



7. A Survey on Emerging Technologies in Retail Industry

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ABSTRACT:

Big data are taking middle stage for decision-making in many retail organizations. Customer data on attitudes and behavior across channels like touch points, devices and platforms are often readily available and constantly recorded. These data are integrated from multiple sources and stored, often during a cloud-based environment. Big data analytics in retail enables companies to form customer recommendations supported their purchase history, leading to personalized shopping experiences. These super-sized data sets are also help in forecasting trends and making strategic decisions supported marketing research. Statistical, econometric and data science models are developed for authorizing appropriate decisions. Machine learning based models, are especially useful for learning from the information and making predictive decisions. In many cases, such decisions are automated using systems like chat bots and robots. Of interest group are issues like Omni channel shopping behavior, resource allocation across channels, the results of the mobile channel and mobile apps on shopper behavior, dynamic pricing, data privacy and security. Research on these issues exposes several interesting insights on which retailers can build. Totally we influence big data in today's retailing environment, CRM strategies must be location specific, time specific and channel specific additionally to being customer specific..

KEYWORDS:

Big data, Use cases, Retail industry, Machine learning, Data science.

Introduction:

With the new technology of digital India, retailers are well equipped of product selling and buying through online which makes the customer to feel in free zone as they can buy or sell from anywhere at any time. Primary source of each retailer is the collection information which can be collected from different sources. One of the fabulous technologies was Retail data analytics which permits the retailers with the conceptual idea of customer's choice. These data are integrated from multiple sources and stored, often during a cloud-based environment.

Big data analytics in retail enables companies to form customer recommendations supported their purchase history, leading to personalized shopping experiences. Way forward for retail is completely captivated with upcoming technology. One of the best supports for retailers was using the technology as central part of the business. Retailing business is very important as it extends the stable growth of the marketing strategy. Analysis of the data is one of the important sectors in retail business. As the customer's choice, retailing industry is working for the product selling in the corner of customer's choice. [1]

Big Data and Retail Industry:

Consumer choice of interest is changing rapidly in today's world. In retail industry, Big Data Analytics is concerned with the choice of the customer by using largest technology with the process of data analysis techniques. This can be processed with Hadoop tool to analyses and store the data in real time [2].

Need for Retail Big Data Analytics:

The market join of the TESCO have 600 million of the records with regard of the retail information which are growing in the rapid growth of million dataset of each and every week of considering history of information up to 5 years in the sales department and information about 350 stores. It is impossible of storing and getting huge information in the legal function. There may be the process of occurring data that would be a huge amount of knowledge loss which can be processed of the functions because of the information processing static and dynamic speed of legacy systems. In the concept of the gradual growth in retail functions and in the stable development in the demand for online channels, consumers are always ready to the compare with the services, products and also the rate in no deal with the exact information which may be that are the they shop online or in the domain of the retail stores [3].

IV Challenges posed by Big Data in Retail:

- In the retail marketing, it's becoming higher and harder for the retailers in the industry in the prediction of the patron in the concept of the habits.
- In the upcoming trends in the Retail industry are always in the really rapid growth because for the extract functions in the methods of networks, diversion of the technology and in the changes of the range in the industry of the consumer choices that produce it with the risk for retailers.
- It is very great necessary for retailers to use the technology in the sentiment analysis using Hadoop tool in the Big Data Analytics.

V Big Data and Hadoop Use Cases in Retail:

1. Retail Analytics in Fraud Detection and Prevention: The fact of occurring again in the domain of gaining knowledge on an action which offends against the law that has been suggested to the section that has been at the each and every action of the week. On the basis under the section of the Fraud Detection, it may be an issue which are been determining in the basis of avoiding of loss to and maintain the trust of the customer [4].

Figure 1: Some types of retail fraud



A person who controls the way in which the retail industry that are always suggesting to the new ideas of invention of the tools. Retailers are in the deal to create the permanent less use of the retail in the analysis of the information which gathers to spot fraudulent activities. With a large dense of large amount of processing the data technologies like Hadoop, Map Reduce and Spark. [5]

3% shrinkage due to fraudulent activities

How to minimize the fraudulent activities?
Help to come up with quick and corrective measures to control fraudulent activities
What are the root causes of fraudulent activities?

Customer Segmentation
Market Basket Analysis
Test and Learn
Forecasting
Product Recommendation
Supply Chain Analytics
Clustering
Fraud Detection & Prevention
Pricing Optimization
Shelf Space Optimization
Real Estate Optimization

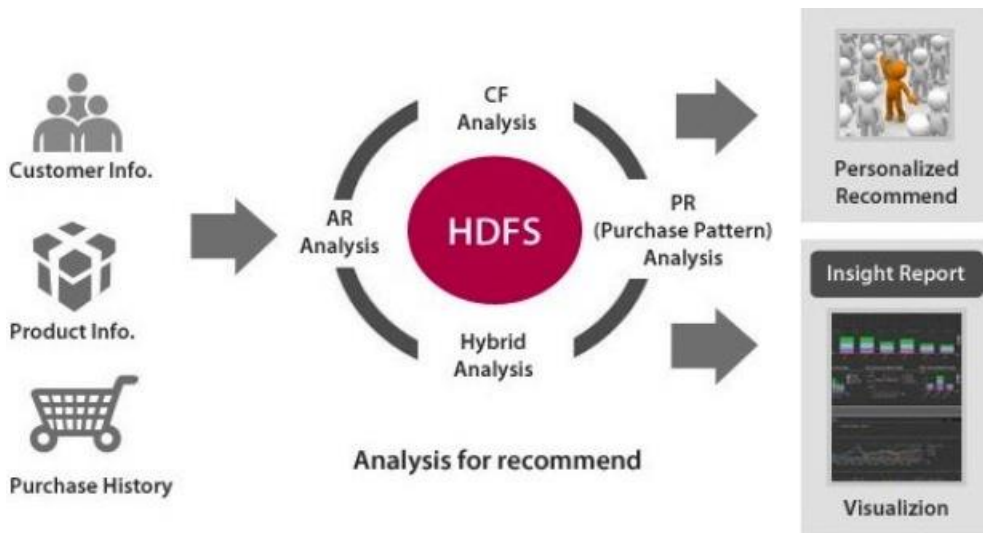
CVS (US based pharmacy chain)

- Analyzing trends in inventory movements at the SKU level into, within, and out of the stores
- Nearly 1,600 key performance indicators, including warehouse invoice, transfers, returns, positive order adjustments and store alarms.
- Analyzing large continuing discrepancies between items sold and ordered.
- Prosecuting eight times as many suspected fraud incidents as it did five years ago.

Jaeger (UK fashion retailer)

- Using data mining of point-of-sale data with other, more complex data streams to identify losses resulting from employee theft as well as process-related errors.
- After only three months Jaeger determined that its savings were significantly more than predicted before implementation.

2. Retail Analytics in localization and personalization for Customer Driven promotions: Retailers produce big variety of elements that include store formats, promotion strategies, pricing of the products, staffing. Personalization could even be obsessed on various factors like demographics, location specific attributes (proximity to certain other businesses) and thus the acquisition behavior of the customer. [6]



Localization techniques require various analytical approaches to be implemented which includes behavioral targeting, price optimization and store site selection analytics. If the motive is to localize clusters then some way for clustering must be used. Localization in retail sector isn't usually geographically oriented; however retailers can target pricing, offers and other product assortments counting on the behavior of the customer to provide them a customized shopping experience [7].

Right customer at the right place at the right time



Do all the customers look the same?
Which customer is likely to react to offers?
Are your campaigns reaching effectively?

Customer Segmentation

- Market Basket Analysis
- Test and Learn
- Forecasting
- Product Recommendation
- Supply Chain Analytics
- Clustering
- Fraud Detection and Prevention
- Pricing Optimization
- Shelf Space Optimization
- Real Estate Optimization

Tesco

- 80% of sales can be tracked through ClubCard.
- Provides rebates of 1% of customer purchase. Historically by direct mail, but increasingly by email.
- Customized coupons based on shopper behavior are provided to customers
- Over 10 million variations in coupons for about 13 million customers.

Nieman Marcus

- Top 100,000 customers in its complex (20 different levels) loyalty program, InCircle, account for almost half of its revenues.
- Top customers can win free fur coats and even a Lexus luxury car.

3. Retail Analytics in Supply Chain Management: Big Data has the potential to remodel processes across various industries and this tech trend may be the thanks to increase efficiency within the retail supply chain management. Supply chain management is critical to the retailers within the future. Retailers make every effort to form optimized, flexible, global and event driven supply chain model to extend efficiencies and enhance relationship with supply chain stakeholders. [8]



Metro Group retailer uses retail analytics to test the movement of products inside the stores and display relevant information to the customer. as an example, if a consumer takes an item into the trial room, the merchandise recommendation system recommends other related products while the customer is trial the apparel. They store personnel inform from the patrons whether the products are in sock or not [9].

4. Retail Analytics in Dynamic Pricing: 100% price transparency is also a pre-requisite - with customers coordinating towards comparison between online and showroom prices. There's a requirement to make a dynamic pricing platform with retail analytics which will power many pricing decisions amongst the foremost important retailers. Dynamic Pricing in Retail Analytics is also implemented in 2 ways-

Internal Profitability Intelligence – Every online transaction is tracked at unit level profitability by taking into consideration various variable costs like vendor funding, COGS (Cost of products Sold) and shipping charges.

External Competitor Intelligence - This given set of retailer products, retail analytics provide real time intelligence, about those products on competitor's website with the corresponding prices.

Dynamic pricing impacts:

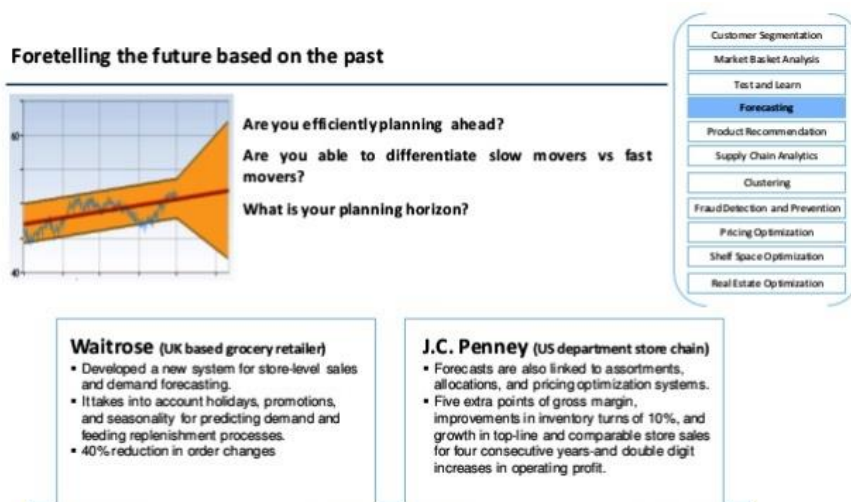


Amazon’s analytical platform features a great advantage in demand pricing. Because it responds to the competitive market rapidly by changing the costs of its products every 2 minutes (if required) other retailers change the costs of the products every 3 months.



Staples.com is another giant retailer leveraging retail analytics for dynamic pricing by identifying various opportunities for price optimization to come up with incremental revenue and margin. Other retailers that leverage Retail Big Data Analytics are RadioShack and Group on.

5. Retail Analytics in Integrated Forecasting: Forecasting demand and sale volume in retail is way harder than the opposite industry, because of ample products and their variants, seasonal impacts on the demand of a product, changing trends in fashion, changing customer preferences, thousands of varied shops and various other promotional influences affect the demand and sale volume of any product. . All this results in huge amounts of giant Data being generated which could be leveraged through Retail Analytics



Staples, a US based supply supermarket uses Hadoop and other Big Data technologies to forecast sales by processing near 10 ample data transaction hebdomadally as input and forecasts the daily and weekly sales of the office supplies across 1100 stores in US. Staple uses these predictions to specialize in, market promotions supported region. Staple was able to see significant drop - near 25% in their overall promotion costs with the employment of Retail Analytics. [10]

Retailers are making the foremost out of big Data technologies Hadoop to chop back costs and maximize profitability [11]. Big Data in retail has got to be integrated with best in school technologies like Hadoop to attain insights which can help retailers can react quickly to changing trends.

VI. The Future of Big data in retail:

The long run of massive data in retailing Leading-edge practitioners of massive data in retailing like Amazon and Alibaba are developing more advanced machine learning models to continue their lead over rivals. Such models are driven by deep learning algorithms. Most deep learning models supported neural networks. These deep learning models form the engine for smart systems. AI is Interpenetrating, all consumer tools, starting from Siri to Alexa and Gmail. The longer term are going to be dominated by AI-assisted customer behavior and AI-based managerial decisions. Automation will still grow and replace jobs. By some estimates, AI may lead to the displacement of about one third of the roles within the retailing industry. Whatever happens within the future, one thing is clear: Big data and analytics are going to be the bedrock of smart retailing within the future.

Conclusion:

The shopping trends have undergone a whole change within the past few years because the control has now shifted within the hands of consumers. Before buying any product consumer can compare the worth of that exact product at different online shopping websites and choose for the economical one. Today consumers have a privilege to read and supply their views related to the merchandise and provider. It provides plenty of help to the customer to be told from the experiences and reviews of these that have already tried that exact product. it's now the time for retailers to think and use new strategies to attract customers with themselves due to hard competition prevailing within the retail market. For this retailers make use of big data for harnessing massive volumes of recent data available. This research paper illustrated the role played by big data within the retail sector and also the working of Map Reduce technology via two examples. Retailers should detect fraudulent activities so on safeguard their margins and reputations. Big Data can provide assistance to the retailers to acknowledge anomalies and patterns by continuously monitoring the tactics and practices that appears unusual. this might help indicate incidents of fraudulent like shrink and store associate theft and appearance for exceptions

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