Data Mining Approach for Retail Knowledge Discovery

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Abstract—Data mining provides number of applications to retail industry with the collection of information related to industry. This paper introduces the use of data mining to collect the information from retail market. Data mining techniques are used to discover the meaningful relationship between the relative spatial distances of displayed products and the items’ unit sales in a retailer’s store. This paper includes four sections. First section introduces data mining technique and retail industry. Second section contains literature survey regarding this study. Data mining techniques used in retail industry are discussed in third section and at last, conclusion of whole study is described.

Keywords—Data mining, Retailing, Association, Internet, Technology

I. INTRODUCTION

Data Mining is the process of analyzing data from different perspectives and summarizing it into useful information. Data Mining is also known as Knowledge Discovery Data & Knowledge Mining [13]. Data Mining is also defined as mining of knowledge from huge amount of data. With the use of Data Mining, nature and behavior of any kind of data can be predicted. In retail industry, Data mining collects usage quantity of information from on sales/purchase, customer purchasing history, consumption and services. Data mining in retail industry helps in identifying customers buying patterns and trends that lead to be improved quality of customer services and satisfaction. Day by day the new technologies are taking its own valuable place which meets the expense of alternate approach to marketing strategies. The new Information technologies make it very easy for the consumer to gather the information and purchase both products and services thereby changing a consumer’s expenditure and buying deeds. The key advantage of the new technologies is that substantial occurrence is not needed in any form of purchasing activity. Due to the development in computers, the customers use computers and access all information of any business enterprise from their home and thereby improving their time saving of organization of daily tasks. Computer-based systems have launched new opportunities for companies to signify themselves among the customers and e-customers [11]. The accumulation of simplify computer-based systems e.g. laptops, tablets and smart phones have increased flexibility and versatility radically. Consumer needs to interact customers for their Products and services are required to with computer based gadgets. There would be some underlying factor making the consumer re-adapt into availing the computer-based systems for their daily chores of purchasing both services and products. Even when the IT technologies and computer based systems are used more to perform purchasing activities, yet it has not completely substituted the importance of physical stores in the market for many companies. Most of the companies have converted to bricks and clicks thereby offering their services and products both online as well as on the physical evidence of their companies’ facilities. These newer structures have that have widespread presences are more alluring for the newer generations that embrace technological gadgets for daily operations. The advantages of e-commerce include that with the use of technology, convenience with regard to time and place becomes easier as seen in case of shopping and purchasing activities [3].

II. LITERATURE SURVEY

Dr. suman kumar et. al [1] has developed e-tailing in India: its issues, opportunities and effective strategies for growth and development, this paper attempts to provide a clear picture about the e-tailing in India and its various issues, opportunities. It also attempts to draw an effective retailing strategy in India based on the detailed survey of e-tailing companies. The Indian online retail is a rich segment waiting to be exploited. Internet is a potent medium that can serve as a unique platform for the growth of retail brands in India. Online retailing or e-tailing is described as transactions that are conducted through interactive online computer systems, which link consumers with sellers electronically, where the buyer and merchant are not at the same physical location. in a short space of time, internet retailing or e-tailing has firmly established itself as a viable alternative to store based shopping.

Piyush et. al [2] has developed development of modern retailing in India: it’s impacts on distribution and procurement networks and changing consumption pattern in this paper the Indian retail industry is estimated to be $470 billion. The organized or modern retailing with 6% share stands at $26 billion. The retailers in different formats, including online, has affected an irreversible change in consumer buying habits and businesses related to serving these retailers. However, unlike many other countries, India has its own unique character of size, geographical spread, cultural diversity, and multiplicity of formats being introduced at quick succession. Retailers also face the challenge of developing infrastructure.
Sunita et al [3] e-tailing – the mantra of modern retailer’s success this paper internet is a potent medium that can serve as a unique platform for the growth of retail brands in India. The Indian retail market is witnessing a revolution. The current web-based models for retailing are part of an embryonic phase preceding an era of rapid transformation, challenge, and opportunity in Indian retail market. it is not just the metros that are fueling the online scene in India the demand supply gap in tier 2-3 cities where there is brand awareness but no availability of products and services is also adding to growth. Online retailing portals such as eBay, in, snapdeal.com, and naaptol.com are registering anywhere between 40 and 60% of their sales from rural areas apart from the tier ii and iii cities.

Sivathanu [4] has developed challenges affecting the organized retail sector in this paper the Indian retail industry has been thrown open to foreign majors and is packed with players who strive to offer great products and value-for-money to Indian consumers .this research paper provides the current status of the retail sector in India and the detailed information about the challenges faced by the retail sector in India. The paper includes the opportunities of retail stores, retail format in India and the recent trends in retail. This paper surveys the managers to understand the challenges impacting the retail sector. It concludes with providing the detailed opportunities available for the retail sector.

Jyoti [5] has obtained prospect of e-retailing in India, this paper consumer’s perception regarding shopping has been changed with the introduction of internet media. The electronic retailing (e-tailing, e-retailing, internet retailing etc.) is the model of selling of retail goods using electronic media, in particular, the internet. E-retailing is a subset of e-commerce (electronic commerce). E-retailing accounts for about 10% of the overall growth of ecommerce market. The growth in the e-retailing market is driven by the need to save time by urban India. It is estimated that 2.5 billion internet users, access to internet has played a significant role in growing the business markets. The internet gives retailers an instrument for: broadening target markets, enhancing consumer relationships, extending product lines, improving cost efficiency, improving consumer communications, and delivering customized offers.

Meenakshi [6] study on growth of retail market in India with special reference to broadening of mall culture in tier ii city this paper now the consumer wants to shop at a place where he can get food, entertainment and shopping, all under one roof. This has given Indian organized retail market a major boost. Shopping malls are the hot shopping destinations in new life style. Due to rapid retail boom, variety of malls has emerged. With this big ticket mall culture hitting the great Indian middle class, the days of pure shopping delight seems to be diminishing.

Rajora et al [7] rural retailing in India – a changing paradigm, this paper in the world of cut throat competition, every marketeer is searching better solutions and products and services to serve the end users, around 70 % population is resides in rural or semi urban area & in recent years, rural market of India have acquired significance, as the overall growth of the Indian economy has resulted in the substantial increase in the purchasing power of the rural communities, in fact it has been estimated that the rural markets are growing at five times the rate of urban markets, thereby offering ample opportunities to marketeers. In this paper researcher will discuss about the perspectives in the rural retail& challenges in the rural marketing & some suggestions about how rural marketing can be done more effectively.

Kalpana Singh [8] has developed retail sector in India: present scenario, emerging opportunities and challenges in this paper the government’s initiative to allow 51 per cent foreign direct investment (fdi) in multi-brand retail has been a subject for debate for quite some time now. Indian retail sector has therefore attracted the attention of people from various fields including academia, industry, research organizations. the present study is undertaken to gain an insight about the present structure of Indian retail sector, the major sub-sectors in organized and traditional retail and changes in the relative share of various sub-sectors over last few years and penetration of organized retail in various segments. the analysis also covers the opportunities and emerging challenges before Indian retail sector in view of recent policy changes by government of India.

Kamaladevi et al [9] exploration of e-tail business with reference to e-customer experience, in the modern era, the global retailers are establishing their business by using e-tailing and the main reason is the middle class consumers who have turned to the internet for shopping. Many budding entrepreneurs are now entering into e-tailing as a hot favorite and are confidently investing in e-tailing business. The global shoppers today are enabled with touch screen and tablets, where websites are designed to give the look and feel of an actual retail store.

III. TECHNIQUES

The data mining techniques that are used in retail market for knowledge discovery are describes as following:

A. Market Basket Analysis

Data mining association rules, also called market basket analysis, is one of the application areas of Data Mining. Consider a market with a collection of huge customer transactions. An association rule is X⇒Y where X is called the antecedent and Y is the consequent. X and Y are sets of items and the rule means that customers who buy X are likely to buy Y with probability %c where c is called the confidence. Such a rule may be: “Eighty percent of people who buy cigarettes also buy matches”. Such rules allows us to answer questions of the form “What is Coca Cola sold with?” or if we are interested in checking the dependency between two items A and B we can find rules that have A in the consequent and B in the antecedent. The aim is to generate such rules given a customer transaction database. The algorithms generally try to optimize the speed since the transaction databases are huge in size. This type of information can be used in catalog design, store layout, product placement, target marketing, etc. Basket Analysis is related to, but different from Customer Relationship Management (CRM) systems where the aim is to find the dependencies between customers’ demographic data, e.g., age, marital status, gender, and the products [10].

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B. Apriori Algorithm

Apriori is an algorithm proposed by R. Agrawal and R Srikant in 1994 [1] for mining frequent item sets for Boolean association rule. As the name indicates, this algorithm is based on the fact that the algorithm uses prior knowledge of frequent item set properties. Apriori search is an iterative approach, also known as level-wise search, where k item set are used to explore (k+1) item sets. In this algorithm basically two steps is used for iteration. The first step generates a set of candidate item sets and in the second step, occurrence of each candidate set in database is counted. (i.e. all infrequent item sets). Apriori uses two pruning technique, first on the bases of support count (should be greater than user specified support threshold) and second for an item set to be frequent, all its subset should be in last frequent item set. The iterations begin with size 2 item sets and the size is incremented after each iteration [12].

IV. CONCLUSION

In this paper different techniques of data mining for retail industry are discussed. These techniques show that association rule mining plays an important role in retail market. The study shows that traditional techniques such as the frequent-buyer program or the market basket analysis can only provide a profile of customers’ purchasing affinities. They can describe only the combinations, which are in customers shopping carts, but cannot tell us why. The reason why some products are frequently bought together, like detergent and fabric softener, is apparent, while other combinations, like bottled juice and cold remedies or beer and diapers, are not so easily explained. Apriori algorithm provides a possible answer to these questions by investigating spatial relationships between displayed products and their impact on sales that result from the visual effects of adjacency on impulse buying and cross-selling. It means Apriori algorithm performs best as compare to other traditional techniques.

REFERENCES