

# Big Data Analytics for Service Enhancement

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**Abstract**— Information revolution and tremendous usage of mobile, web applications has resulted to “Big Data”. With the data growing each second, ability to manage data has been a critical task. The existing infrastructure should be able to support the growth of data without tampering the running applications. Using the services from cloud providers organizations can cater to the demands of the customers. This paper focuses on customer service enhancement in business using big data .It focuses on business analytics and how industry can benefit by adopting this technology. By understanding the business performance, organizations can provide better service to the customers. Initially the paper explains why big data is required. Then it defines how organizations can benefit using big data technology. Few use cases are provided which defines how retail and telecom industry can gain profit. Finally the paper explains about nanotechnology and how big data can coexist with the future technology.

**Index Terms**—Big Data Analytics, Aaas

## I. INTRODUCTION

The information revolution and tremendous usage of mobile, web applications has resulted to “Big Data”. With the data growing each second, ability to manage data has been a critical task. The existing infrastructure should be able to support the growth of data without tampering the running applications. Using services like infrastructure, platform and software from cloud providers’, organizations can cater to the demands of the customers. Thus cloud architecture satisfies the demands of the organization. Organizations benefit using the applications running on cloud. Big data together with cloud allows the industry to operate smoothly .Big data expertise helps in predictive modeling, customer analytics, expense reduction and market analytics.

This paper focuses on customer service enhancement in business using big data .It focuses on business analytics and how industry can benefit by adopting this technology. By understanding the business performance, organizations can provide better service to the customers. Initially the paper explains why big data is required. Then it defines how organizations can benefit using big data technology. Few use cases are provided which defines how retail and telecom industry can gain profit. Finally the paper explains about nanotechnology and how big data can coexist with the future technology.

## II. BIG DATA

The emergence of data warehouses, smart phones and internet resulted in massive explosion of complex data. The

collection of large and complex datasets is difficult to process using the traditional relational database management systems. The advancement of big data was due to the large volumes of unstructured data and rising need to process various formats of data arriving at high speed. Social media, machine sensors, mobile devices generate several terabytes of data per second .Data warehouses cannot handle the processing demands posed by sets of big data that need to be updated frequently or even continually.

The machine sensors in the industry release terabytes of data each second to perform analysis. This amount of data cannot be handled by traditional databases. Among variety of data like audio, video, images, clickstream log, how can personalized recommendations be provided for each user? In stock markets, the computers need to process large amount of information per second and provide the best market orders for the customer. How fast can a data be analyzed to make a decision? The organizations need only data specific to the business that will help in generating revenue. Big data was developed to address the above issues. According to zdnet.com “Big data refers to the tools, processes and procedures allowing an organization to create, manipulate, and manage very large data sets and storage facilities”

Big data is important to business and society .More data may lead to more accurate analyses. More accurate analyses may lead to more confident decision making. And better decisions can mean greater operational efficiencies, cost reductions and reduced risk. Few areas where big data expertise can be used are healthcare, financial services, telecom and marketing analytics.

## III. BIG DATA ANALYTICS

Big data grows day by day. Retailers, financial sectors produce millions of real time transactions daily. Mere collection of data is useless. By performing analysis on the data and identifying the patterns using complex data mining algorithms can help achieve meaningful information. This information can be later utilized to make business decisions. To analyze such a large volume of data, big data analytics is typically performed using specialized software tools and applications. Usage of big data tools and software enables an

organization to process extremely large volumes of data and determine which data is relevant .This data can be analyzed to drive better business decisions in the future. This adds value to the business.

Consider how big data analytics is useful in retail industry .By tracing the customer search behavior, past purchase information, customer geographic location, social networking interactions following useful information can be extracted.

- 1) Identify customer buying pattern and predict his/her likes and dislikes.
- 2) Identify profitable customers and target advertisements
- 3) Bring change to business analyzing the requirement of customer
- 4) Determine root causes of failure in business, potentially saving billions of dollars annually.
- 5) Send recommendations to mobile devices while customers are in the right area to take advantage of offers

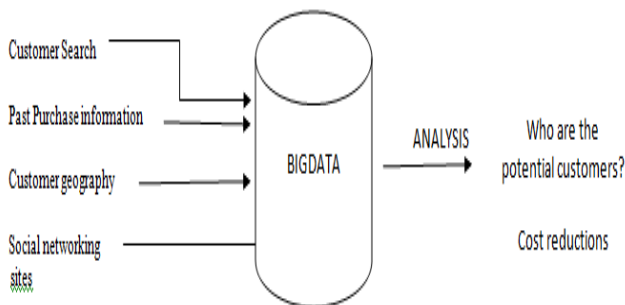


Fig. 1. Big data analytics in retail industry

Thus big data analytics help to provide service according to the requirements of the user. This enables the business to invest money in what is required .Besides retail, social media provides wide source of information. In Face book, the contents in the user profile reveal the user preferences. Based on user’s preference and friendship information this provides friend suggestions, member focused offer and target advertisements. For example if User1 is a friend of User2.Then User1 can receive friend suggestion from User2’s friend list.

Big data analytics use computation intensive data mining algorithms that run on high speed processors to produce timely results. For an organization to use analytics ,it may have to invest more on servers, hardwares and IT staff.

Cloud computing can provide infrastructure for high intensive calculation and storage required for big data analytics applications. Hence by using the Analytics as a Service (AaaS) offered by the cloud, cost reductions can be achieved. The organizations just have to pay for what service they use and invest their time effectively in making business decisions.

IV. BIG DATA AND NANOTECHNOLOGY

Nanotechnology helps to manufacture materials that reduce cost and provide better power savings. The advancements of nanotechnology are seen in

manufacturing, transportation, computing and telecommunication. The contributions are major in the field of electronics where the size of clock, mobile, watches has shrunk in size with greater power savings. The miniaturization of materials, energy efficiency and ability to use fewer materials to manufacture are the benefits offered by this technology. Medical sensors which can detect diseases even before symptoms arise are an example to this.

Ability to manufacture materials in smaller size will lead to growth of several devices thereby contributing to more information. A question arises as how to process the information from millions of devices. The big data analytics make use of data and provide valuable information to the business.

V. USE CASE

Consider the illustration for airline system where big data and nanotechnology are applied. The electronic systems used on aircraft provides plethora of information. It provides information regarding improved navigation and routing, collision avoidance system, weather etc.These information is collected by means of sensors fitted to the aircraft. Ability to manufacture smaller devices helps in deploying numerous sensors. It is necessary that information from all the sensors are aggregated to predict how a climate would be or to detect a malfunction. There can be gigabytes of data arriving at the same time from all the sensors which needs to analyzed and reported. In order to predict weather condition, raw data from the sensors, GPS information, history of previous recording all has to be preprocessed and analyzed using machine learning algorithms. The result thus obtained is used for decision making.

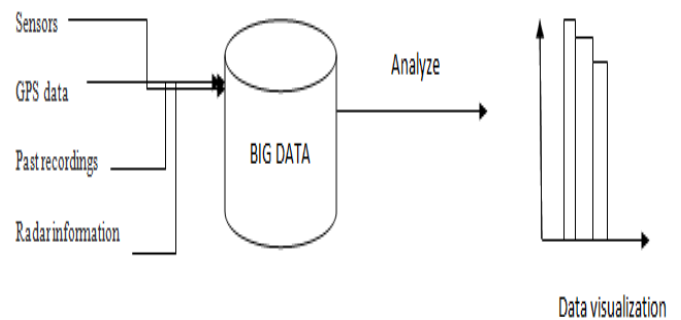


Fig 2. Airline system scenario

VI. CONCLUSION

Big data is a means to handle both structured and unstructured data. This technology can be used in various fields like medical, computers, physics etc. Hence an integrated skill of statisticians, mathematicians, programmers, biologists are required to find solutions to the unsolved problems. By making use of big data analytics organizations can reduce the expenditure, create more profit. By making use of services from the cloud, companies can invest their time productively in decision making. In future, with the advance of nanotechnology that creates data explosion big data analytics will help to predict

solutions to several problems by analyzing the hidden data patterns.

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