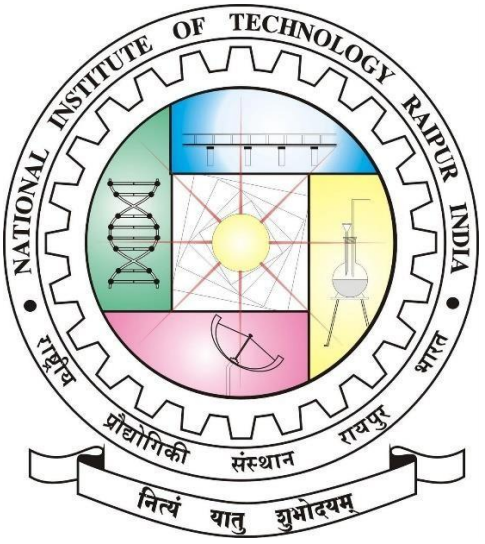
National Institute of Technology,

Raipur



Term Paper

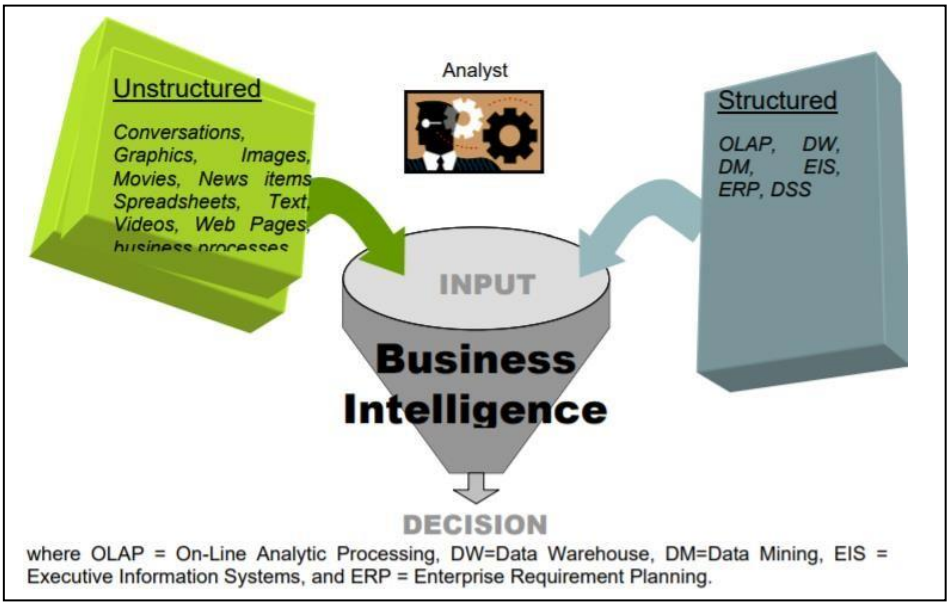
MACHINE LEARNING FOR BUSINESS ANALYTICS

Name: Abhinav Lodh
Roll No. 19117001
Semester: 6th
Branch: Electrical Engineering

INTRODUCTION

Machine learning is an important component of artificial intelligence. Machine learning is collecting data, analyzing data, and prediction data for industrial applications. Machine learning learns automatically from the data and behaves accordingly without explicitly programmed. Data analytical is required to evaluate and estimate the benefits of organizational goals. It is used to formulate equations, models and functions within systems. Data analytics required statistics, artificial intelligence, data mining, deep learning, prediction mechanism, and so on to evaluate the evaluation of data within an organization. The statistical analysis leads to work on the behavioral function of industries along with analysis of collecting data, presentation, processing, and visualization for different purposes including uses, re-uses, filtering, binning, etc. **Business analytics** (**BI**) comprises the strategies and technologies used by enterprises for the data analysis of business information. BI technologies provide historical, current, and predictive views of business operations. Business analytics can be used by enterprises to support a wide range of business decisions ranging from operational to strategic. Basic operating decisions include product positioning or pricing. Strategic business decisions involve priorities, goals, and directions at the broadest level. In all cases, BI is most effective when it combines data derived from the market in which a company operates (external data) with data from company sources internal to the business such as financial and operations data (internal data). When combined,external and internal data can provide a complete picture which, in effect, creates an "analytics" that cannot be derived from any singular set of data.

BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and decision makers. Implicit in this definition is the idea (perhaps the ideal) that business analytics systems provide actionable information delivered at the right time, at the right location, and in the right form to assist decision makers. The objective is to improve the timeliness and quality of inputsto the decision process, hence facilitating managerial work.



Inputs to Business Analytics Systems

WHAT MACHINE LEARNING CAN DO FOR BUSINESS

For businesses, machine learning can manage the heavy data lifting necessary to get to the core of your performance.

For example, machine learning algorithms can identify the factors that are contributing to and detracting from your brand health by analyzing your data from every angle. Machine learning is unique in that it can quickly identify relationships that may not be immediately apparent or intuitive to humans.

Say your brand exhibits positive trends. Sales are increasing year over year. Penetration is up. Every graph and visualization arcs in a positive direction.

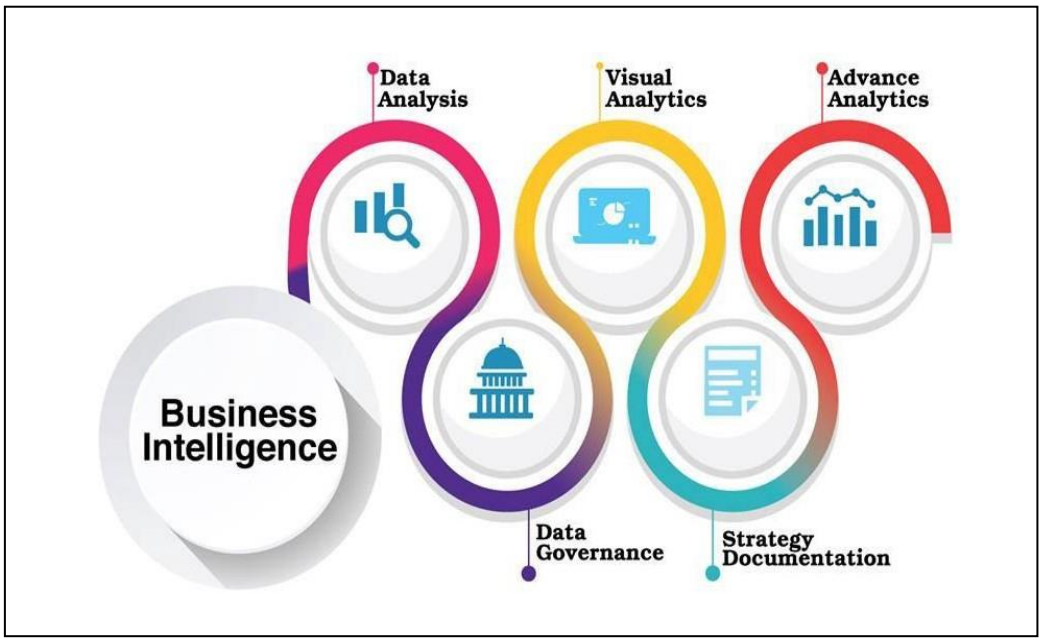
With good numbers in hand, it can be easy to miss the bigger picture. And frankly, your team likely doesn't have the bandwidth to dive deep, especially when things look good on the surface.

Machine learning algorithms can identify the underlying currents. Sales may be increasing, but your market share is stagnant and the brand's category is declining nationally. Meaning, sales are only a part of what they could be, and failure to adapt to a changing marketplace could result in decline over time.

BUSINESS ANALYTICS

Business analytics can help companies make better decisions by showing present and historical data within their business context. Analysts can leverage BI to provide performance and competitor benchmarks to make the organization run smoother and more efficiently. Analysts can also more easily spot market trends to increase sales or revenue. Used effectively, the right data can help with anything from compliance to hiring efforts. A few ways that business analytics can help companies make smarter, data-driven decisions:

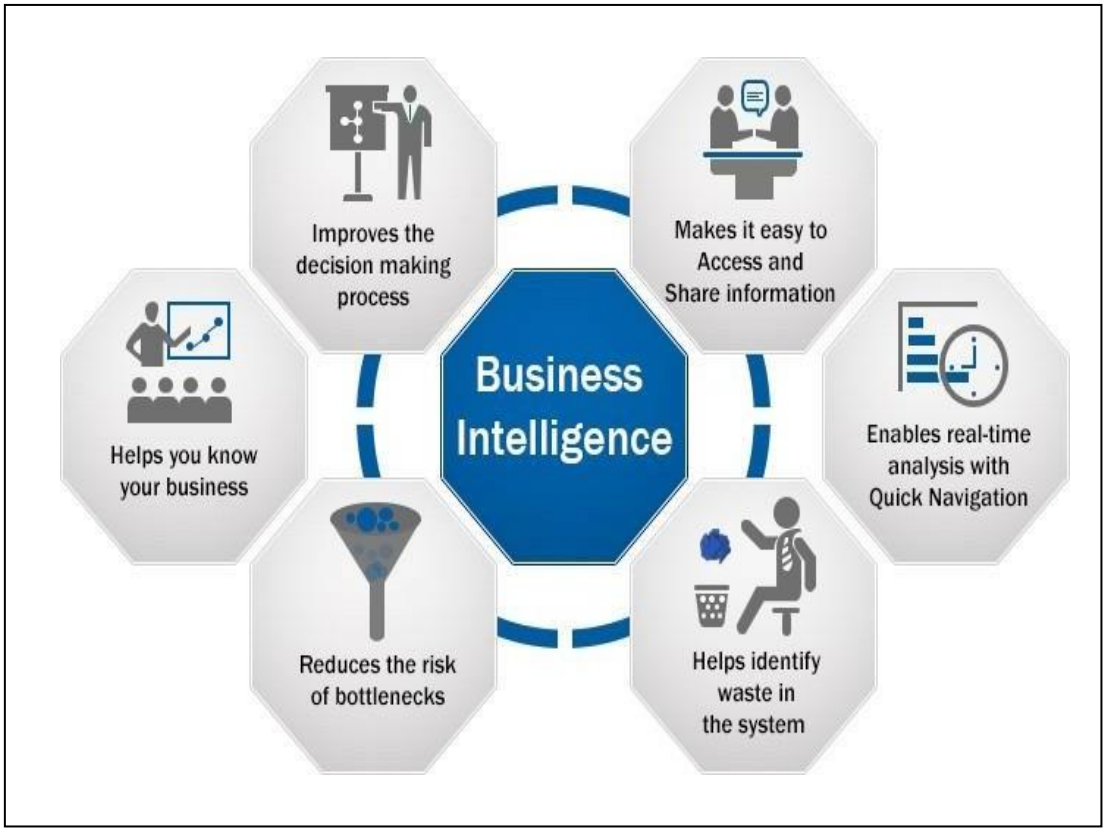
- Identify ways to increase profit
- Analyze customer behavior
- Compare data with competitors
- Track performance
- Optimize operations
- Predict success
- Spot market trends
- Discover issues or problems



WHY BUSINESS ANALYTICS IS IMPORTANT

The role of business analytics is to improve an organization's business operations through the use of relevant data. Companies that effectively employ BI tools and techniques can translate their collected data into valuable insights about their business processes and strategies. Such insights can then be used to make better business decisions that increase productivity and revenue, leading to accelerated business growth and higher profits.

Without BI, organizations can't readily take advantage of data-driven decision-making. Instead, executives and workers are primarily left to base important business decisions on other factors, such as accumulated knowledge, previous experiences, intuition and gut feelings. While those methods can result in good decisions, they're also fraught with the potential for errors and missteps because of the lack of data underpinning them.



TYPES OF BUSINESS ANALYTICS

There are generally two types of Business Analytics,

When managers have a good idea of what they wish to analyze sales figures or customer satisfaction stats but they are not aware of the end results then most preferred tool is **strategic business analytics**. When decision makers stand on the option they *"don't know*" strategic BI is adopted. There are instances in a business organization where managers deliver anticipated information in such situations **operational business analytics** is the best preferred over strategic analytics

Strategic Business Analytics

Strategic Business Analytics also known as auto-delivered analytics is often associated with reporting from an analytical data source or data warehouse. Basically, strategic BI improves a business process by analyzing a predetermined set of data relevant to that process and provides historical context of data. In addition, strategic analytics provides the base for forecasting, goal-setting, planning and direction. Strategic BI needs to be delivered in an interactive manner, enabling the manager to present his views on data in different ways. Also, strategic business analytics emphasizes on its output on a graphical display such as charts and graphs to represent trends, opportunities and problem areas. Strategic business analytics converges on four important parameters:

- Collection and storage of data
- Optimization of data for analysis
- Identification of crucial business drivers through past data records

Operational Business Analytics

Operational business analytics is associated with the transactional or operational data source and is consistent with reporting data during organizational processes. In general, operational BI provides time-sensitive, relevant information to operations managers, business professionals, and front-

line, customer-facing employees to support daily work processes. Also if the data retrieved from the analysis directly supports or helps complete operational tasks, then the analytics is operational in nature. But operational business analytics demands recipients time as possible which iron out the information presented in an interactive manner. Since operational BI is task oriented there is less need of charts and graphs. Consider an example informing a staff member in an organization regarding information on client's credit or on over dues. In such a scenario graphical representation won't hold good but a brief message will solve the problem. Hence communication methods and devices play a vital role in operational BI. Thus, operational BI comprises multiple delivery methods like instant message, email, dashboard and Twitter. The output from an operational business analytics include invoices, schedules, shipping documents, receipts and financial statements.

BUSINESS ANALYTICS: METHODOLOGIES

There are a variety of online business analytics tools using which you can access numerous ways to collect business insights, here are some of the widely recommended methodologies widely used to gather business analytics.

Step 1 – Data collection

The first step in acquiring business analytics is data collection. There are various methods to collect data, which can provide reliable information for statistical analysis and help an organization to make data-driven decisions.

Surveys

Online surveys – Online Survey remains the most reliable, economical, and widely used method to reach a larger audience for data collection.

In-person surveys – In-person surveys are face-to-face interviews. For years, it has been the most effective method of collecting the most accurate information. As this approach to gather business analytics relies on direct communication, observing body traits, behavior, and reactions of the respondent also play a vital role

Polls

Polls are a little different than surveys and this approach usually consists of only one question. The response rate for polls is extremely high, as it is very easy to answer and it takes very less time.

For example – The best example for a poll would be election polls. Polls are conducted to find out which party is favored and preferred by voters that would govern the specified area in a particular term.

Step 2 – Analysis

This is the step where all the data comes under a single platform. A Business Analytics software will enable you to collect as well as analyze data with advanced analytical tools embedded in the same software. Analyzing the data collected through various methods helps an organization to understand their customer's opinions and find out areas needing improvement. The software allows you to compare scores (such as NPS, CES, CSAT) for varied periods and also among departments. You can use the same BI Software to analyze the data under advanced pretexts such as Conjoint Analysis, Max diff Analysis, Trend Analysis, Text and Sentiment Analysis and many more. This way, you would get a solid snapshot of where your organization stands among your customers at any given time.

For example – The Hospitality industry must measure customer experience and satisfaction on an ongoing basis. By analyzing and monitoring customer satisfaction scores and NPS scores consistently, the organization can improve their customer's experience and become more customer-centric to achieve higher revenues and customer loyalty.

Step 3 – Reporting and presentation

After analysis, the next step is to understand what the metrics mean. This step is the most important, as the wrong interpretation of the data can send your organization down a cliff. Conversion into visual infographics can sometimes

make it easier for a person to understand. Such understanding will enable the organization to find answers to most pressing business, operational and marketing questions.

These steps will help you to start using business analytics software effectively, however, this is not the final step. An organization needs to continuously monitor and analyze real-time data to stay in the competition and keep meeting the ever-changing customer needs or even figure out the nextbest steps for the future. Following this path to utilize business analytics effectively will provide an organization to spend money and time more wisely and tackle future goals, needs, and trends successfully.

ADVANTAGE OF BUSINESS ANALYTICS

1. Relevant and accurate reporting:

Using different kinds of data sources, employees can customize their reports and monitor KPIs. Real-time generated reports offer the most pertinent data, which help companies make faster and better decisions. Data from sales, finance, or operations are used to create easily accessible reports, have great visualizations with the help of charts, graphs, tables, etc. These reports offer faster insights, access, accuracy, and relevancy.

2. Key Insights:

BI reporting tools assist in monitoring. To get the complete insight on revenue, losses, gains, the productivity of the employees, performances of the employees (individual and team-based.) It provides valuable information about the positives and the negatives. With these tools, companies can easily track the metrics and be current with what's happening and what's to come by setting up alerts, getting real-time information on the KPIs, and alerting any pitfalls that otherwise could have gone unnoticed.

3. Stay ahead in the game:

Companies of all sizes have vast amounts of data. Moreover, managing and using data for business decisions provides a competitive edge. BI offers incredible benefits with the help of this data in terms of forecasting, budgeting, planning, and staying on top of things via analysis. Competitive analysis helps

companies to know the competition and the performance of their competitors as well. This, in turn, leads to finding out how to differentiate one's products from others. It goes the same for services as well.

4. Quality and accurate data:

The success of any kind within an enterprise is data-dependent. Quality of data defines the quality of the company and its success. Any inaccuracies or flaws in the data can turn businesses upside down. BI tools help businesses in cleaning up data, creating data of high quality, collecting, updating, and analyzing data to gain the most relevant insight on what's going on within the company.

5. Improved customer satisfaction:

Business analytics software mainly helps companies to not just learn about their employees but their customers too. When it comes to customer behavior, user personas, feedback, BI lets you in on all the insights. These BI tools help to identify what's lacking with your services or products and enhance customer satisfaction by making necessary changes. Real-time data on the customer's feedback help in bringing corrective changes and deliver excellent customer service and satisfaction.

6. Improve growth patterns:

BI assists companies in gaining a competitive edge by helping them find new opportunities and build smarter strategies. With the help of all the data, you can identify market trends and help improve profit margins for the company. New sales trends can be identified by leveraging data from the internal and external markets, analyzing the data. The market conditions can help spot any business issues that can otherwise go unnoticed.

7. Efficiency and accuracy:

BI tools offer a single source of information; it helps the employees or the executive hierarchy to spend more time on productivity and less time on managing data. This way, employees can focus on producing reports and timely deliverables in real-time. This accurate information leads to better decision making and helps companies achieve long and short-term goals.

8. Faster decision making:

BI reduces the times a company has to lose a customer, revenue, or deal with inaccurate information or slow processes. It is essential in gaining a competitive edge for companies to make faster and accurate decisions by leveraging the existing data, at the right time, and improve decision making.

9. Greater operational efficiency and increased revenue:

BI tools offer business data, which makes the leaders and employees of a company think about the decisions made, processes implemented, and strategies executed. Getting a 360-degree view on all the dimensions to help companies identify issues and improve operations, increased sales, and in turn, increase revenue.

10. Bigger profits:

Most businesses find profit margins as a big concern. BI tools can analyze from the enormous volumes of data any discrepancies, inefficiencies, errors, etc. It helps expand profit margins, and the sales teams get better insights for future sales and analyze where to spend the budgets in the future.

CONCLUSION

In today's data-driven world, companies are facing information overload and companies who are interested in working smarter, are investing in ways to control and understand this information. The era of big data is upon us. In fact, we are producing so much data that 90% of the data out there has been collected in the past few years. Although adopting new technology may seem like a daunting task, BI software usually has a good pay off even if the benefits aren't seen immediately.

Business Analytics helps companies monitor trends, adapt to varying market conditions, and improves decision making at all levels of the organization. The BI tools a company uses depends on their goals. Some companies are interested in gaining insights into consumer buying, other companies are interested in improving employee productivity or seeing who the best performers are. There are an infinite number of ways companies can deploy a business analytics solution. Here are just ten ways business analytics can improve businesses.

REFERENCES

1. Running Lean by Ash Maurya
2. Business Intelligence Research Paper by Solomon Negash.
3. When Business Analytics meets Machine Learning | by Maxim Scherbak | Towards Data Science.
4. Machine Learning for Business Analytics Research Paper by Kagan Okatun.