MODERN DIGITAL SKILLS

CHAPTER 11: INTERNET OF THINGS (IoT)
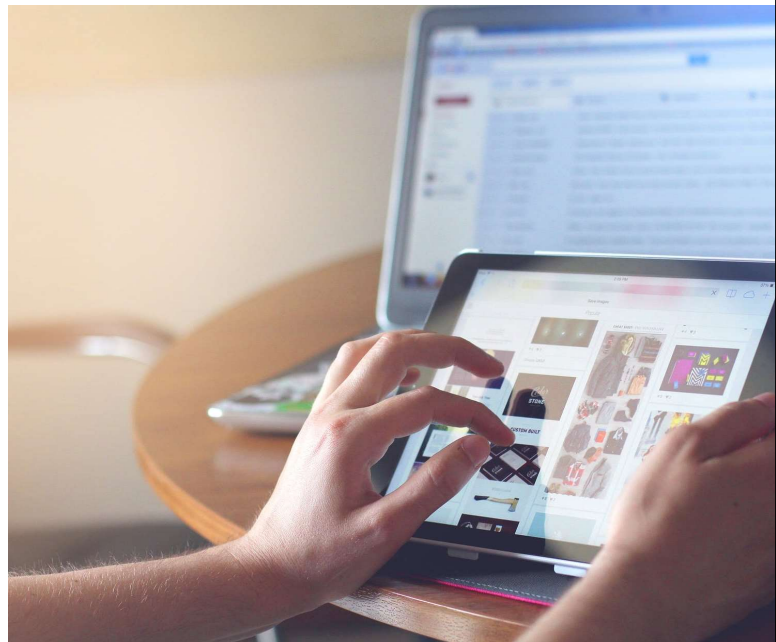
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What is Internet of Things (IoT)?

✓ **The Internet of Things (IoT):** a network of physical devices or "things" that use sensors, software, and connectivity to share data.

✓ A **"Thing"** in the context of the IoT, is an **entity** or **physical object** that has a unique identifier ,an embedded system and the ability to transmit data over a network.
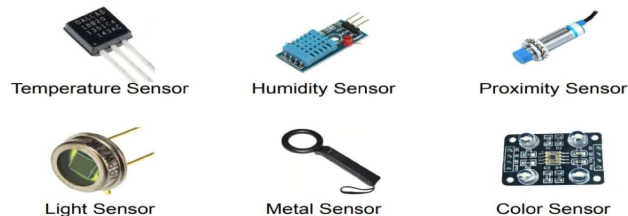
✓ **IoT Goal** is to make everything smart!

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Internet of Things (IoT)

Sensors

✓ **Sensors:** Pieces of hardware that **detect changes** in an environment and **collect data**.

- They are the pieces of an IoT ecosystem that **bridge** the digital world to the physical world.
- IoT sensors may **detect** things like temperature, pressure, and motion
- If sensors are **connected to a network**, they share data with the network.

DIFFERENT TYPES OF SENSORS

Temperature Sensor   Humidity Sensor   Proximity Sensor

Light Sensor   Metal Sensor   Color Sensor

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Internet of Things (IoT)
How does (IoT) work?

✓ <mark>**Steps of IoT dataflow**</mark>

1. **Data Collection**: **IoT devices** with built-in **sensors** gather data from various locations (e.g., homes, cars).
2. **Data Transfer**: The collected data is sent to the **cloud** via the internet.
3. **Data Analysis**: The data is examined in the cloud to **generate new insights** and information.
4. **User Actions**: they **remotely** log in to the system to perform **tasks** based on the analysis
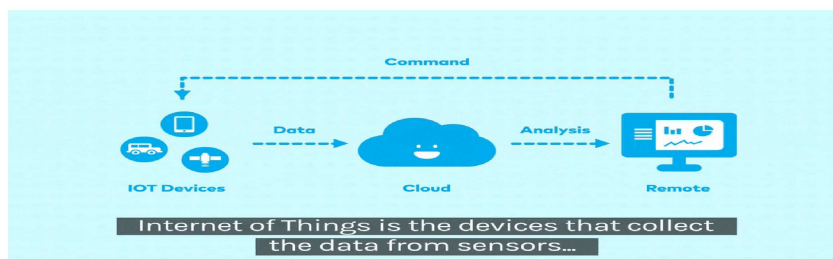
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Internet of Things (IoT)
Sectors

✓ <mark>**IoT Sectors**</mark>: there are many important sectors that can benefit from IoT Technology for example:

1. Medical and Healthcare
2. Cities, Home and Building
3. Education
4. Agriculture

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Internet of Things (IoT)
Applications (Examples)

1. <mark>Controllable slow cooker</mark>

- By using smartphone apps, we can **adjust the settings** on the slow cooker from anywhere.
- we can **adjust temperature** and **cooking time** and **check the status** of your meal.

Internet of Things (IoT)
Applications (Examples)

2. <mark>Smart Thermostat</mark>

- Smart Thermostat **detects the temperature** in each room
- It allows the heating and air conditioning to run until the **desired temperature** is achieved.
- It can be connected to a mobile App

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Internet of Things (IoT)
Applications (Examples)

3. <mark>**Robot Vacuum**</mark>

- A robot vacuum is an automated device that **cleans floors** without human help.
- It **vacuums dirt** and uses **sensors** to navigate around obstacles .
- Many models can be scheduled and controlled via **smartphone apps**.

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Internet of Things (IoT)
Applications (Examples)

4. <mark>**Video Monitor Camera**</mark>

- A Video Monitor Camera is a must-have smart device for **home or business security**.
- It can offer **real-time monitoring** for children or home because it has features like motion detection and night vision.
- Connected to a **mobile app**, it allows users to watch live footage, receive alerts, and review recordings from anywhere.

5 Reasons to buy **security cameras**

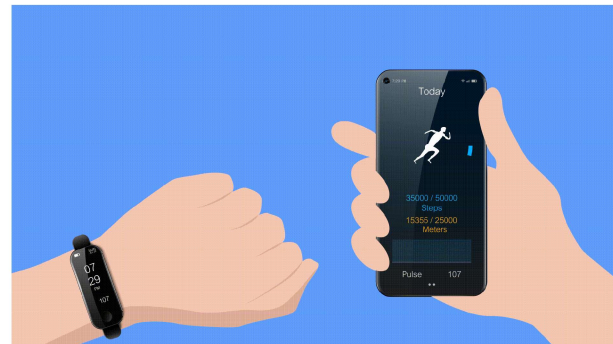Keep an eye on the **young ones**

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Internet of Things (IoT)
Applications (Examples)

5. Smart watch

- Smart watch is a device that acts as pedometers, health monitors, weight monitors, sleep monitors, etc.
- It **measures** our activity, movements, and pulse, smart watch can teach us more about our bodies and inspire us to adopt healthier behaviors.

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Internet of Things (IoT)
Applications in Agriculture

✓ **Smart agriculture** uses IoT sensors to collect environmental and machine metrics where data can help farmers make decisions.

✓ *Example*:
- in the **smart irrigation systems,** the sensors that are placed in the soil monitor the moisture levels, temperature, and humidity.
- These sensors are connected to a central system that automatically controls irrigation.
- Farmers can remotely control the system using their mobiles.

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Internet of Things (IoT)
Applications in Healthcare

- ✓ <mark>**IoT in Healthcare**</mark> is represented by **tracking** and **real-time health systems** which are responsible for improving patient treatment and diagnosis.

- ✓ *Example*:
  - ▪ In **real-time health monitoring** system, wearable sensors continuously **track** patients' heart rate, blood pressure, oxygen and glucose levels.
  - ▪ If the **glucose monitor** for a diabetic patient tracks that blood sugar is not normal, the system can alert the patient and doctors immediately

Popular RPM Devices

Spirometers | Blood Pressure

Blood Glucose | Weight Monitors

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Internet of Things (IoT)
Applications in Education

- ✓ <mark>**IoT in Education**</mark> is enabled through a growing collection of internet-connected technologies and devices that provide real-time data and valuable insights to students, parents, faculty and administration.

- ✓ *Examples of IOT connected devices in schools*:
  1. Smart lighting
  2. Temperature sensors
  3. Security cameras
  4. Interactive boards
  5. Attendance tracking systems

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Internet of Things (IoT)
Smart Cities

✓ **A Smart city** is a city that uses IoT sensors to measure and optimize important city processes such as:

1. water use
2. energy use
3. waste management
4. Parking
5. Traffic
6. air quality

IOT APPLICATIONS FOR SMART CITIES OF DIFFERENT SIZES

Traffic management · Monitoring air quality · Public safety solutions · Smart parking · Smart lightning · Smart waste collecting

Internet of Things (IoT)
Advantages

Advantages of IoT
1. Useful for personal safety
2. Enhanced data collection as IoT allows an accurate picture of everything
3. Useful in the healthcare industry
4. Save time and effort
5. Useful in traffic and other tracking or monitoring systems
6. Cost-Efficient Business Operations

Internet of Things (IoT)
Disadvantages

Disadvantages of IoT
1. Lack of Security measures which leaves users exposed to various kind of cyber attacks
2. Increased Privacy concerns of personal data
3. The complexity of IoT system
4. Increased unemployment
5. High chances of the entire system getting corrupted
6. High dependency on the internet

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Future Trends in IoT

- **Widespread of Billions of Connected Devices**

- **Enhanced Connectivity with 5G** which will enable faster data transfer and lower latency.

- **Integration of AI and IoT such as self-driving cars and robots in manufacturing .**

- **Improved IoT Security**: by **Enhancing Security Measures**

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