**Functions of IoT in Smart Agriculture:**

* IoT (Internet of Things) is a technology where devices are connected to the internet to **collect and exchange data**.
* In agriculture, IoT is helping farmers become smarter by providing real-time updates and automating several manual tasks.
* It leads to **higher productivity, better crop quality**, and **reduced environmental impact**.

**1. Soil Health Monitoring**

* IoT sensors are placed in the field to measure **moisture content**, **temperature**, **pH level**, and **nutrient availability** in the soil.
* Farmers get real-time alerts on their phones or computers.
* These values are important for understanding **soil quality** and deciding **what crop to grow**, **when to irrigate**, and **how much fertilizer to apply**.
* For example, if soil moisture is low, the system can automatically trigger irrigation.

**2. Precision Farming**

* Precision farming means using **data and technology** to ensure each part of the field gets the right amount of **water, fertilizer, and pesticides**.
* IoT devices collect detailed data about **soil**, **weather**, and **crop needs**.
* This reduces **waste of resources**, improves **crop health**, and increases **yield**.
* It also protects the environment from harmful chemicals.

**3. Smart Irrigation Systems**

* Traditional irrigation often wastes water. With IoT, farmers can use **automated irrigation** based on soil moisture sensors.
* When moisture is low, the system automatically turns on the water supply. When the soil is moist enough, it stops.
* It automates irrigation based on real-time data, reducing manual labor.
* This saves **water, electricity**, and ensures **optimal plant growth**.

**4. Crop Health Monitoring**

* IoT-based **drones or cameras** can fly over the farm and take pictures of the crops.
* AI processes the data to detect signs of **disease**, **pest attacks**, or **nutrient deficiencies** early.
* Farmers are immediately alerted, so they can take action before the problem spreads.
* Helps in **early diagnosis**, reducing crop loss.

**5. Livestock Monitoring**

* Animals are fitted with **wearable devices** that track **location**, **movement**, **body temperature**, and **heart rate**.
* Alerts are sent if an animal is sick, injured, or lost.
* It helps in **improving animal health**, reducing deaths, and increasing **milk/meat production**.

**6. Smart Greenhouses**

* In greenhouses, IoT sensors monitor and control **temperature, humidity, ventilation and light**.
* The system can adjust conditions automatically for better plant growth.
* This helps grow crops in **controlled environments** all year round. Increases crop quality and reduces dependency on natural climate.

**Functions of IoT in Smart Healthcare:**

* IoT is transforming the healthcare sector by connecting **patients, doctors, and medical devices**.
* It allows **real-time monitoring**, reduces hospital visits, and helps in early diagnosis and efficient treatment.

**1. Remote Patient Monitoring (RPM)**

* IoT devices like **fitness trackers, smartwatches, and ECG monitors** can continuously monitor **vital signs** like **heart rate**, **blood pressure**, and **oxygen level**.
* These devices continuously send health data to doctors.
* Useful for patients in **rural areas** or those who cannot frequently visit hospitals.
* Doctors can monitor them from a distance and act if something goes wrong.

**2. Chronic Disease Management**

* Patients with long-term illnesses like **diabetes, asthma, or heart disease** can wear IoT devices.
* These devices track their health condition 24/7 and alert doctors or family if there’s an emergency.
* Doctors can adjust treatment remotely.
* Helps in **preventing complications** and reduces emergency hospital admissions.

**3. Smart Hospitals**

* Hospitals use IoT to track **medical equipment**, manage **medicine inventory**, and automate **routine tasks** like lighting, air conditioning, or cleaning schedules.
* Ensures efficient use of equipment.
* Also automates patient record entry, room sanitation, and air quality control.
* Improves hospital efficiency and **reduces manual errors**.
* Reduces **workload on staff** and improves patient safety.

**4. Emergency Response and Alerts**

* If a patient faints or their heartbeat becomes abnormal, IoT devices send automatic alerts.
* Alerts go to nearby doctors, hospitals, or family with GPS location.
* Useful for patients living alone or in rural areas with limited access to healthcare.

**5. Smart Medication Systems**

* Smart pill boxes alert patients to take medicine on time.
* If a dose is missed, caregivers or doctors are informed.
* Prevents drug misuse or overdose.
* Especially helpful for elderly and mentally ill patients.

**6. Health Data Collection and Analysis**

* Health data collected by IoT devices is analyzed using AI or cloud systems.
* Helps in **early diagnosis**, **predicting future health issues**, and planning **personalized treatments**.
* Doctors get a **complete picture** of the patient’s health history.