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Big Data Analytics- In Retail Sector

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Abstract— Retailing concept has fundamentally changed the business, and the customers at present have the ability to use and access to the variety of products offered with the help of retail outlets in many forms. In order to compete with the global market and business needs and as well as for better growth, retail companies are using marketing strategies based on the aspect of data. This has made a way for companies in retailing where data being a major source to understand the timely needs of customers and in the prediction of the buying behaviour of the customers. Retail companies are finding different ways to extract meaningful information from large data sets through different sources, and in various formats. Big data is one of the technologies in present days which are helping the retail industries. Companies are trying to understand how big data and analytics can empower them to take right decisions. In this study it tells about how big data analytics impacts retail sector.

Keywords— Analytics, Big data, Forecasting, Retailers, volume.

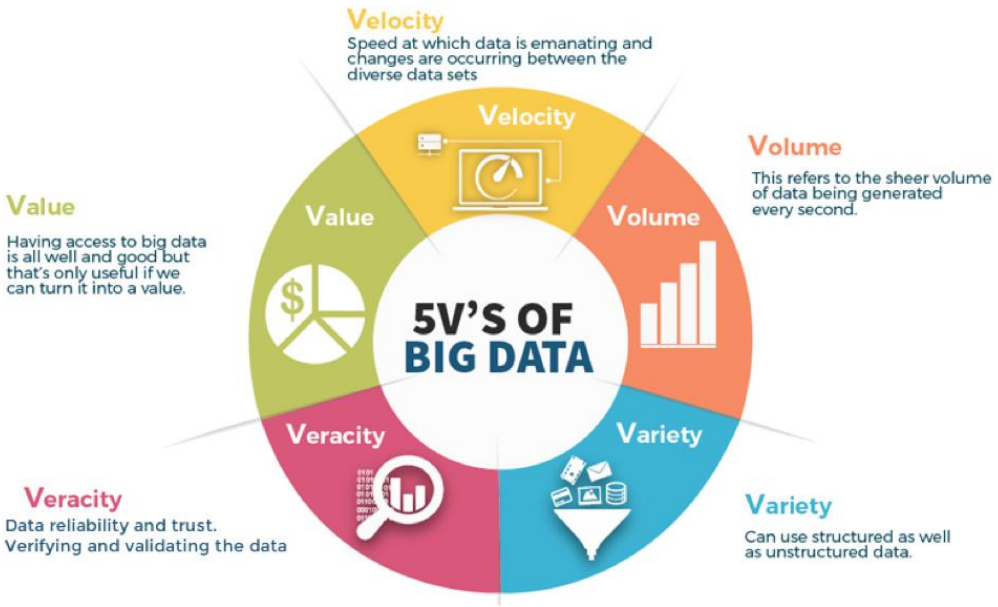
I. INTRODUCTION

1. BIG DATA

Big data refers to the usage of huge Data in the context of the processing and the volume of the data when it is concerned. Otherwise they are data sets which are too complex in which the traditional or conventional software's cannot efficiently and effectively process them. Big data analysis challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy, and data source. Big Data is associated with 3 main characteristics as: volume, velocity, variety and later two more characteristics are also the part of it in the name of veracity and value.

Big data may take structured or unstructured representation of the data, and it mainly helps us to extract hidden patterns and identify the trends, uncover unknown associations with various elements and entities to help in taking better decisions across the business processes in industries.

The five important characteristics of big data are:



i. **Volume**: Big Data is a vast 'volumes' of data generated from many sources daily, such as business processes, machines, social media platforms, networks and many more.

ii. **Velocity**: velocity plays an important role compared to others. Velocity creates the speed rate of change, and activity bursts. The primary aspect of Big Data is to provide demanding data rapidly.

iii. **Variety**: Big Data can be structured, unstructured, and semi-structured that are being collected from different sources.

iv. **Veracity**: veracity means how much the data is reliable. It has many ways to filter or translate the data. Veracity is the process of being able to handle and manage data efficiently.

v. **Value**: Value is an essential characteristic of big data. It is not the data that we process or store. It is valuable and reliable data that we store, process**,** and also analyse**.**

2. Analytics

Analytics deals with the discovery and finding out the hidden patterns from the data, where analytics depends on various fields like statistics, computer programming, domain specifications and many more in to its usage.

Organizations and industries are using analytics to improve the decision making aspects and to increase the performance activities and to optimize the existing procedures and things in their work place.

In the previous days the forecasting methods can be used by industries like banking and insurance companies but in recent days the analytics and forecasting can be used by retail companies in a big way.

Big data analytics is a form of advanced analytics, which involve complex applications with elements such as predictive models, statistical algorithms and what-if analysis powered by analytics systems.

In business, predictive analytics are predictive models exploit patterns found in historical and transactional data to identify risks and opportunities.

3. Retailing

The concept of retailing is selling of products or goods to customers by a vendor

Retailing is ―business activities involved in selling goods and services to consumers for their personal, family, or household use‖, Berman and Evans 2013. [6].

As with most other business activities, retailing is extremely competitive, and the mortality rate of retail establishments is relatively high. The basic competition is based on price, but, for brick-and-mortar retailers (those that operate within a physical building), this is moderated somewhat by non-price forms of competition such as convenience of location, selection and display of merchandise, attractiveness of the retail establishment itself, and intangible factors such as reputation in the community.

4. Tools used by Retailers in India

A. Real Time Merchandising Systems (RTMS):

Data forecasting people use this as the principle or one of the mechanism to forecast and analyse the pricing aspects as it is needed, generally retailers see there is subsequent drop down of the pricing aspect of their products in business when a specific season ends. RTMS algorithms take big data and recommend the correct time for pricing aspect of their products.

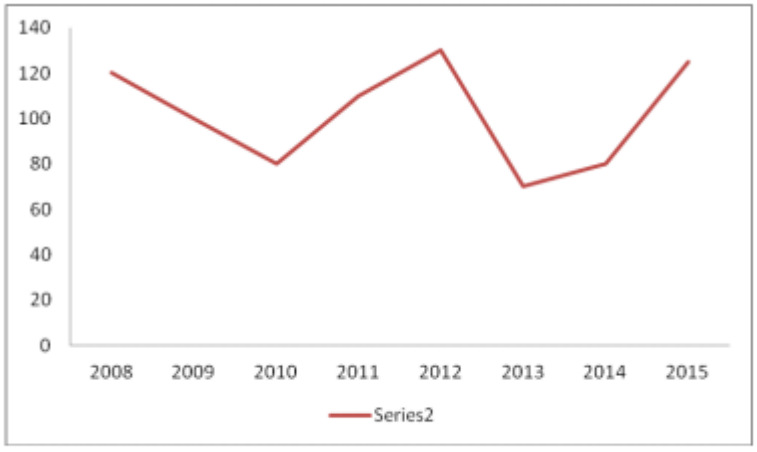
B. Trend forecasting algorithms:

Based on the past figures in the business the future can be predicted. It also uses time series analysis for predicting the future of data. Trend forecasting is based on tangible, concrete numbers from the past. It uses time series data, which is data where the numerical value is known over different points in time in the format of days or weeks or months or even years.

Retailers use a combination of social media data, browsing data, and ad-clicking experiences to formulate what we are thinking and loving at the moment. Representing these variables in the graph a mathematical model can be developed and that model can be used for future trend of the customers.

So if we have done a Google search to look for a guide for best mobile accessories, we should not be surprised if by the next day, by seeing ads related to mobile accessories on the sites. A small illustration is discussed below.

X (Year)	Y (Profit in thousands rupees)
2008	120
2009	100
2010	80
2011	110
2012	130
2013	70
2014	80
2015	125



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C. **Supply Chain and Price optimization:**

Every store want to attract good amount of customers towards their business, so as each customer want to get their product order in online very quickly, the retail companies generally receive millions of orders from customers on a daily basis and they want to dispatch the orders in a quick time. Hence industries link with the manufacturers and track their inventory. Amazon" uses big data systems for choosing the warehouse closest to the vendor to reduce shipping costs by 10 to 40% (Data for Amazon). Graph theory and related algorithms amazon uses to find the minimum path from source to destination for which minimum amount can be charged from customers.

To study the impact of use of big data in retail industry:

The retail shopping experience has changed intensely over the past few years. Competition is aggressive than ever with a growth of brick-and-mortar and online sellers for a consumer to choose from. Today's retailers are learning to clinch the changes brought by technology rather than lose customers to the convenience of online shopping. [4]

Impact of use of Big Data in retail: (Source: www.proactivecomputer.com)

a. In-store Marketing Tactics in the Real Time Data will be involved in real time and include heavy traffic and in-store checkout wait times. Retailers with in-store kiosks and free wifi, can empower their sales staff people with mobile devices to better serve tech-savvy customers on the spot.[3]

b. One-to-One Marketing through Personalization: Personalization in retail, shows that businesses are personalizing online user journeys, and are also able to quantify the improvement, and seeing an increase in sales of 19 per cent on average. Retailers who empower shoppers to build and customize products will prosper [3].

c. Spotting Most Valuable Customers There is an incredible pay off for retailers in being able to find and segment where their most profitable customers are in. Because it costs substantially more to acquire new customers than it does to retain a business's best customers. [3]

d. Deeper Insights into customers' Purchase Behaviours The growth of mobile devices, tablets and social media has fast-tracked the availability of new and revealing customer data. Retailers now know more than the basic demographic information about each customer. They can analyse customers' buying history, mobile and social media communications, buying preferences, etc.[3]

e. Leveraging Technology Evolution Retail companies have been investing in ERPs and aiming their efforts on confirming high quality of data and doing in-depth data analysis. This provides them with better insights into their customers that wasn't possible earlier.[3].

5. Challenges

Several challenges we have to see and tackle while using big data in the industries with respect to data privacy, data breaches, conflict resolutions in data access and storage etc. so skilled professionals need to be there in maintaining and running big data in industries and organizations.

6. Conclusion

In the retailing sector and market there is huge data disruption based on the quality of data generated from online, social media inclusion and many more technological interventions. Risk management, performance based enhancements and uncovering related aspects, are the paybacks organisations harvest through utilization of Big Data capabilities.

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