

Definition**Predictive Analytics**

Predictive analytics uses past data to develop models that can help determine what future events are most likely to happen.

Definition**Prescriptive Analytics**

Prescriptive analytics is the development of models that help us answer the question, “What should we do moving forward?”

**Data Resources**

We live in a data rich society. Anyone with access to a personal computer can access thousands of different databases throughout the internet. These databases are packed full of observational data. The website for this textbook, stat.hawkeslearning.com, provides numerous links to data resources. However, some of the largest, most credible, and most commonly used databases are:

- Amazon Web Services
- Centers for Disease Control and Prevention (CDC)
- Data.gov (Data regarding the U.S.)
- Federal Reserve Economic Data (FRED)
- Organization of Economic Cooperation and Development (OECD)
- The World Bank
- The World Factbook (CIA)
- UNdata (United Nations)
- United States Census Bureau
- World Health Organization

companies can gain a deeper understanding of their customers to better meet their needs. Companies also use analytics to develop models to drive insights into the past, present, and future.

There are primarily two types of analytics—predictive and prescriptive. We use both types of analytics to help us gain insight into the future. **Predictive analytics** answers the question of what could happen. **Prescriptive analytics** answers the question of what should happen.

Retail stores use predictive analytics to predict products that customers will buy, times that they will log on to specific sites, or even the amount of time that a customer may spend on a site. Being able to make these predictions allow retailers to better tend to customer needs as well as make the business more profitable.

After prediction, prescriptive analytics focuses on how to take advantage of future opportunities of the decision-making process. Prescriptive analytics is considered the future of business analytics. It provides an organization with adaptive, automated, and time-dependent courses of action to take advantage of business opportunities. For example, in finance, prescriptive analytics can be used to help investors select which investments to purchase. In sports, prescriptive analytics can help teams determine which player to draft or trade.

Analytics plays a major role in the past, present, and future of the decision-making processes of many organizations. Businesses of all kinds that use Big Data and analytics can improve their decision-making processes. Applications such as banking, health care, etc., need predictive and prescriptive analytics to improve their standards and quality to help their customers and themselves.

 **2.2 Exercises**
Basic Concepts

1. Where is Big Data used?
2. What are the three (sometimes four) characteristics of Big Data?
3. Give another example of where we can find semi-structured data.
4. What is business analytics?
5. How is business analytics used?
6. What is the difference between predictive and prescriptive analytics?
7. Give an example of a company using predictive analytics to make business decisions.
8. Give an example of a company using prescriptive analytics to help their organization moving forward.

Exercises

9. GOES satellites (GOES-16 & GOES-17) provide continuous weather imagery and monitoring of meteorological and space environment data across North America. These satellites provide the kind of continuous monitoring necessary for intensive data analysis. They hover continuously over one position on the surface. Describe three characteristics of Big Data that would be produced by these satellites.
10. For the data in question 9, would the data collected be described as: structured, unstructured, or semi-structured? Explain your choice of answer.

11. The following sample of data about BMI (Body Mass Index) was obtained by the WHO (World Health Organization). What kind of data analytics can be done on these data?

Mean BMI (kg/m²) [age-standardized estimate] 18+ years, 2016			
Country	Both sexes	Male	Female
Afghanistan	23.4 [22.0–24.8]	22.6 [20.1–25.1]	24.1 [23.0–25.3]
Albania	26.7 [25.8–27.5]	27.0 [25.8–28.2]	26.3 [25.0–27.6]
Algeria	25.5 [24.5–26.5]	24.7 [23.4–26.1]	26.4 [24.9–27.8]
Andorra	26.7 [24.6–28.7]	27.3 [24.8–29.8]	26.1 [22.8–29.5]
Angola	23.3 [21.2–25.6]	22.3 [19.7–25.0]	24.3 [20.9–27.7]
Antigua and Barbuda	26.7 [24.6–28.8]	25.7 [23.2–28.2]	27.7 [24.4–31.0]
Argentina	27.7 [26.8–28.6]	27.8 [26.6–29.0]	27.6 [26.3–28.8]
Armenia	26.3 [25.8–26.9]	25.6 [24.8–26.3]	27.0 [26.1–27.8]
Australia	27.1 [26.6–27.6]	27.6 [26.9–28.2]	26.7 [26.0–27.4]
Austria	25.6 [24.3–26.8]	26.5 [24.8–28.2]	24.6 [22.6–26.5]

Source: World Health Organization <https://apps.who.int/gho/data/view.main.CTRY12461?lang=en>

12. JetBlue Airlines collects data which includes passenger ID number, name, date of birth, country of birth, country of residence, frequent flyer number, departure airport, destination airport, airfare paid, and flight number. How can this information be used to make business decisions?
13. Mobile phone companies use the GPS feature to determine the location of users and to provide location-based services (LBS) such as information, entertainment, and security. Describe how a marketing company can use location-based services analytics to provide targeted ads about a nearby retail store to a user.
14. Describe how prescriptive analytics can be used in sports to determine which player to draft or trade.
15. Credit card companies are some of the biggest users of data analytics. How can location-based services (LBS) be used to prevent credit card fraud?
16. Many hospitals and health care providers are now utilizing electronic health records (EHR). This of course generates an immense amount of patient data; hence the need for data analytics. Describe how this data can be used to improve service and better patient care.