The information processing is also widely used in data mining to analyze customer behavior. The behavior of customer can easily analyze because so many customers now uses the online markets and market technologies for shopping purpose. We have described the existing literature that is done in supermarket to analyze the customer behavior and customer interest in purchasing products in nearby supermarket. Then in future we are going to propose our proposed system that will help to customer to find the right product in a nearby supermarket.

Index Terms – Online markets, supermarket, data mining.

I. INTRODUCTION

The processing on huge amount of text is performed by information system and that's why it becomes an important part of our daily routine. The information processing is also widely used in data mining to analyze customer behavior. The behavior of customer can easily analyze because so many customers now uses the online markets and market technologies for shopping purpose. This customer behavior statistic is playing very important role for retailer. The retailer can understand customer requirement as well as effective analysis may satisfy portability of product, quality of service and product, and satisfaction of customer.

Thus, Market Basket Analysis is one of the approach that can predict the customer behavior i. e customer purchase some group of items and along with these items they also purchase some other items for example while purchasing milk, they also purchase bread [1]. This customer behavior is based on previous expenditure pattern of that customer or client. Regarding this, Association rules are playing important role to check the relationship between items in big dataset transactions. It is also used in decision making and to calculate the risk factor.

When a significant item needs to find out from large dataset items, it becomes one of the important research areas in data mining. There may be the situation where same items but having different characteristics, quality and so on. So in such a case, customer behavior also may change. The customer who purchase frequent items that is calculated by using frequent itemset algorithm, called as Apriori Algorithm. This is one of the most important algorithm used in market basket analysis and it was proposed by Agrawal and Srikant in 1994 [2]. The Artificial intelligence algorithm, "Recommendation System" is used to filter the information of customer behavior and also it suggests some additional products to the customer [3].

To determine the past customer behavior , collaborative filtering is used. The customer purchase, activities and preferences are checked by using collaborative filtering and based on these parameter it predicts which products customer will prefer [4].

The goods arrangement in a shopping room and online recommendation of products are not related with each other. But the important thing is to analyze customer behavior by checking the transactions. By using this analysis, shop can make the promotions and improve the quality. For such a region, the retailer requires to construct powerful recommendation system. The quality of recommendation system will increase through processing large data. This large data is added through external heterogeneous sources. These sources can be integrated from offline and online markets. For example, suppose when we consider one specific market area, then range of products may be the similar but the characteristics or quality may vary. So, when we integrate the external data sources into existing system, it is also required to check structure and contents of data sources. Kutuzova and Melnik [5], proposed a system for integration of heterogeneous data source based on market basket analysis.

The goal of integration, which was provided by them, is to improve the quality of developed RS by utilizing extra information sources. These outside information sources may have a totally unique organization and contrast in content. For the shared examination of heterogeneous information, it is important to change over every one of the information to an appropriate single structure.

This incorporates investigation of information attributes, looking for basic gatherings of principles by utilizing cauterization techniques what's more, sifting of non-acclimating portions of information. Further, coordinated information from every accessible source are utilized to assess also, improve the nature of proposal framework

In this investigation, they examined the probable outcomes of improving the nature of a proposal framework for grocery of general stores and proposed the integration structure that permits adjusting outside heterogeneous information hotspots for fit to existed suggestion framework. The integration schema depends on a few market bin investigation strategies, for example, affiliation rules, shared sifting and cauterization. For the test contemplate, we discovered two datasets with exchange of information of general stores' clients. We characterize two measurements to assess the nature of developed proposal framework and direct investigations looking at the first and adjusted suggestion frameworks.

The next research related to marketing is that Point of Sale system used in supermarket in 1970. It is the most powerful system to recognize the purchase behavior of customer. It is useful in various business models to examine and analyze the purchase behavior of customers. It is useful in various business models to examine and analyze the purchase behavior to increase the sales of product. But there are also some drawbacks of these systems related to behavior of customer in-store. For this situation, RFID (Radio Frequency Identification) has come with new perspective. It is wireless non-contact technology. The first experiment on RFID is carried out by Sorensen Associates in 2000 to identify in-store behavior of customer [5].

The RFID tag is attached with object so that movement of object can be easily tracked and noticed automatically. The advantages of RFID technology in the field of marketing are to capture in-store behavior of customer in supermarket accurately. Yi Zuo et al.[9], presented customer purchasing behavior using RFID data and statistical learning theory SVM in a Japanese supermarket. The customer decision to purchase the product is depending on customer response for a particular product in a supermarket. So according to this, customers are categorized based on similar behavior and characteristic, known as homogeneous group. This is also useful to identify the variation of purchase behavior among the different groups. Furthermore, they provided a time perspective on shop in a particular area instead of whole supermarket. This time perspective is useful to improve the customer in-store behavior.

Now a day, every customer wants the quality of service that companies provide them. So there is competition between the companies to maintain and increase their quality of service. So customer relationship management system plays vital role to maintain the relationship with customers. It uses machine learning models to recognize customers personal and behavior data so that organization can increase the customer retention rate. These predictions are used to design marketing plans or business plans [6].

The large - scale retail stores that sell a variety of goods under one roof and control a variety of departments, each of which is specialized in a single merchandise. A department store is a retail store that handles several types of goods, including fast - moving consumer goods, separating each class from the other in administrators, accounting and location. A supermarket is therefore a retail business unit that handles a wide range of shopping and specialty products and is structured into separate departments for sales marketing campaign, accounting control and store operation purposes. A supermarket's success will depend heavily on its location, the accessibility of space, the region and society to be served, and the ability to retain customers are aspects to consider before setting up a store at a particular location.

Andreas Kanavo et al. [7], discussed the customer behavior model using data mining techniques. For a given supermarket dataset, their ultimate goal is to check customer behavior in the sense whether customer is interesting to purchase a product or not. This prediction is done by using data analytics and machine learning algorithms. This is a classification problem. Furthermore they gathered the various reviews of Amazon (Washington, USA). After getting the review of each customer, the effect of person to person on each product can analyzed. To check customer behavior they have inputs like customer gender, age, education etc. In the first step, input is customer id. Data cleaning is done to deal with missing values.

Thereafter, the categorization of customer is done based on money and time spent at supermarket. Also, the same procedure is used to calculate the distance of each customer from house to supermarket. The sales rate is analyzed by using big-data analytics (MapReduce and Spark). For Customer opinion, advertisement, review they used vector space model, Tf-idf and cosine similarity. Furthermore, they need to improve classification accuracy in terms of time and scalability as well as more features of supermarket need to take into consideration.

Since the 1990s, the Japanese supermarket industry has been experiencing a long - term decrease in sales for over 20 years. The reason behind this is environmental changes, such as a reduction in the number of visitors to the supermarket due to the decreasing population and the aging population. Takamasa TANAKA et al. [8], discussed method for supermarket that keeps information of good customers and also generate the sale rate for future use. The high quality customers are kept at top priority in the list. They proposed the method to classify the high quality customer and these customers are involved in advertisement. In such a way they implemented the management - specific method that maintains existing customers who respond to the Japanese supermarket industry's declining phase. For good customer analysis, logistic regression method is used. This is useful for retaining customers, and it's an important issue in the market decreasing phase for Japanese supermarket management.

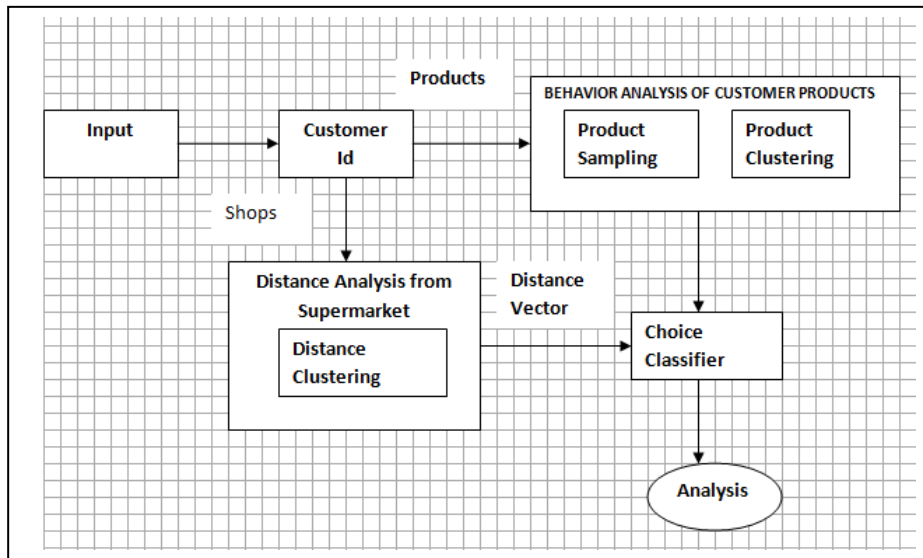


Figure 1 Supermarket Model [7]

Pricing is hugely clear and transparent and in the online world and it can be a key driver for online shopping. But while pricing structure is not new which is used by many to increase sales and margins, it has enormous benefits for online retailers. Rajan Gupta and Chaitanya Pathak [10], discussed the system to develop a generic framework and appropriate methods by introducing sound machine learning algorithms to improve customers purchases of the best price (not the cheapest price) on the e - commerce platform.

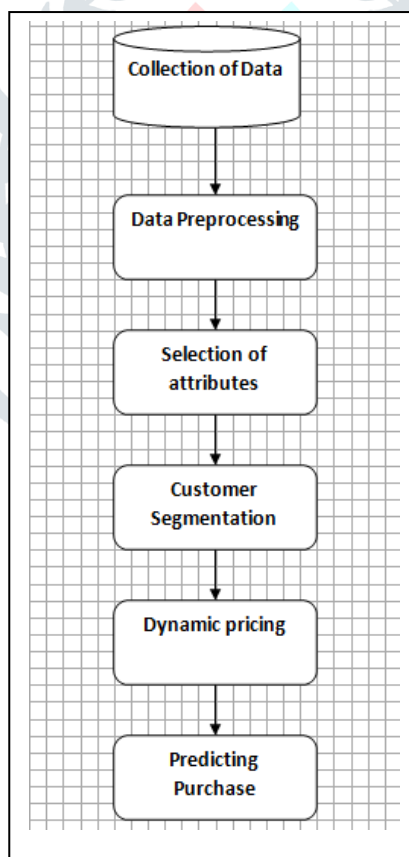


Figure 2 Dynamic Pricing Model [10]

The price optimization means the goods are offered at different prices and the cost varies on customer demands. So price optimization factors are competitors pricing, supply, demand and conversion rates and sales goal. The fundamentals can be seen in companies like retail, automotive, mobile communication etc. There are some existing models available like agent-based modeling, data driven model, auction-based model. These models were not feasible to solve the problem of purchase behavior through dynamic pricing. So, author proposed the framework in which dynamic pricing is the base problem to be solved and this will provide the good result. Their proposed system consists of phases 1) Data collection 2) Data preprocessing 3) attribute selection 4) Customer Segmentation 5) Dynamic Pricing 6) Predicting the purchase. These stages depicted in fig. 2.

Martyn Roberts et al. [11], discussed the case study based on new markets and customer who used the internet to build and increase the business through Electronic Commerce (EC). By using EC, companies can directly interact with customer. So, this case study depicts the supermarket online shopping model. In the first step, they have taken survey on customer behavior based on traditional shopping and online shopping preference. The following supermarket model is described in [11].

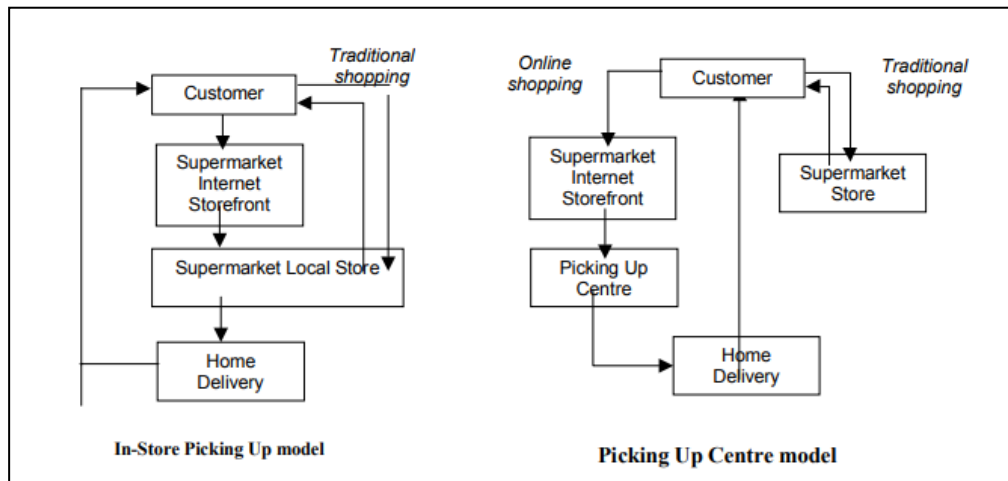


Figure 3 Supermarket Internet shopping model [11]

The internet shopping has more benefits than the traditional offline shopping but customer need to worry about product price, delivery charges and internet access cost.

After studying above literature, we are going to propose our system to purchase and recognize stock market products online. In system architecture, The customers will search products using image or the textual data. User demand is to search the supermarkets which will include that product. We are searching shop by scanning the nameplate of the shop. So the user gets information of product easily without entering into the supermarkets. The image processing of product or nameplate will be done using OCR(Optical Character Recognition) Retailer can update details of stock and generate report based on sell. The searched data will be send to the server via vision API, then using machine algorithms like CNN, KNN, server will search the required data into database. It will also store the data which is uploaded by whole seller about the products.

II. CONCLUSION

We have studied various literatures regarding Supermarket and customer behavior while purchasing the products in a supermarket. The most of existing system have used the data mining concepts like Apriori algorithm, tf-idf, association mining, clustering. For good customer analysis logistic regression method has been used. Therefore, we are going to propose the system in which customer will search the products through image or textual data. The image processing of product or nameplate will be done using OCR(Optical Character Recognition) Retailer can update details of stock and generate report based on sell. The actual motivation is to help the person to find the right product in his or her choice and it helps to know the right cost estimation of the product.

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