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ABSTRACT

Business Data Management is used for analysis of any Business Data of any domain through which we can reach to a particular solution by which we can solve that particular problem faced by shopkeeper

Here I have collected the data from business of Grocery Domain of which products are sold at what price and quantity of no of products sold by shopkeeper and took look out what problem faced by shopkeeper in his bussiness and analysed his data which was provided to me by him I have Analysised using python as by total no of products sold by him and purchased by buyer and seen total revenue obtain by shopkeeper ,And I have calculated which distribution gets most fit for shopkeeper data that is possion distribution or normal distribution and accordingly I have plotted graph i.e based on skewness,Kurtosis , elascticty we can reach to some conclusion. And according to various Statistical figure I have provided him necessary Solution.

INTRODUCTION

Data Analysis is essential as it helps businesses understand their customers better, improves sales, improves customer targeting, reduces costs, and allows for the creation of better problem-solving strategies. The purpose of Data Analysis is to extract useful information from data and taking the decision based upon the data analysis. Data processing is essential for organizations to create better business strategies and increase their competitive edge. By converting the data into readable formats like graphs, charts, and documents, employees throughout the organization can understand and use the data. Data, is collected and analyzed to answer questions, test hypotheses, or disprove theories.

Business Analytics has become an integral part of business operations and performance management. Businesses and corporations who wish to gain a competitive edge in the market during modern times must employ the services of skilled business analysts to do so. Without utilizing data effectively and without a dedicated analytics team, companies will not be able to sustain themselves in this world where the competition employs various analytical tools and techniques to facilitate peak performance. It's not just about performance, as business analytics can help companies increase revenue by cutting costs and decreasing waste.

MOTIVATION FOR BUSINESS ANALYTICS

“Using data analytics is a very effective way to have influence in an organization,” said Harvard Business School Professor Jan Hammond, who teaches the online course Business Analytics, in a Interview. “If you’re able to go into a meeting and other people have opinions, but you have data to support your arguments and your recommendations, you’re going to be influential.

Advantages of Big Data For Business Analytics

Here are some advantages of using Big Data for Business Analytics:

- **More Informed Decision Making:**

Big data allows companies to work with a huge amount of user or customer data that allows them to make better decisions. A lot of past or historical data also helps companies predict more accurately.

- **Faster Decision Making:**

Using machine learning, big data can predict and identify patterns rapidly. This speeds up decision-making and allows businesses to use a lot of data very fast. The compiled data can also be processed alongside fresh incoming data, which has helped companies make informed decisions in real-time.

- **Cost Reduction:**

Generating and collecting your own data is the most cost-effective method, as sourcing data from third parties is much more expensive. Also, saving past data enables you to generate only the relevant data and not waste time on generating the same leads or information again. Also, big data, in general, helps businesses cut costs. Thus, the importance of data analytics in business is truly seen when companies increase their revenue with the help of big data.

- **Providing Better Service to Customers:**

With the help of big data, companies can understand customers’ buying behavior and can then effectively provide the after-sales services or complementary services that they might require. With the help of an enormous amount of data such as posts, comments, and messages on social media, companies can even figure out customer sentiments and how satisfied these customers are with the company’s products or services.

- **Finding New Opportunities:**

Businesses can discover new opportunities with such huge volumes of data. With the help of this data, businesses can come up with major solutions to problems or come up with fresh concepts and product ideas. They might also be able to figure out how to improve sales or reach out to more consumers finally.

- Having a Competitive Edge over Competition:

Businesses that use big data are able to project more superior business models and make better predictions that allow them to have the edge over their competitors who are using more traditional methods. Forecasting is more accurate with big data, and companies can directly increase their performance in the market with the help of these advanced insights

Scope And Future of Business Analytics-

The scope of business analytics is massive, and the future seems bright for people pursuing this field. More than 2.5 quintillion bytes of data are generated every day, thus ensuring that businesses cannot function without business analytics anymore. The world produces more data now in two days than we did in total from the beginning of civilization till 2003. This simply reinforces the fact that if we wish to effectively use this data to enhance the performance of our website, business, product, service, we must rely on business analytics.

53% of companies use business and data analytics in their daily operations, while many smaller enterprises have started adopting analytics ever since the Covid-19 pandemic started. Business analytics is also one of the most desirable jobs now, with companies always in dire need of skilled analysts. The growing dependency on data and the reliance on business analytics will only increase with more advancements in technology and a more fast-paced world where the competition is armed equally well with business intelligence and data.

HISTORY

Analytics have been used in business since the management exercises were put into place by Frederick Taylor in the late 19th century. Henry Ford measured the time of each component in his newly established assembly line. But analytics began to command more attention in the late 1960s when computers were used in decision support system. Since then, analytics have changed and formed with the development of enterprise resource planning (ERP) systems, data warehouses, and a large number of other software tools and processes.

In later years the business analytics have exploded with the introduction of computers. This change has brought analytics to a whole new level and has brought about endless possibilities. As far as analytics has come in history, and what the current field of analytics is today, many people would never think that analytics started in the early 1900s with Mr. Ford himself.

Analytics and visualizations have been used throughout history without the support of computers and software. This was done by manually plotting graphs using statistical methods and manually recording data. This was quite different from the business analytics that we recognize and know about. The more modern version of business analytics was only used much later in the 20th century to identify trends during the Second World War. This process of identifying trends helped code-breakers use data from encrypted messages such as destination (recipients of the messages), origin, and the time and date of these messages to find out what information these contained. This is a more modern use of analytics to predict information. However, we have also seen business analytics being used a bit earlier in history. Sir Henry Furness, a well-documented banker, had been extensively using data during the 1860s to stay ahead of his competition.

Here are some more historical facts about business analytics:

- During the early 1900s, Henry Ford, inspired by Frederick Taylor's scientific management system, hired him in order to measure the performance of the assembly line of his famous Ford Model T. This led to a series of events that had transformed the manufacturing industry and production lines across the world. This also helped Henry Ford make his assembly line as efficient as possible.
- In 1956, IBM introduced the first hard disk drive that allowed users to store data that can be used for business or corporate purposes.
- During the 1970s, Bill Inmon started discussing the concept of a data warehouse to solve the problem of storing vast amounts of data for business intelligence.

- During the 1980s, the first business data warehouse was developed by IBM researchers Barry Devlin and Paul Murphy.
- In this period between the 1990s and early 2000s, various solutions and software were introduced, such as business intelligence tools by companies like SAP, Microsoft, SAS and IBM alongside relational databases.
- After the early 2000s, common people started using data more proactively for personal purposes. This also led to more corporate use of data through employees extensively using organisational data. More tools were also introduced during this time with which individuals can use business intelligence tools without extensive training. Eventually, Google Analytics was introduced that allowed website owners to analyse statistics about their website, such as trends in website visits.

APPLICATION

- **Marketing**
Studying buying patterns of consumer behaviour, analysing trends, help in identifying the target audience, employing advertising techniques that can appeal to the consumers, forecast supply requirements, etc.
For example: Use Business Analytics to gauge the effectiveness and impact of a marketing strategy on the customers. Data can be used to build loyal customers by giving them exactly what they want as per their specifications.
- **HR Professionals**
HR professionals can make use of data to find information about educational background of high performing candidates, employee attrition rate, number of years of service of employees, age, gender, etc. This information can play a pivotal role in the selection procedure of a candidate.
For example: HR manager can predict the employee retention rate on the basis of data given by Business Analytics.
- **Manufacturing**
Business Analytics can help you in supply chain management, inventory management, measure performance of targets, risk mitigation plans, improve efficiency in the basis of product data, etc.
For example: The Manager wants information on performance of a machinery which has been used past 10 years. The historical data will help evaluate the performance of the machinery and decide whether costs of maintaining the machine will exceed the cost of buying a new machinery.
- **Credit Card Companies**
Credit card transactions of a customer can determine many factors: financial health, life style, preferences of purchases, behavioral trends, etc.
For example: Credit card companies can help the retail sector by locating the target audience. According to the transactions reports, retail companies can predict the choices of the consumers, their spending pattern, preference over buying competitor's products, etc. This historical as well as real-time information helps them direct their marketing strategies in such a way that it hits the dart and reaches the right audience.

Other than above, Business Analytics is helpful in various areas such as the fraud detection, health-care, defence, sales, etc. Like Mohit, if you're fascinated by numbers, and want a challenging job role, you should definitely have a career in the field of business analytics. Data can be an intelligent tool to foster your brand name in the economic market. Business Analytics lets you exploit this opportunity to make better business decisions.

Data Analytics Applications

Now that we know and understand what data analytics and its types are, we should also understand the different ways in which it is used. The truth is that it has use cases across many business verticals.

Here are some of the data analytics applications across different industries:

- Retail Understanding customer needs and buying habits to predict trends, launch new products, and boost sales.
- Healthcare Analysing patient data for lifesaving diagnosis and treatment. Data analytics also helps in developing new drugs.
- Manufacturing Data analytics helps in solving complex supply chain issues, labour constraints, and breakdown of equipment.
- Banking Pointing out probable loan defaulters and detecting frauds

Logistics Developing new business models and optimizing routes.

Different Types of Data Analytics

We've put together four different types of data analytics,

- Descriptive This surface-level analysis is aimed at analysing past data through data aggregation and data mining.
- Diagnostic This kind of analysis explores the “why”. For instance, diagnostic analysis can help in understanding the reason behind a sudden drop in customers for a company.
- Predictive This, as the name suggests, helps in predicting the future course. This is done through actionable, data-driven insights which businesses can use to plan their future.
- Prescriptive This kind of analytics helps in understanding how predicted outcomes can be used. This is a complex type of analytics involving algorithms, machine learning, and computational modelling procedures.

For performing data analytics, data analysts require a few important tools like Python, R, Tableau, Power BI, and SAS. We've described them briefly below

Data Analytics Tools

- Python – This object-oriented open-source programming language is used for manipulating, visualizing, and modelling data.
- R – An open-source programming language used in numerical and statistical analysis.
- Tableau – This helps in creating several kinds of visualizations for presenting insights and trends in a better way.

- Power BI – This is a business intelligence tool that supports multiple data sources, helps in asking questions and getting immediate insights.

CHALLENGES FACED BY BUSINESS ANALYTICS

Business analytics depends on sufficient volumes of high-quality data. The difficulty in ensuring data quality is integrating and reconciling data across different systems, and then deciding what subsets of data to make available.

Previously, analytics was considered a type of after-the-fact method of forecasting consumer behaviour by examining the number of units sold in the last quarter or the last year. This type of data warehousing required a lot more storage space than it did speed. Now business analytics is becoming a tool that can influence the outcome of customer interactions. When a specific customer type is considering a purchase, an analytics-enabled enterprise can modify the sales pitch to appeal to that consumer. This means the storage space for all that data must react extremely fast to provide the necessary data in real-time.

Managing Vast Amounts of Data

A vast amount of data daily can build up into a massive mess without an automated data management solution.

Look at it this way. Data is created for every interaction across your different channels – email, social, website, paid search ads, virtual store. With time, analyzing it can get overwhelming, hindering the completeness of the insights obtained.

However, you still need to leverage the data to obtain insightful information to boost your business growth and stay ahead of the competition.

Thus, to avoid the time-consuming and inefficient procedure, not forgetting the high risk of inaccuracy, it's essential to use analytics tools to collect, manage, and analyze the data in real-time.

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1. Collecting Meaningful Data

With the high volume of data available for businesses, collecting meaningful data is a big challenge. Ideally, employees spend much of their time sifting through the data to gain insights, which can be overwhelming. Besides, it's impossible to sort and analyze all the data available in real-time, which might fail to provide accurate and relevant reports.

Nonetheless, you can easily overcome this problem using an appropriate data analytics tool. The tool can help you collect, analyze, and provide real-time reports for better decision-making. On the same note, it reduces the number of time employees spend collecting and analyzing data, thereby boosting productivity.

The use of data analytics tools should also go hand in hand with employee training on effective data utilization, either through online training programs or coaching workshops.

2. Selecting the Right Analytics Tool

Without the perfect tool for your business data analytics needs, you may not be able to conduct the data analysis efficiently and accurately.

Different analytics tools (Power BI, Tableau, RapidMiner, etc.) are available, and they offer varying capabilities. Besides finding software that fits your budget, you should consider other factors such as your business objectives and the solution's scalability, integration capabilities and the ability to analyze data from multiple sources, etc.

If you have a data analyst, they should be well-versed in how to select the right tool. But since the analytics landscape is changing quickly, those not conversant with modern data analytics could enroll in a refresher course such as the Tabulea Data Analyst Certificate to hone their skills. Alternatively, you could consult an expert to guide you on the best tool based on your business needs.

3. Data Visualization

Data requires to be presented in a format that fosters understandability. Usually, this is in the form of graphs, charts, infographics, and other visuals. Unfortunately, doing this manually, especially with extensive data, is tedious and impractical. For instance, analysts must first sift through the data to collect meaningful insights, then plug the data into formulas and represent it in charts and graphs.

The process can be time-consuming, not forgetting that the data collected might not be all-inclusive or real-time. But with appropriate visualization tools, this becomes much easier, accurate, and relevant for prompt decision making.

4. Data From Multiple Sources

Usually, data comes from multiple sources. For instance, your website, social media, email, etc., all collect data that you need to consolidate when doing the analysis. However, doing this manually can be time-consuming. You might not be able to get comprehensive insights if the data size is too large to be analyzed accurately.

Software built to collect data from multiple sources is pretty reliable. It gathers all the relevant data for analysis, providing complete reports with minimal risk of errors.

5. Low-Quality Data

Inaccurate data is a major challenge in data analysis. Generally, manual data entry is prone to errors, which distort reports and influence bad decisions. Also, manual system updates pose the threat of errors, e.g., if you update one system and forget to make corresponding changes on the other.

Fortunately, having the tools to automate the data collection process eliminates the risk of errors, guaranteeing data integrity. More so, software that supports integrations with different solutions helps enhance data quality by removing asymmetric data.

6. Data Analysis Skills Challenges

Another major challenge facing businesses is a shortage of professionals with the necessary Analytical Skills. Without in-depth knowledge of interpreting different data sets, you may be limited in the number of insights you can derive from your data.

In addition to hiring talent with data analysis skills, you should consider acquiring software that is easy to use and understand. Alternatively, you could conduct training programs to equip your employees with the most up-to-date data analysis skills, especially those handling data.

7. Scaling Challenges

With the rapidly increasing data volume, businesses are faced with the challenge of scaling data analysis. Analyzing and creating meaningful reports becomes increasingly difficult as the data pile up.

This can be challenging even with analytics software, especially if the solution is not scalable. That's why it's important to consult before acquiring a tool to ensure it's scalable and supports efficient data analysis as your business grows.

8. Data Security

Data security is another challenge that increases as the volume of data stored increases. This calls for businesses to step up their security measures to minimize the risks of potential attacks as much as possible.

There are several ways of mitigating the risk, including; controlling access rights, encrypting data with secured login credentials, and conducting training on big data. Alternatively, you could hire the services of cybersecurity professionals to help you monitor your systems.

9. Budget Limitations

Data analysis is a cost-intensive process. It can be a costly investment, from acquiring the right tools to hiring skilled professionals and training the employees on the basics of data analysis. Again, with the high volatility of data, the managers have to be proactive to secure the system and address any security threats while scaling the system to accommodate the growing volume of data.

Ideally, risk management is a small business function, and getting budget approvals to implement the strategies can be a challenge. Nonetheless, acquiring the necessary tools and expertise to leverage data analysis. So the managers have to be strategic about the solution they receive and provide detailed return on investment (ROI) calculations to support the budget.

10. Lack of a Data Culture

The success of data analysis in a business depends on the culture. In a research paper on business intelligence, 60% of companies claimed that company culture was their biggest obstacle. However, most companies are not data-driven. They have not equipped the employees yet with the necessary knowledge on data analysis.

To overcome this challenge, it's crucial to equip your employees to support data culture by providing the necessary training.

11. Data Inaccessibility

Data collected can only benefit the business if it's accessible to the right people. From the analysts to the decision-makers, businesses need to make sure every key person has the right to access the data in real-time and be fully empowered with knowledge on how to analyze different data sets and use the insights.

Mainly, businesses restrict system access for security reasons. But with appropriate security safeguards, you can enhance safer and unrestricted data access for analysis and decisionmaking purposes.

Big Data – Overview

Data is the most important aspect of business analytics. The Meaning of ‘big data is, fundamentally, data that is too complex, and more importantly, too massive to be processed by traditional methods or software. Modern business analytics is highly focused on mining, analyzing, and extracting insights from large datasets. This is why big data is a huge deal in this day and age. Companies collect massive chunks of data on a daily basis as they keep operating, and this data consists of multiple complex pieces of information associated with customers, products, performance, finance, etc., that must be maintained properly and then effectively used for future operations. For instance, businesses can use past data collected over many years to predict customer behavior, such as buying patterns. Or, banks can use customers’ credit history when deciding upon eligibility. Histories of other customers can also be studied to predict the likelihood of certain events, such as buying substitute products.

Big data is a treasured part of business analytics, and analysts have started getting comfortable working with big data in organizations of all sizes. Big data has also directly encouraged the use of Machine Learning (ML) when working with massive datasets. ML allows data to be extracted without errors, structured and utilized much more effectively.

DESIGN AND ANALYSIS OF SYSTEM

1. Poisson Distribution (P_o):

It is denoted as $X \sim P_o(\lambda)$. And is read as X is a discrete random variable that follows Poisson Distribution with parameter λ .

Where λ is the expected rate of occurrences.

Poisson Distribution is a discrete probability distribution function that expresses the probability of a given number of events occurring in a fixed time interval.

Examples:

- The number of diners at a restaurant on a given day.
- Calls per hour at a call centre.

2. Normal or Gaussian Distribution (N)

It is denoted as $X \sim N(\mu, \sigma^2)$. And is read as X is a continuous random variable that follows a Normal distribution with parameters μ, σ^2 .

Where μ is the mean, and σ^2 is the variance. Mean, Variance together talks about shape statistics.

A normal distribution is a continuous distribution that describes the probability of a continuous random variable that takes real values.

Examples: Heights of people, exam scores of students, IQ Scores, etc follows Normal distribution.

Properties of Normal distribution:

- The random variable takes values from $-\infty$ to $+\infty$
- The probability associate with any single value is Zero.

CONCLUSION

The importance of data analytics in business is massive; companies cannot operate effectively in this day and age without relying on data and business analytics. Businesses can reduce wastage, remove errors, and increase revenue with business analytics. Ever since data started being used for making business decisions, the world has changed drastically, with products and services getting better and consumers getting exactly what they want, when they want, without much effort.

Data Analysis and Conclusion Definition-

Data analysis includes the inspection, modification, modeling, and transforming of data as per the need of the research topic. The conclusion is the final inference drawn from the data analysis, review of literature, and findings

FUTURE ENHANCEMENT

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