Seminar presentation on Applications of IOT

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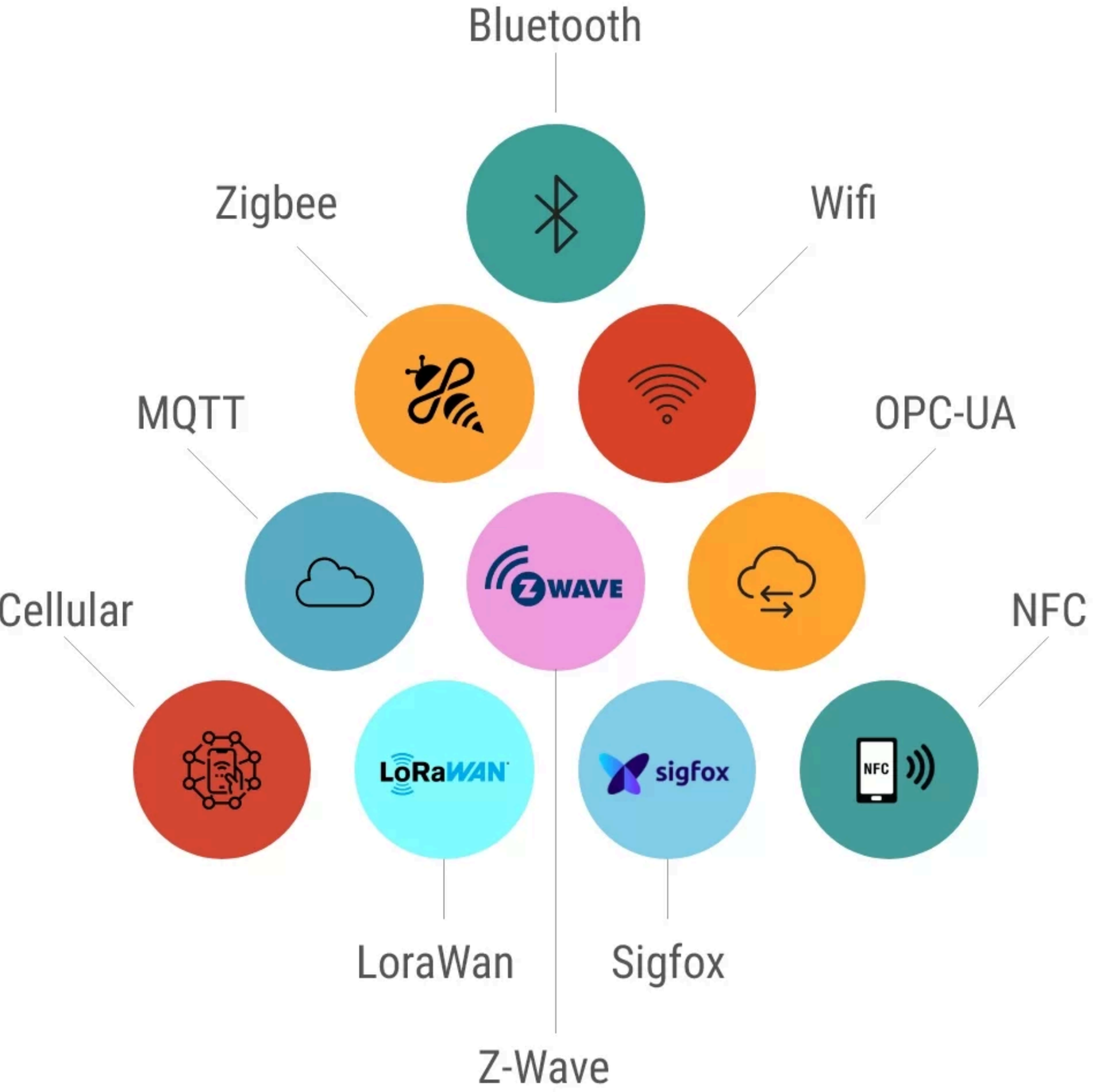


What is IOT ?

Key Components

Sensors and actuators
Connectivity (Wi-Fi, Bluetooth, Zigbee, etc.)
Data processing and analytics
User interface (smartphone apps, dashboards)

The Internet of Things (IoT) refers to a network of physical devices (sensors, actuators, machines) connected to the internet, enabling them to collect and exchange data.

Wi-Fi: Devices connect via your home or office internet to send data (e.g., smart speakers, cameras).
Bluetooth: Short-range connection used for devices close to each other (e.g., smartwatches syncing with your phone).
Cellular (4G/5G): Devices that need to connect over long distances, like smart cars or remote sensors, use cellular networks.
Zigbee/Z-Wave: Low-power connections used in smart homes for devices like lights and thermostats to communicate.
LoRa (Long Range): Long-distance, low-power connection used in agriculture, smart cities, or remote monitoring systems.
Ethernet: Wired connection for stable, high-speed data transfer, typically used in offices or industrial systems

Z-Wave is a low-power, wireless communication protocol used primarily for home automation

MQTT (Message Queuing Telemetry Transport) is a lightweight messaging protocol designed for sending small amounts of data between devices in real-time. It’s very popular in IoT because it’s efficient and uses very little bandwidth

Sigfox is a low-power, wide-area network (LPWAN) technology used to connect IoT devices over long distances with very low power consumption
OPC-UA is an industrial communication standard used to connect and share data between machines, sensors, and control systems, primarily in factories and industrial settings

NFC is a short-range wireless communication technology that allows two devices to exchange data when they are very close to each other (magnetic field)

Major Applications

1.Smart Homes

Project: Smart Lighting System

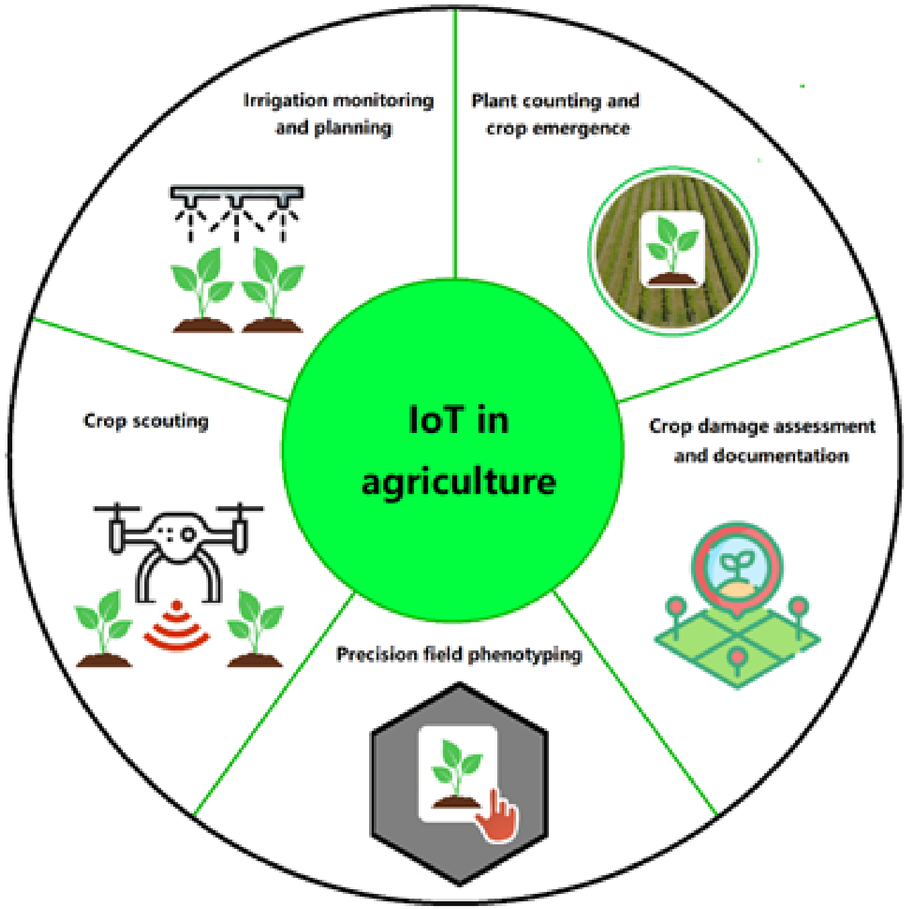
Uses IoT-enabled bulbs connected to a central hub, allowing users to control lighting via a smartphone app. Sensors detect occupancy and adjust lights based on natural light availability.

2.Healthcare

Project: IoT-Based Patient Monitoring System

Patients' vitals (heart rate, blood pressure, etc.) are continuously monitored using wearable IoT devices. The data is transmitted to a healthcare provider, enabling real-time intervention.

- Smart video pills are tiny, swallowable capsules with built-in cameras and sensors that capture images and videos of your digestive system as they travel through your body
- Computer vision refers to the use of artificial intelligence (AI) and machine learning to analyze and interpret visual information,
- abnormalities like tumors, fractures, or diseases
- Moodables are devices or applications designed to monitor and improve mental health by tracking emotions and helping manage moods through technology
- heart rate, sweat, and skin temperature
- stress, anxiety, depression,
- Ingestible sensors are small, swallowable devices that can monitor internal health parameters after being ingested,
- monitoring drug adherence, diagnosing digestive conditions, and measuring internal biomarkers for diseases

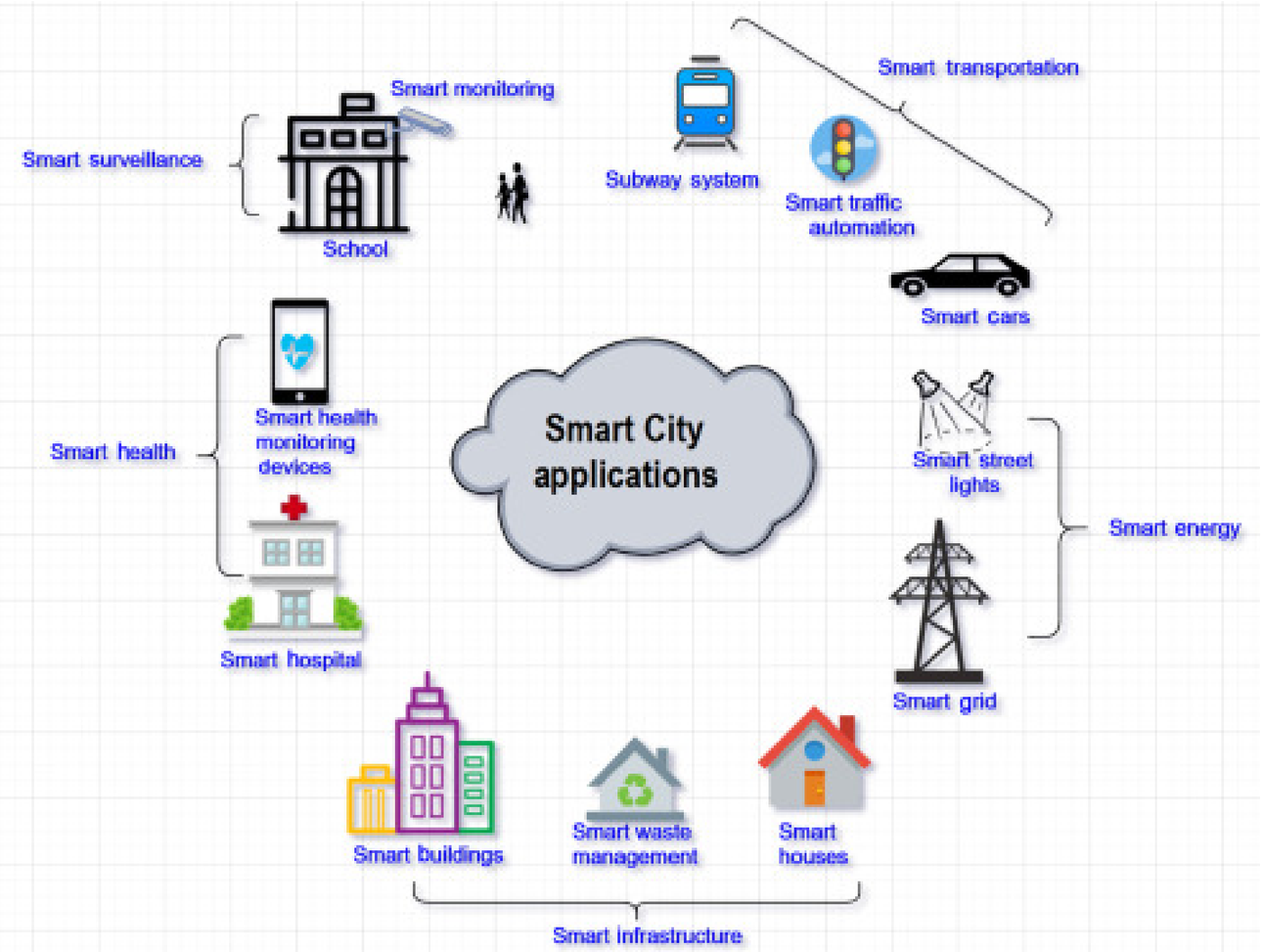


3.Agriculture

Project: Precision Farming with IoT Sensors

Soil moisture sensors, temperature sensors, and humidity sensors help farmers optimize irrigation, monitor crop health, and improve yield by analyzing environmental conditions in real-time.

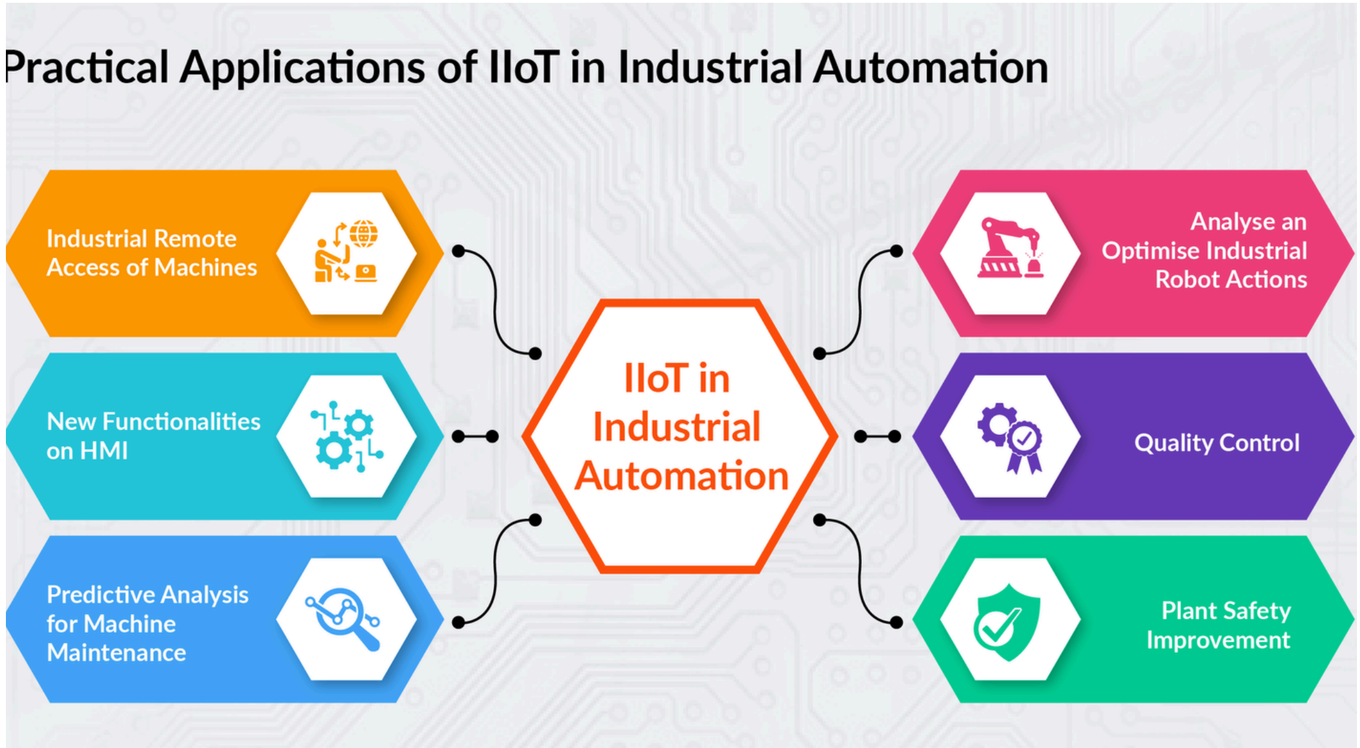
4.Smart Cities



Project: Smart Traffic Management

IoT-enabled sensors monitor traffic flow and adjust traffic lights in real-time to reduce congestion. Data is also sent to municipal authorities for planning and infrastructure development.

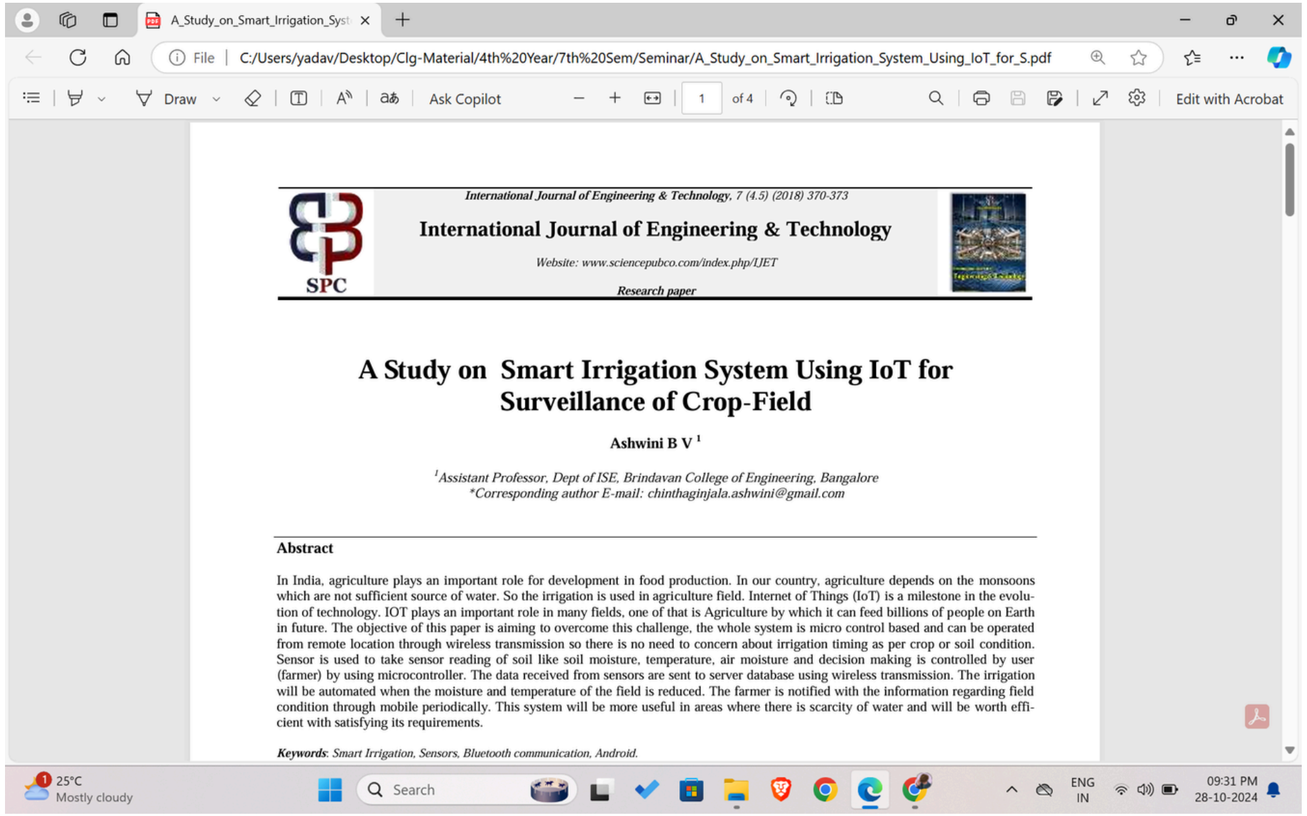
5.Industrial IoT (IIoT)



Project: Predictive Maintenance in Factories

IoT sensors installed in machinery monitor parameters like vibration and temperature to predict failures, reducing downtime and maintenance costs.

Research paper based on IoT in Agriculture



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Research paper

A Study on Smart Irrigation System Using IoT for Surveillance of Crop-Field

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Abstract

In India, agriculture plays an important role for development in food production. In our country, agriculture depends on the monsoons which are not sufficient source of water. So the irrigation is used in agriculture field. Internet of Things (IoT) is a milestone in the evolution of technology. IOT plays an important role in many fields, one of that is Agriculture by which it can feed billions of people on Earth in future. The objective of this paper is aiming to overcome this challenge, the whole system is micro control based and can be operated from remote location through wireless transmission so there is no need to concern about irrigation timing as per crop or soil condition. Sensor is used to take sensor reading of soil like soil moisture, temperature, air moisture and decision making is controlled by user (farmer) by using microcontroller. The data received from sensors are sent to server database using wireless transmission. The irrigation will be automated when the moisture and temperature of the field is reduced. The farmer is notified with the information regarding field condition through mobile periodically. This system will be more useful in areas where there is scarcity of water and will be worth efficient with satisfying its requirements.

Keywords: *Smart Irrigation, Sensors, Bluetooth communication, Android.*

1. Overview of Smart Irrigation

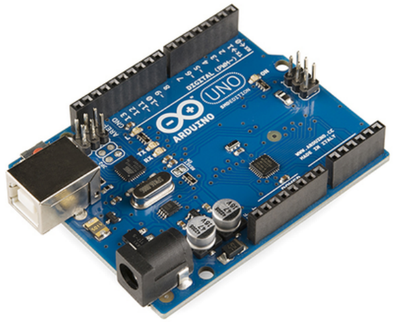
- Objective
  - monsoon Dependance
  - Groundwater Level
  - Climate Change
  - Poor crop yield
  - Unplanned Irrigation methods
- Key benifites
  - conserve energy & water resources
  - handles the system manually and automatically

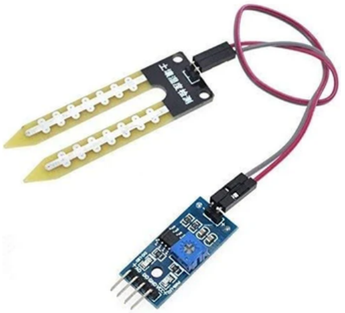
2. System Components

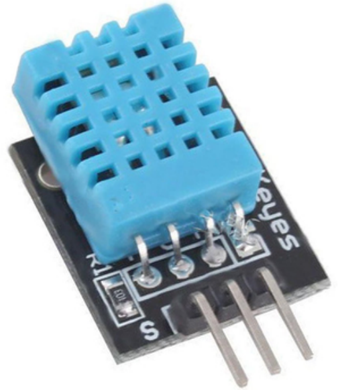
Arduino Microcontroller

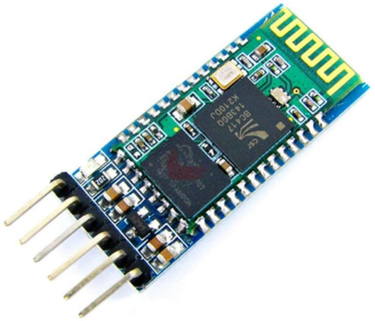
Sensors

- Soil Moisture Sensor
  - measure the volumetric water
- Temperature and Humidity Sensors
  - measures relative humidity
- Bluetooth Module









3. How It Works

- Data Collection:
- Decision Making:
- User Control:

*Naïve Bayes algorithm for irrigation control

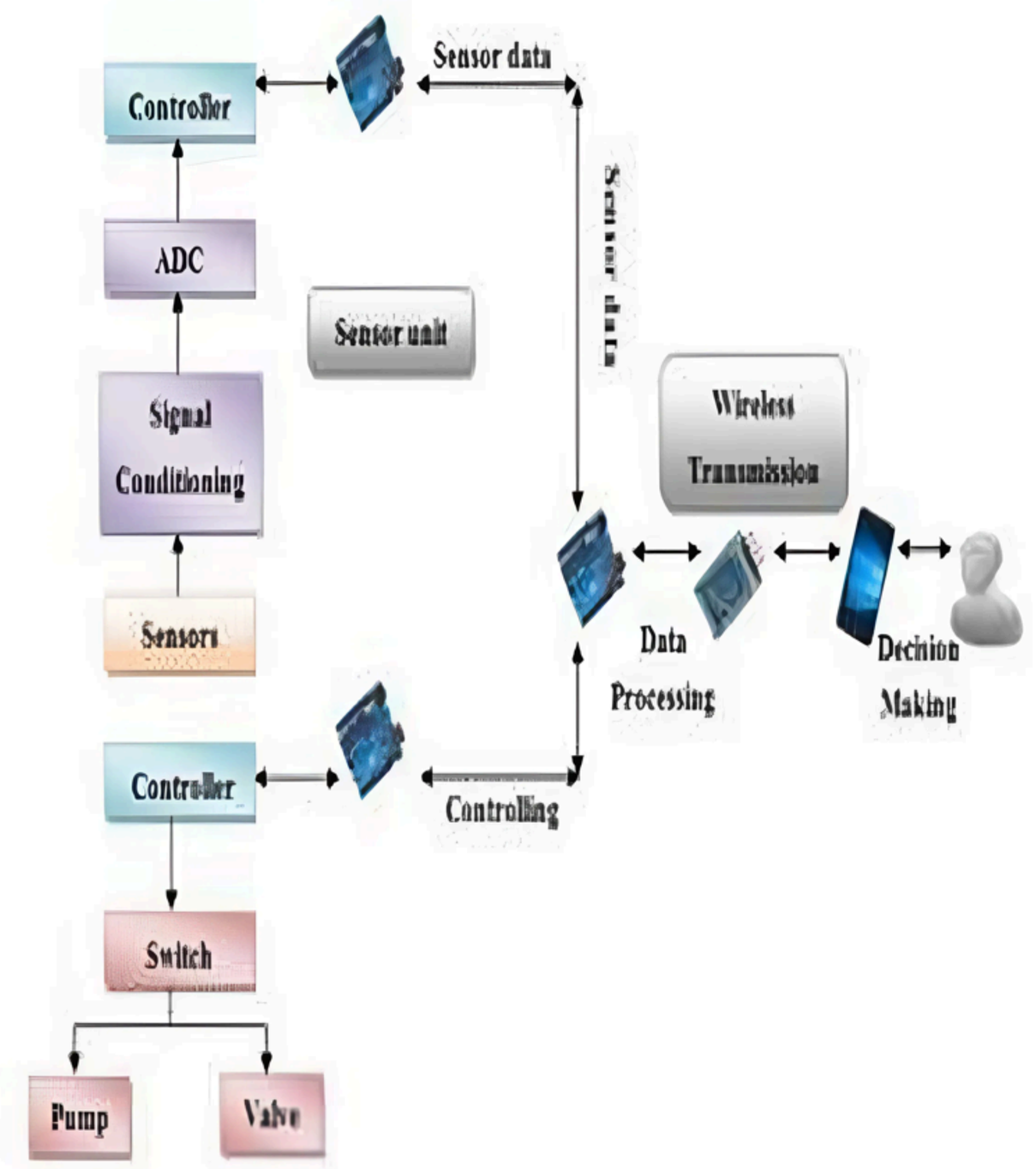


Fig.3:.System Architecture

- Sensors: Collect data from the environment.
- Signal Conditioning: Prepares the sensor data for processing.
- ADC (Analog-to-Digital Converter): Converts the conditioned signal into a digital format.
- Controller: Manages the system, sending commands to the sensor unit and controllin elements like switches, pumps, or valves.
- Wireless Transmission: Sends data to a remote location.
- Data Processing: Analyzes the transmitted data.
- Decision Making: Uses processed data to make informed decisions.

4. Advantages of IoT-Based Smart Irrigation

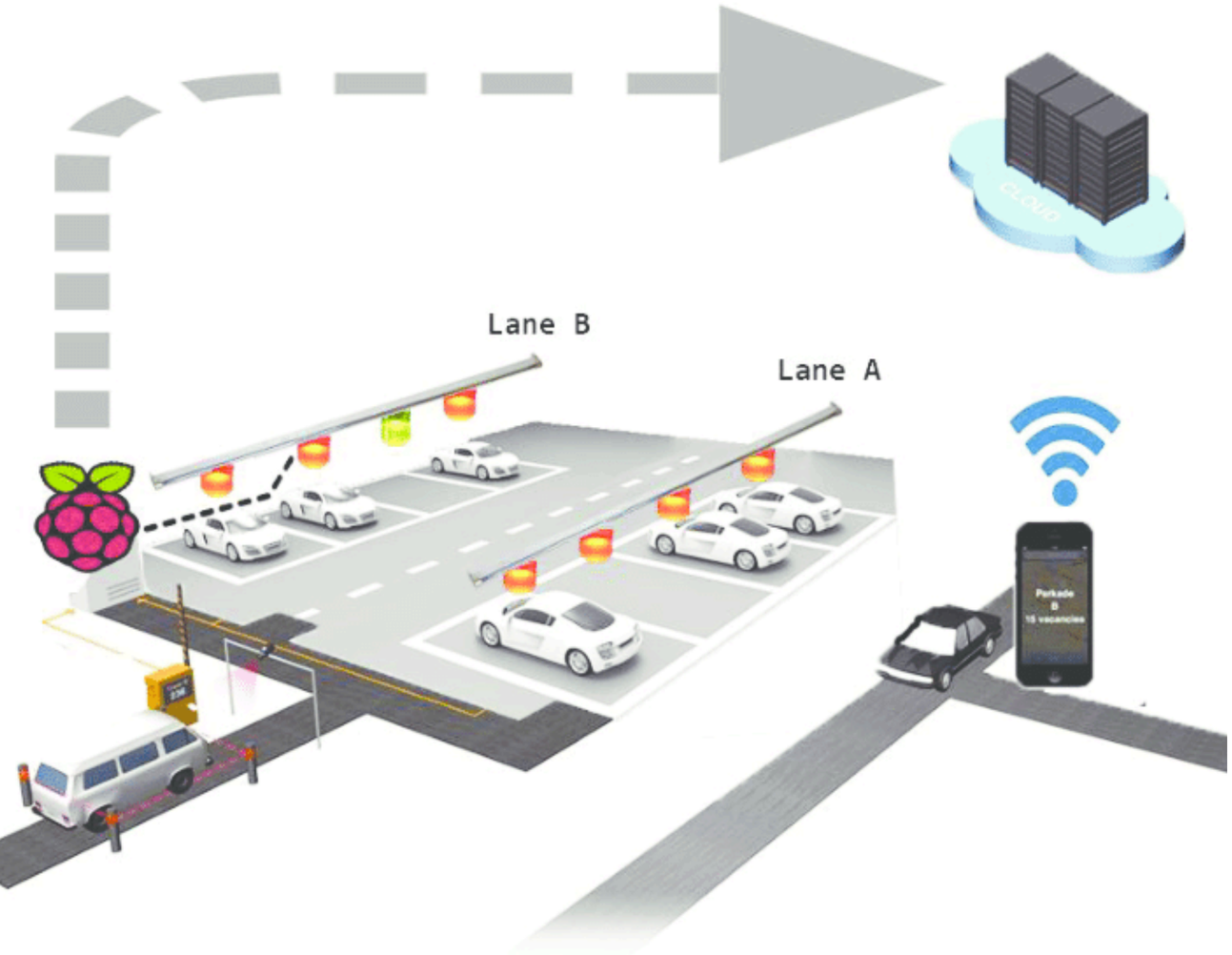
- Water Conservation
- Increased Crop Yield
- Remote Monitoring

Exciting IoT Projects

Low-Cost IoT-Based Weather Station

- This project collects weather data (temperature, humidity, wind speed) using sensors connected to a microcontroller. The data is transmitted to the cloud and displayed on a web dashboard.
- Why it's interesting: Shows practical use of IoT in environmental monitoring, with real-time data accessible to the public.

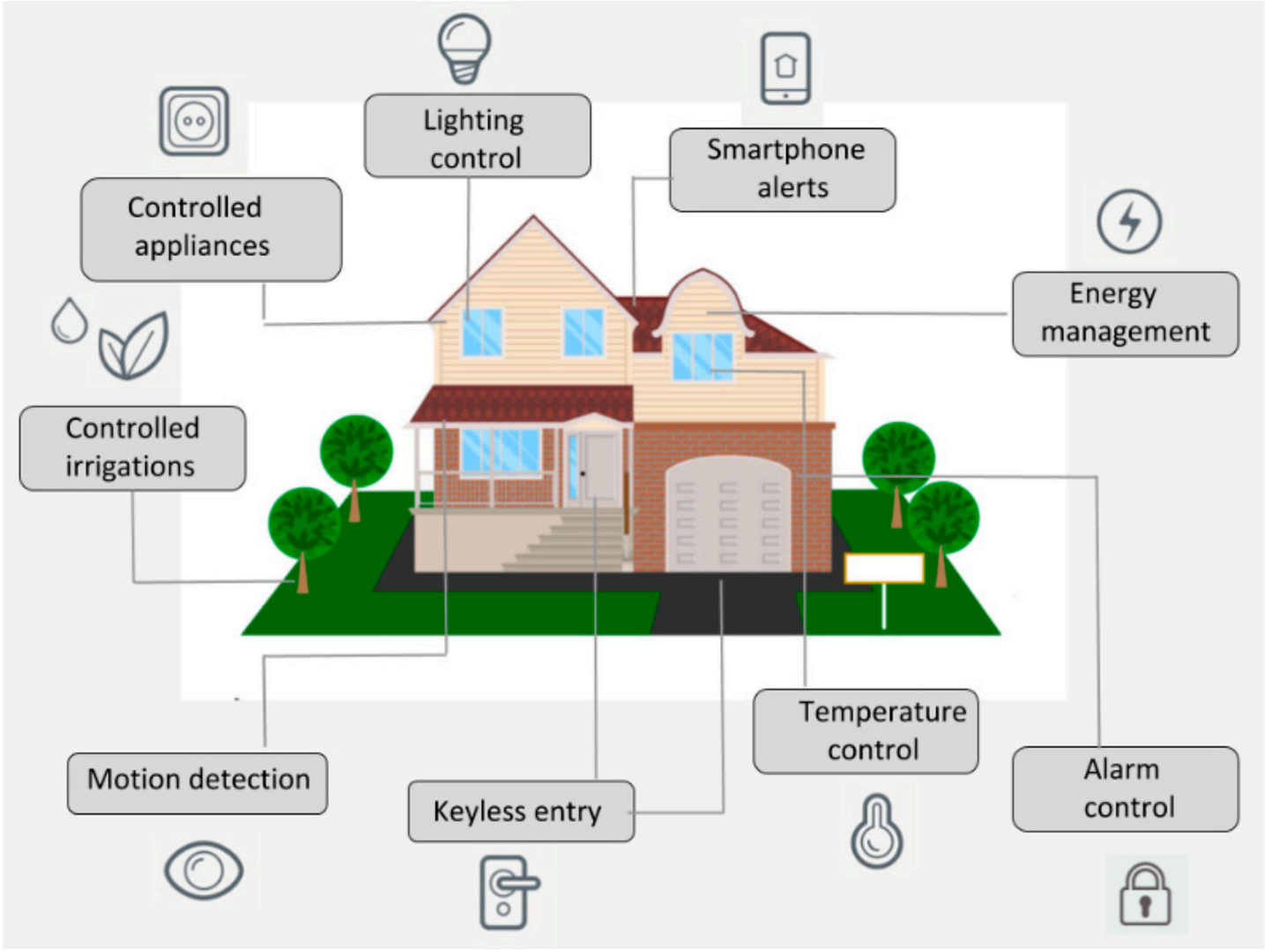
2.IoT-Enabled Smart Parking System



Link

- This system uses ultrasonic sensors in parking lots to detect free spots and transmits the information to a smartphone app. Users can reserve parking spots before arriving at a location.
- Why it's interesting: Solves a real-world problem of urban parking challenges, and the use of real-time data enhances the user experience.

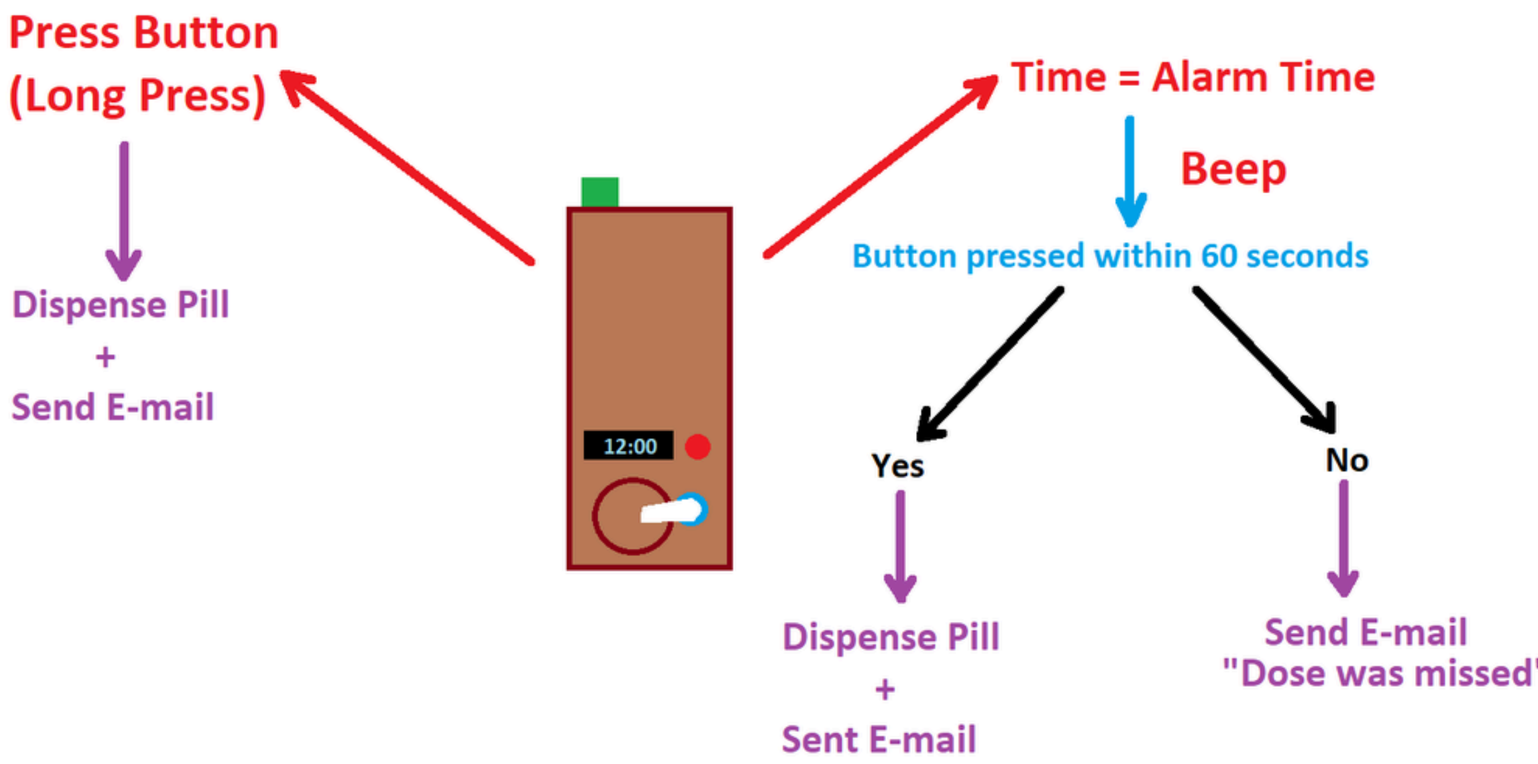
3.IoT-Based Home Automation Using Blynk and Arduino



4.IoT-Driven Smart Healthcare Pill Dispenser

This system helps patients take medication on time by dispensing pills at scheduled intervals and sending reminders to a smartphone app. It also tracks medication intake data.

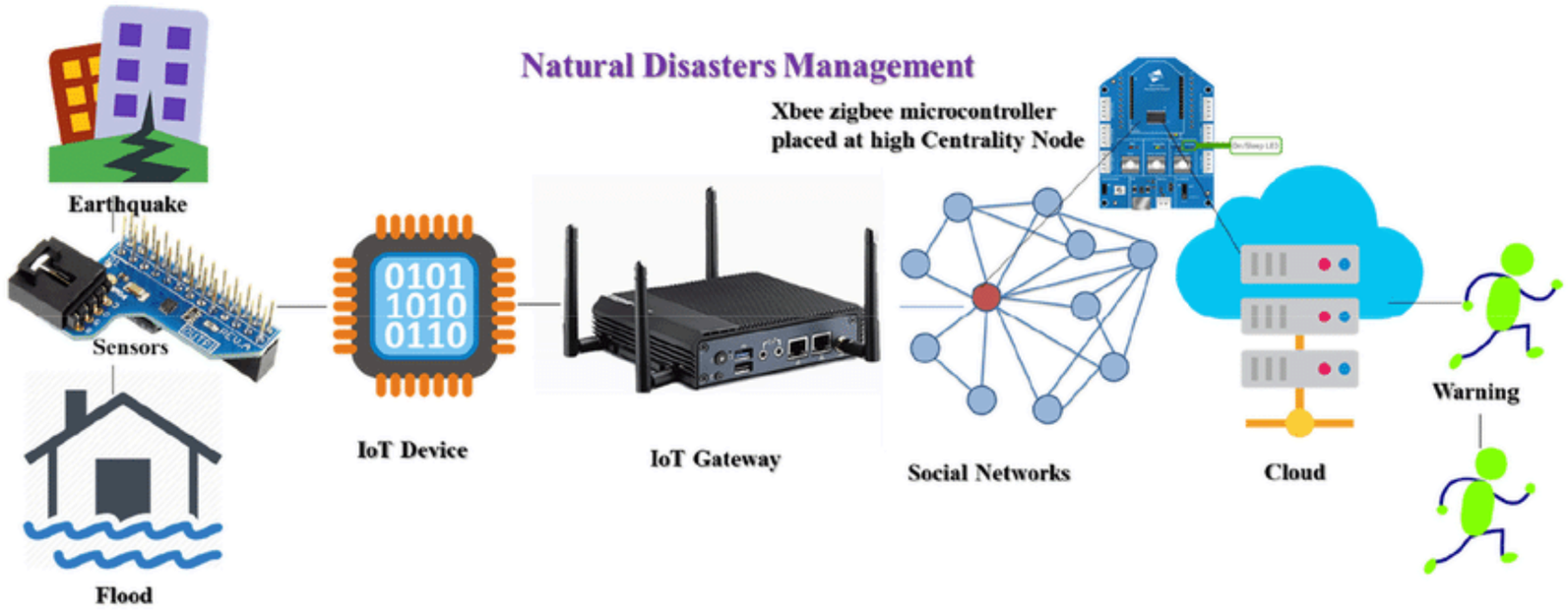
Why it's interesting: Innovative healthcare application with real-world impact on patient safety and adherence.



5.IoT for Disaster Management

Why it's interesting: Real-time monitoring and response during natural disasters can save lives and minimize damage.

IoT sensors can be deployed in flood-prone or earthquake-prone areas to detect early warning signs and send alerts to authorities and citizens.



Future of IoT

Edge Computing and AI in IoT

Future IoT devices will have AI-enabled features, processing data locally at the edge (on the device) rather than sending all data to the cloud. This will reduce latency and improve real-time decision-making

Conclusion

In conclusion, the Internet of Things is transforming the way we live and work, connecting devices and data to create smarter, more efficient systems. As IoT continues to evolve, it promises to drive innovation, improve productivity, and enhance everyday experiences, making our world more interconnected than ever before.

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