

Application of Big Data Analytics in Hospitality

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Article Info

Page Number: 523 - 530

Publication Issue:

Vol 71 No. 4 (2022)

Article History

Article Received: 25 March 2022

Revised: 30 April 2022

Accepted: 15 June 2022

Publication: 19 August 2022

Abstract

The new era of big data information management is here, and it's generating and storing a lot of data. Perhaps Big data has the potential to help hospitality firms grow. Companies in the hospitality industry will benefit from this, as it will help them grow both in terms of business and in terms of customer and guest experience. With any generation's technological transformation, Hands-on intervention, is possible with the ability of potential intervention. Many competitive and creative difficulties arise as a result of access naturally, the hospitality industry is involved. The aim of this study is to introduce about big data and big data analytics, its tools and application in hospitality industry. Here we have discussed about different types of big data analytics and the type of data they deal with. How these analytics techniques are useful in different areas of industry like predictive analytics in identifying future trends, prescriptive analytics is used to improve customer experience through past data and experience.

Keywords: Analytics, Big Data, Big Data Analytics, Hospitality Industry, predictions, visualization, Customer Experience.

Introduction:

Just imagine a world to be a place with no storage system for data a place where details about a being or an organization, or any transaction performed or any other aspect that can be stored and documented is lost immediately after it is used. Then the organization would not be able to extract useful information, perform analysis, predict opportunities and future up comings and provide advantage accordingly [1]. Data is the stepping stone upon which the organization flourish and grows. Thanks to technological breakthroughs and the internet, more and more data is created and processed to extract value out of it. Large volumes of data have become available as storage capacities and data collection methods have improved and have become widely accessible. Along with the size of data also comes the variety and veracity of data.

The problem of analysing the huge data or large volume of data did not occur suddenly or by chance one day, but have been there for past years. It is because the collection of data is found to be a simple task than finding useful insights from the data or say analysing data. Even though the computer system which we have today are much faster and have more storage than those in the beginning of 19's, but the large-scale data is still a burden to analyse by the computers we have today [2]. Several efficient and reliable methods have been proposed with respect to the matter of

processing large-scale and huge amount of data, which includes sampling of data, density-based approaches for processing data, divide and conquer approach, grid-based algorithm, data condensation, incremental learning, and distributed computing methods. These approaches and strategies are seen to regularly employed to increase the performance of data analytics process. The outputs of the algorithms and approaches mentioned above reflects that by using such efficient methods, we may be able to examine large-scale data in a limited span of time but we still need some better approach for analysis and processing. [3].

Fisher et al. stated in his paper and pointed big data not only means large scale data but the data that will become difficult to handle and processed by our current computer systems or methods. Fisher also marked that in the coming years the data will even become huge to be loaded and stored into a single node machine, it also highlighted that the ongoing data mining methods and data analytics tools which were developed for a centralized data analysis process may not be able to be applied directly [4].

The volume of big data is growing with a high pace rate resulting data from a few dozen terabytes (TB) to many petabytes (PB). The amount of data generated by Facebook is around 1 Tb that simply include the daily post. With the increase in amount of data comes the challenges associated with it which include collecting, sorting and storage, searching and sharing, analytic processing, and data visualization. Presently, all businesses are shifting towards analysis of massive amounts of extremely detailed data in order to uncover truths which were not known earlier and discover new insights [5].

Now a days, people are not only concerned with merely collecting data but want to study the data, this is where the concept of big data analytics steps in. Analytics can be defined as gaining insights, discovering and interpreting. Big data analytics is referred to as a “process of examining data to uncover information such as hidden patterns, trend, correlation and marketing strategy”. Starting from choosing the movie to watch on Netflix to making business decision analytics play a role.

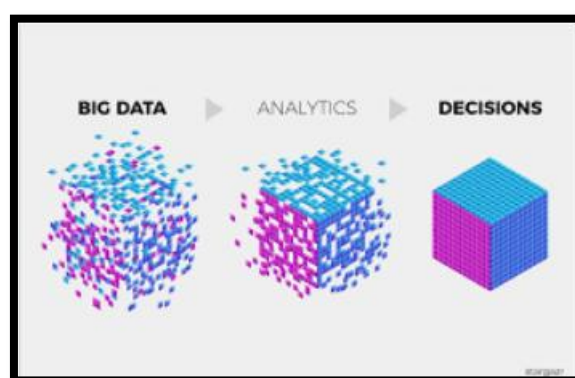


Fig:1 analytical process

The simple example that can be stated is social media: for social networking and content sharing, social media has recently grown in importance. The amount of content generated by social media platforms is immense and mostly unexplored. Social media analytics, on the other hand, can be useful in analyzing and extracting relevant information and predictions from such data [6]. Social

media analytics is the process of collecting, monitoring, summarizing and visualizing social media data and it is based on building and assessing informatic framework and tools. Analytics also makes it easier to comprehend people's emotions and dialogues in online groups, along with extracting some relevant patterns and perception from their interactions like suggested gifs and stickers [7].

Big Data Analytics

The importance of big data relies in its capability to supply valuable information, quick decision making and quality judgments based on data. The decision-making process has been a highlighted and well-discussed issue in study for years. Thus, in support of decision making for different business models we have various types of big data analytics [19].

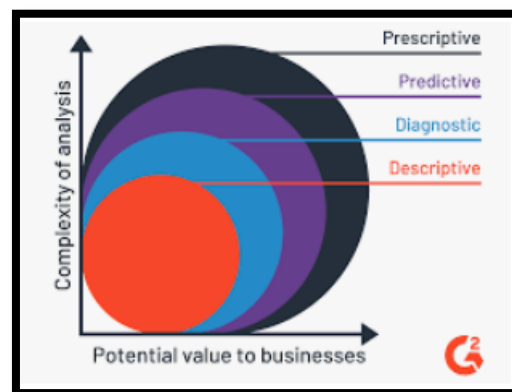


Fig:2 types of analytics

Descriptive analytics is the process of gathering data and using it to describe, interpret, and draw conclusions about the data. This process is used to answer the questions, Who, What, When, Where, and How much. This data can be used to draw conclusions about the current state of the company and the direction it is headed in the future. It enables management in better decision making by identifying areas of strength and weakness [8].

Diagnostic analytics is one kind of analytics that takes data into consideration to find the cause of the problem or be liable to answer the question, “Why?” Diagnostic analytics investigate the root cause of the problem or the situation. It can be achieved by making use of techniques such as drill-down, data discovery, data mining and correlations [18].

In data mining, we frequently have to create a model that may be used to forecast the occurrence of an event. The builder model will extract information from historical data and represent it in a way that the resulting model can be applied to new similar scenarios. This is known as **predictive analytics**. Classification and regression are important to what we often refer to as data mining and, more precisely, predictive analytics. Much of what we do in data mining is referred to as predictive analytics. This is also known as supervised learning in the context of machine learning [9]. The historical data on which we base our models will already have certain outcomes linked with it.

For a given set of problem there is always n number of solution but only the optimum solution is the one which is considered whether it is scientific solution or analytical problem. Use of data to find the best course of action or to obtain an optimum solution is called **prescriptive analytics**.

Prescriptive analytics make use of if else algorithm to find the solution of a problem. The data-driven decisions tend to be more reliable thus, prescriptive analytics is considered as a mechanism for informing decisions and plans. [18].

Big Data Analytics and Hospitality

The hospitality industry is considered to be a huge industry which is broadly classified and spreaded across various services. It includes hotels, travel and tourism along with other services like lodging, event planning, food and drink service, theme park, restaurants and bars. Big data is stealing the hospitality industry by associating with customer behavior and interaction. A drastic change has been observed in customer pattern and preference and thus big data has enabled the industry to provide sophisticated services even before the customer think of it. The industry agrees upon the fact they have been able to grow and increase performance and revenue [11].

Application of data analytics

Risk Management:

Risk is something that goes hand in hand as the organization grows. It has been said that “you cannot avoid risk but can always mitigate risk”. Big data analytics helps the organization to look into future using predictive analytics and take necessary actions to mitigate such risks. The actions can be determined through prescriptive analytics. Let us consider the example here during the covid situation the industry was able to adapt to new normal guidelines quickly which helped them to continue operations [11].

Product development and innovation:

Getting the feedback from the customer at the reception desk is not the end of the task. The feedback data that is collected or obtained from customer is stored and then used and processed by businesses to gain insights on the performance of their product and further, decide whether it is to be continued or stopped. The insights or data obtained are considered the key to innovations, as far as product innovation is concerned. They can be used to manipulate business decision, change in operational strategies and marketing techniques. In case of hospitality one instance that can be taken into account is average service time being directly proportional to customer turnover along with waiting time statistics which is correlated with data of arrival time of customer with settlement and departure time so that hotel management can more accurately estimate elapsed production and service time and improve services accordingly. [14].

Better decision making:

The decision-making process has become faster with fastest growing world. It is reported that big data analytics play a significant role in reduce response time and quick decision-making process in the organization. Which has improved overall business efficiency. When we talk about hotel and tourism industry, they are always quick in decision making process like flexible room pricing strategy, customer loyalty programs to attract new customers and to retain old ones, on spot

discount and vouchers and paid promotions, adapting new normal after and during covid. And if the services are not acceptable by customers, they can always use the strategy to remodel [17].



Fig:3.1 decision process

Improved customer experience:

Tourism industry is becoming vast and is expected to grow in the coming years therefore understanding what customer wants from the industry has become important. Because customers now find their stay at a hotel more of an experience rather than just a visit. The hospitality industry is able to introduce different luxurious facilities that include dining, entertainment nights, saloons and spas, corporate meeting and public seminars and get-together along with many other aspects over the past few years all of these contribute to a positive customer experience. A given client will have varied levels of interest in the variety of activities. Analytics play a crucial role in assisting hotels in better understanding these different client needs [15].

Customer profiling:

In easy terms customer profiling can be defined as segmenting group of customers on the basis of shared traits these traits can be interest, hobbies, income level, status and age. Thus, study of guest demographics and their lifestyle traits is used to create customer cluster. These clusters will be then later on converted to various customer profiles. Profiling further can be used to create email and calling list for targeted customer and potential customers. Algorithms can be applied to identify repetitive customers, clients who are most likely to respond to marketing or promotional messages, customers who will market word of a mouth. It can also help you figure out which customer segments are the most profitable one and which are the productive one hence this will lead the industry towards a directed goal of customer satisfaction. [15]

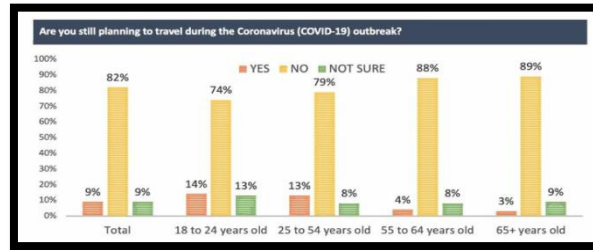


Fig:3.2 Customer profiling

Problems while dealing with data

Privacy and ethics in industry:

Once you are on internet your data is no longer save you got no privacy then. But it's in the hands of the organization to make sure customer privacy is maintained and data is used ethically. Same goes with hospitality industry, when you surf over the internet about various hotels or travel destination your activities are observed and such data is collected now this informative data can be used to predict customer requirement, customer behavior and even provide you competitive advantage. Once the data is shared by the customer its privacy is in the hand of the organization this will even help them to gain the trust of customer. Thus, the industry needs to protect such huge data and for that you require reliable servers and storage system which tend to lack and so is the privacy [13].

Inefficient use of data

Collecting and storing data is not enough. If the hospitality industry really needs to grow then they should start optimizing the data collected and use it efficiently towards strategic planning. The report says that hospitality industry collects huge amount of data but is wasted on customer loyalty program. For instance, make my trip offers large number of discounts to the customers who help them in retaining their loyalty program. But its high time the industry needs to focus on other sectors liking attracting new ones, better performance than competitors, retaining old ones and not just focusing on the ones who yield profit. Profits can help you grow but will not let you expand. Thus, make efficient use of data collected and move towards strategic planning. [13].

Data disasters

With the advancement in technology, we are just some clicks away to perform any task starting from entertainment to paying bills, advance bookings of hotels, flights, train or bus. But these clicks require sharing the private information over the server, like personal details, credit card information, UPI id etc. And the hotel industry completely relies on the data that is collected (personal information and feedback) the industry tends to keep its records on the onsite servers and access the data from there. Now here arises the problem of data loss in case of any unwanted event like hacker attack or if the server goes out this also make the organization liable for all information leak and could even cause heavy loss.[13].

Example:

In hospitality industry, profit making is not new. Differentiating rates for different category of people according to their loyalty and their frequent use of services has been managed successfully for centuries by implementing various loyalty programs and providing discounts vouchers and coupons. Big data gives this scheme a new turn by clustering customers as per their needs and providing genuinely tailored price and rooms to the customers

Big data analytics comes with big data analytics algorithms these algorithms help you in understanding the decision-making process and takes you towards the expected output. Marriot the hotel chain we all are aware has made use of big data analytics and continue to do so for better results. It is reported that they used analytics to estimate the best suited price for the rooms in order to keep their rooms occupied. They achieved this by collecting and merging different data sets these sets can be feedback data and analysed the data and made insights for better strategy and improve revenue management with the algorithms that can deal with such data and provide reliable results.[16].

Indian hospitality industry during and after covid data analysis:

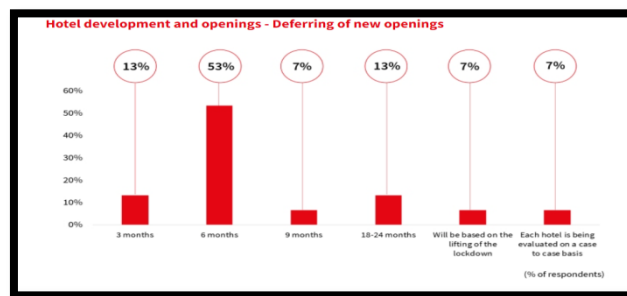


Fig:4.1 hotels data

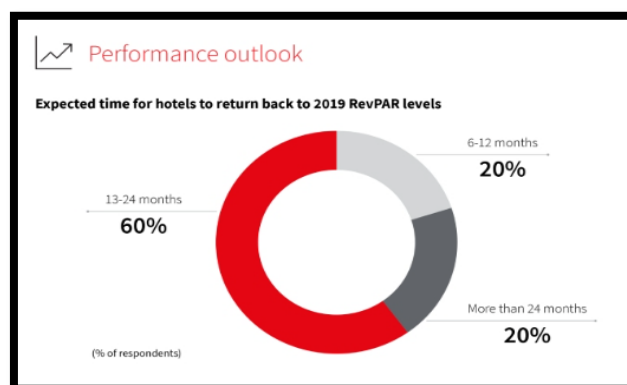


Fig:4.2 expected recovery time after covid (donut chart)

Conclusion

So far, we have discussed about what is big data, evolution of big data and how big data can be processed for analytical purposes. We came across different types analytics and their contribution in

the industry. The paper discusses about how big data analytics play a role in quick decision making, increasing revenue, customer satisfaction and product development and innovation. No matter what all purposes the technology solves there comes the cons with it hand in hand. Hospitality industry relies completely on customer feedback and response. There are times when customer do not provide honest reviews. This may be due to lack of customer trust in the organization or they may fear their personal information may be used mal practices like hacking and corrupting. Along with this it has been observe the data collected is not completely utilized by the industry to yield better results.

The stated example of Marriot hotel industry chain completely reflects that when data is analyzed and used optimally can result in more footfall of satisfied customers indirectly resulting in growth of profits and helping the organization to survive in long run. Similarly, can be sated for the times of covid, the organizations or the hotels or tourism businesses which were able to quickly adapt to the environment are still running their business while other cannot survive and hence closed their work. So, we need big data analytics hand in hand to smoothly run our activities and to survive in the industry and to take advantage of market before our competitors can take.

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