**19ITE305 – BIG DATA ANALYTICS**

**UNIT I: INTRODUCTION TO BIG DATA AND ANALYTICS**
**Topic 5: Classification of Analytics**

Data analytics encompasses a wide array of techniques for analyzing data to gain valuable insights that can enhance various aspects of operations. By scrutinizing information, businesses can uncover patterns and metrics that might otherwise go unnoticed, enabling them to optimize processes and improve overall efficiency.

For instance, in manufacturing, companies collect data on machine runtime, downtime, and work queues to analyze and improve workload planning, ensuring machines operate at optimal levels.

Beyond production optimization, data analytics is utilized in diverse sectors. Gaming firms utilize it to design reward systems that engage players effectively, while content providers leverage analytics to optimize content placement and presentation, ultimately driving user engagement.

Types of Data Analytics
There are four major types of data analytics:
1. **Predictive (forecasting)**
2. **Descriptive (business intelligence and data mining)**
3. **Prescriptive (optimization and simulation)**
4. **Diagnostic analytics**
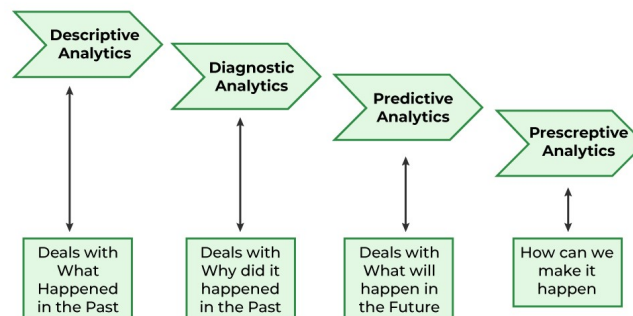


Predictive Analytics
Predictive analytics turn the data into valuable, actionable information. predictive analytics uses data to determine the probable outcome of an event or a likelihood of a situation occurring. Predictive analytics holds a variety of statistical techniques from modeling, machine learning, data mining, and game theory that analyze current and historical facts to make predictions about a future event. Techniques that are used for predictive analytics are:
- Linear Regression
- Time Series Analysis and Forecasting
- Data Mining

*Basic Cornerstones of Predictive Analytics*
- Predictive modeling
- Decision Analysis and optimization
- Transaction profiling

Descriptive Analytics

Descriptive analytics looks at data and analyze past event for insight as to how to approach future events. It looks at past performance and understands the performance by mining historical data to understand the cause of success or failure in the past. Almost all management reporting such as sales, marketing, operations, and finance uses this type of analysis.

The descriptive model quantifies relationships in data in a way that is often used to classify customers or prospects into groups. Unlike a predictive model that focuses on predicting the behavior of a single customer, Descriptive analytics identifies many different relationships between customer and product.

**Common examples of Descriptive analytics are company reports that provide historic reviews like:**
- Data Queries
- Reports
- Descriptive Statistics
- Data dashboard

Prescriptive Analytics

Prescriptive Analytics automatically synthesize big data, mathematical science, business rule, and machine learning to make a prediction and then suggests a decision option to take advantage of the prediction.

Prescriptive analytics goes beyond predicting future outcomes by also suggesting action benefits from the predictions and showing the decision maker the implication of each decision option. Prescriptive Analytics not only anticipates what will happen and when to happen but also why it will happen. Further, Prescriptive Analytics can suggest decision options on how to take advantage of a future opportunity or mitigate a future risk and illustrate the implication of each decision option.

For example, Prescriptive Analytics can benefit healthcare strategic planning by using analytics to leverage operational and usage data combined with data of external factors such as economic data, population demography, etc.

Diagnostic Analytics

In this analysis, we generally use historical data over other data to answer any question or for the solution of any problem. We try to find any dependency and pattern in the historical data of the particular problem.

For example, companies go for this analysis because it gives a great insight into a problem, and they also keep detailed information about their disposal otherwise data collection may turn out individual for every problem and it will be very time-consuming. Common techniques used for Diagnostic Analytics are:
- Data discovery
- Data mining
- Correlations