





MODERN DIGITAL SKILLS

**CHAPTER 10: BIG DATA**

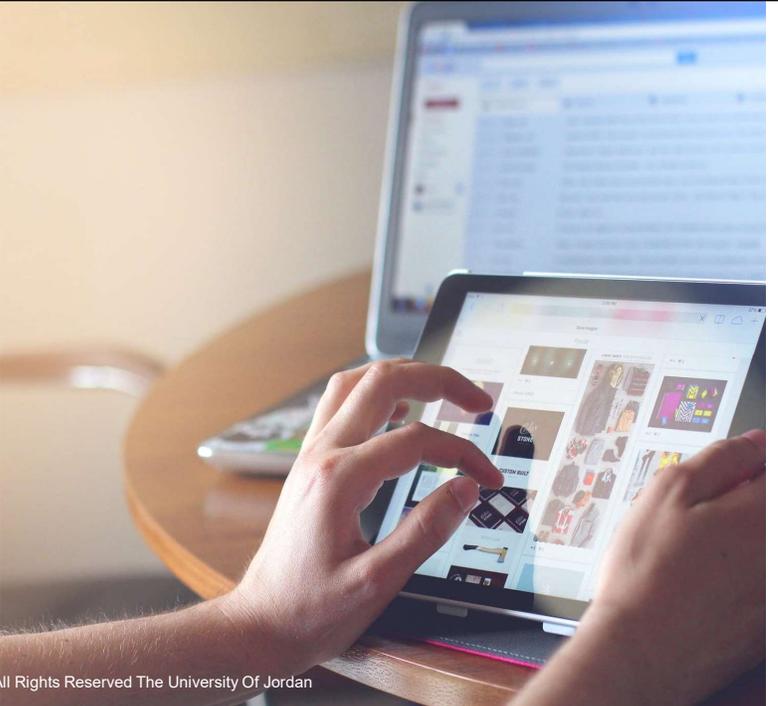


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# Big data

## Introduction

- ✓ **Big Data** refers to extremely large sets of complex and massive data that traditional computers and software cannot handle efficiently.
- ✓ **The main goal of Big Data** is to collect, **process**, and **analyze** this vast amount of data to **discover patterns, trends, and insights** that help organizations **make better decisions**.



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## Some Types of Big data

- ✓ **Some types of Big data:**
  1. **Structured Data:** Organized data such as names and numbers in a specific format, typically stored in databases.
    - *Example:* Data stored in tables or spreadsheets by a company.
  2. **Unstructured Data:** Data without a predefined format, making it harder to analyze. Includes text, images, videos, social media posts, and emails.
    - *Example:* Google search results, including webpages, videos, images, and text in various formats.
- ✓ **Storing Big Data:**
  - We cannot store Big Data in regular databases, instead, we use **special types of databases** .



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## Sources of Big data

### ✓ Sources of Big Data:

#### ▪ Social media

Generate huge amounts of unstructured data in the form of posts, likes, comments, and shares.

Examples: Facebook , Instagram, (Twitter) X

#### ▪ Online transactions

Generate structured data, often involving financial activities and transactions.

Examples: E-commerce, Payment platforms such as PayPal, Online Banking

#### ▪ Sensors

Collect Structured or Unstructured data from physical environments.

Examples: Weather Sensors, Traffic sensors, Soil sensors

## Features of Big data (5 Vs)

### ✓ Features of Big Data (*The 5Vs of Big Data*):

#### 1. Volume:

This refers to the huge amount of data collected. Think of all the photos, videos, and posts shared on social media every day—that's Big Data!

#### 2. Velocity:

Data is created very quickly, sometimes in real-time. For example, when you send a message or make an online payment, that data is processed instantly.

#### 3. Variety:

Big Data comes in many forms—text, images, videos, social media posts, or sensor data from devices. It's not just numbers or neatly organized information.

#### 4. Veracity:

The quality and accuracy of data can vary. Not all data is trustworthy, so it needs to be cleaned and checked to ensure it's reliable.

#### 5. Value:

The main goal of Big Data is to extract useful information that helps people and organizations make better decisions.

# Big data Applications



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# Big Data Management Process

- ✓ **The Big Data management process:** a process that helps companies and organizations make smart, data-driven decisions.
- ✓ **Steps of Big Data management process**
  1. **Collecting** data from various sources
    - **Tool : Logstash.**
  2. **Managing** and storing the data in an organized way
    - **Tool : Hadoop Distributed File System (HDFS).**
  3. **Processing** the data to make it understandable
    - **Tool: Apache Hadoop.**
  4. **Analyzing** the data to gain useful insights.
    - **Tool : Power BI ,R , Python**



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## Some use cases of Big Data analytics

### 1. Healthcare Diagnostics and Treatment

- **Example:** Hospitals and healthcare providers analyze patient data from medical records and lab results to improve diagnoses and personalize treatment plans. For example, doctors can predict a patient's risk for certain diseases based on their data.
- **Benefit:** Improves patient outcomes by offering early diagnosis and more accurate, tailored treatments.

### 2. Smart Cities and Traffic Management

- **Example:** Cities use Big Data to analyze traffic patterns and manage congestion. For instance, real-time data from road sensors, GPS devices, and social media are used to optimize traffic signals and reroute vehicles to avoid jams.
- **Benefit:** Reduces traffic congestion, lowers fuel consumption, and improves city planning.