Dr. Ambarish G. Mohapatra

IOT & Applications

Module – 5
Class-6

IoT Case Studies: Home Automation, Structural Health Monitoring, Weather Monitoring System

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Bhubaneswar

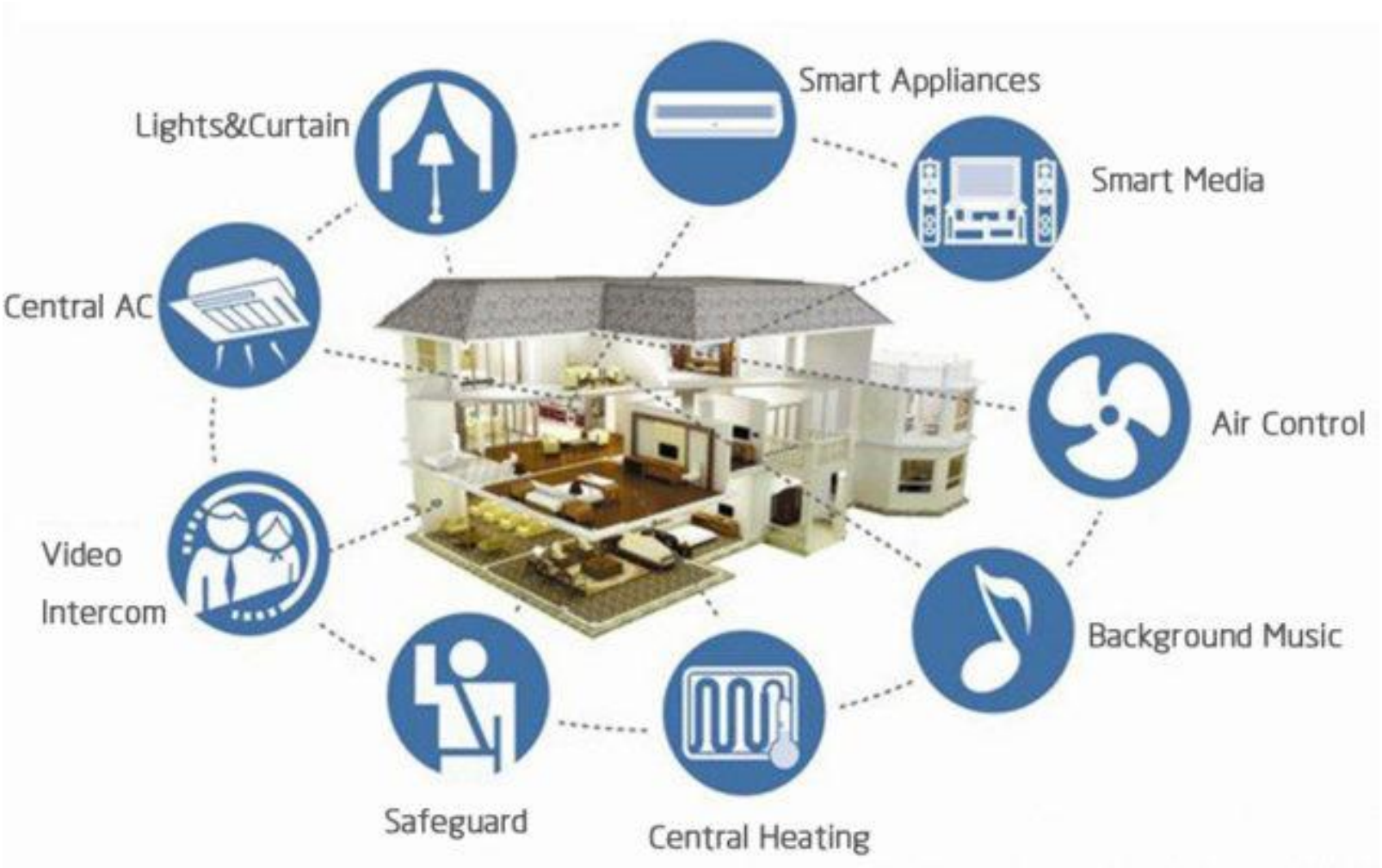
IoT Case Studies

1. Home Automation
2. Structural Health Monitoring
3. Smart Environment Monitoring and Control
4. Agriculture: Smart Irrigation
5. Smart City (Traffic, Water Management)
6. Industrial Automation
7. Smart Retail
8. Smart Healthcare
9. IoT Applications – Smart Grid
10. Smart Manufacturing

1. Home Automation

Long Type Question:
Discuss a case study on IoT implementation of home automation system. List the type of technologies and sensors required to implement such system.

Answer:
1. Block Diagram of IoT implementation based home automation system
2. Technologies involved:
    - Smart Lighting Technology: Solid state lighting devices and IP enabled lights, smart lights with occupancy control.
    - Smart Appliances: Refrigerator and RFID based item detection, air-conditioner
    - Intrusion Detection: PIR sensors and door sensors, cloud control intrusion detection, geo-location based nodes, UPnP instant messaging for alerts.
    - Smoke/Gas Detectors: Fire detection, smoke detectors (optical detection, ionization or air sampling technique), Alarm system, Carbon monoxide, Liquid petroleum gas (LPG) detection, visual feedback on its status (health, battery-low indicators).


Smart Appliances
Lights&Curtain
Smart Media
Central AC
Air Control
Video
Intercom
Background Music
Safeguard
Central Heating

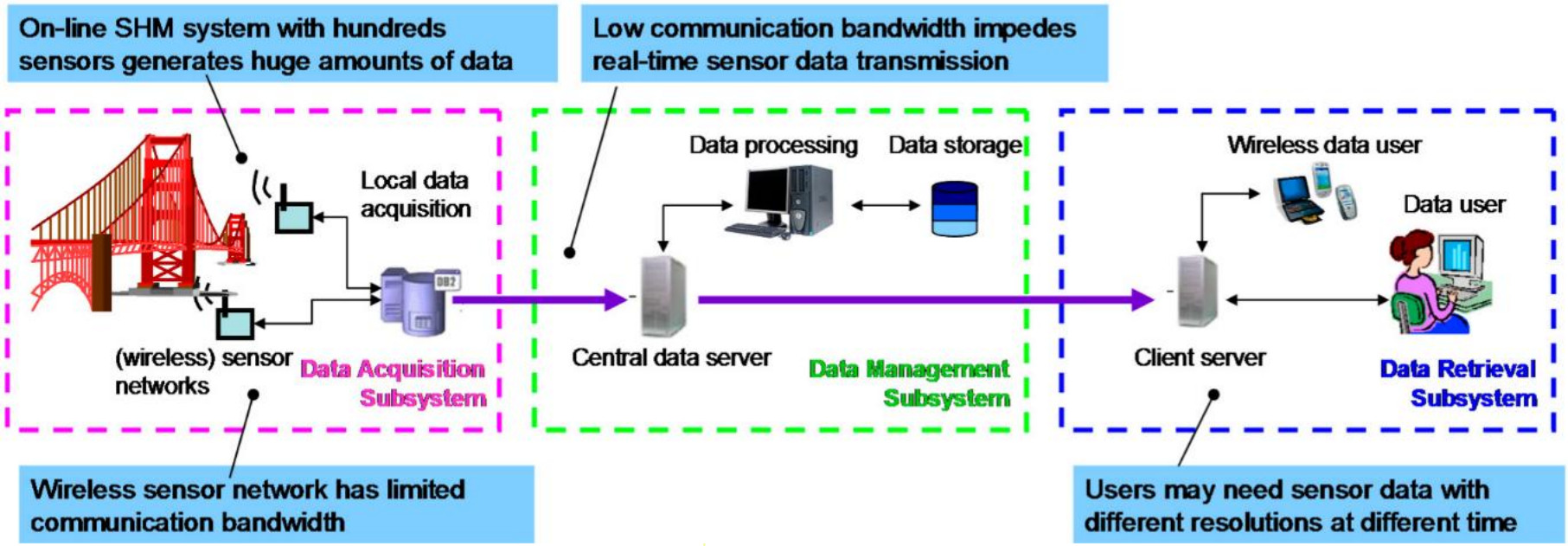
2. Structural Health Monitoring (SHM)

Long Type Question:

Discuss a case study on IoT implementation for structural health monitoring applications. List the type of technologies and sensors required to implement such system.

Answer:

1. Block Diagram of IoT implementation based structural health monitoring system



Structural Health Monitoring (SHM)

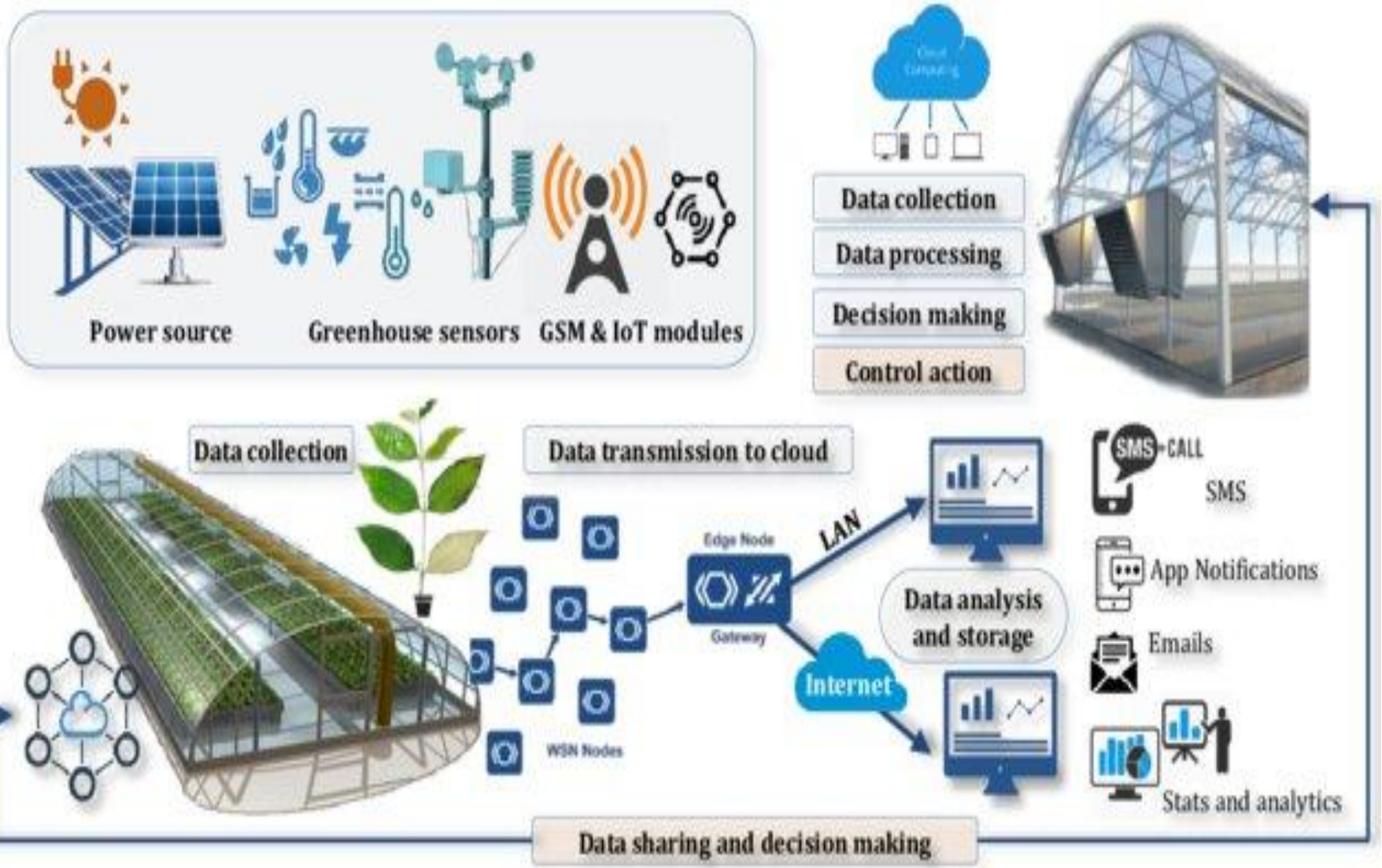
2. Technologies involved:

- SHM systems use a network of sensors to monitor the vibration levels in the structures such as bridges and buildings.
- The data collected from these sensors is analyzed to assess the health of the structure. By analyzing the data, it is possible to detect the cracks and mechanical breakdowns, locate the damage to a structure and also calculate the remaining life of a structure.
- Using such system, advance warning can be given in the case of imminent failure of the structure.
- An environmental effect removal based health monitoring scheme in an IOT environment is also possible.
- Since, SHMs use large number of wireless sensor nodes which are powered by traditional batteries, research work is going on to explore energy harvesting from ambient energy, such as mechanical vibrations, sunlight and wind.

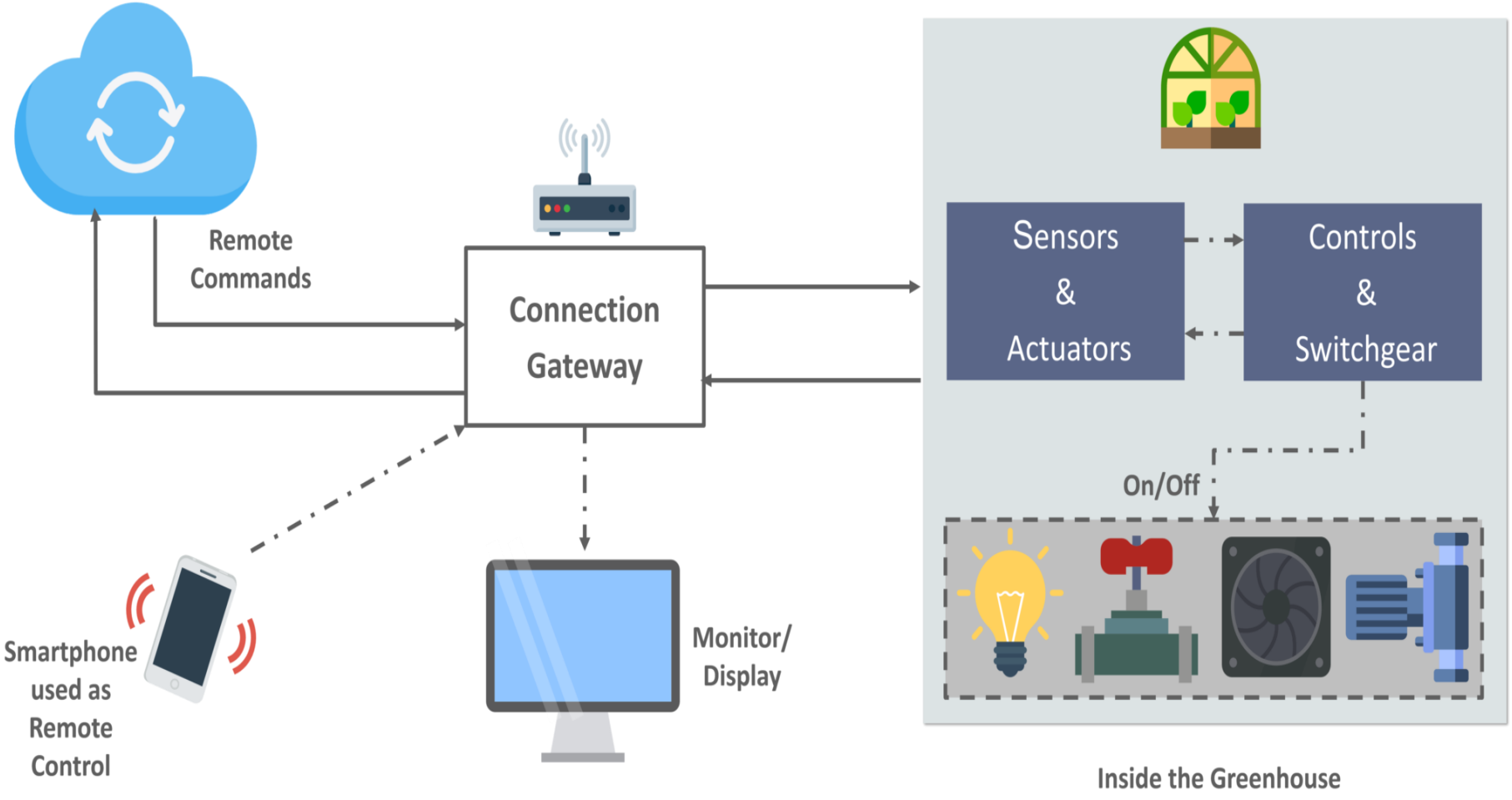
SHM cont…


Wifi Antenna
Wifi Bridge
Antenna 4G
Wilow®IIOT Sensors
Wilow®IIOT GATEWAY with 4G Connectivity

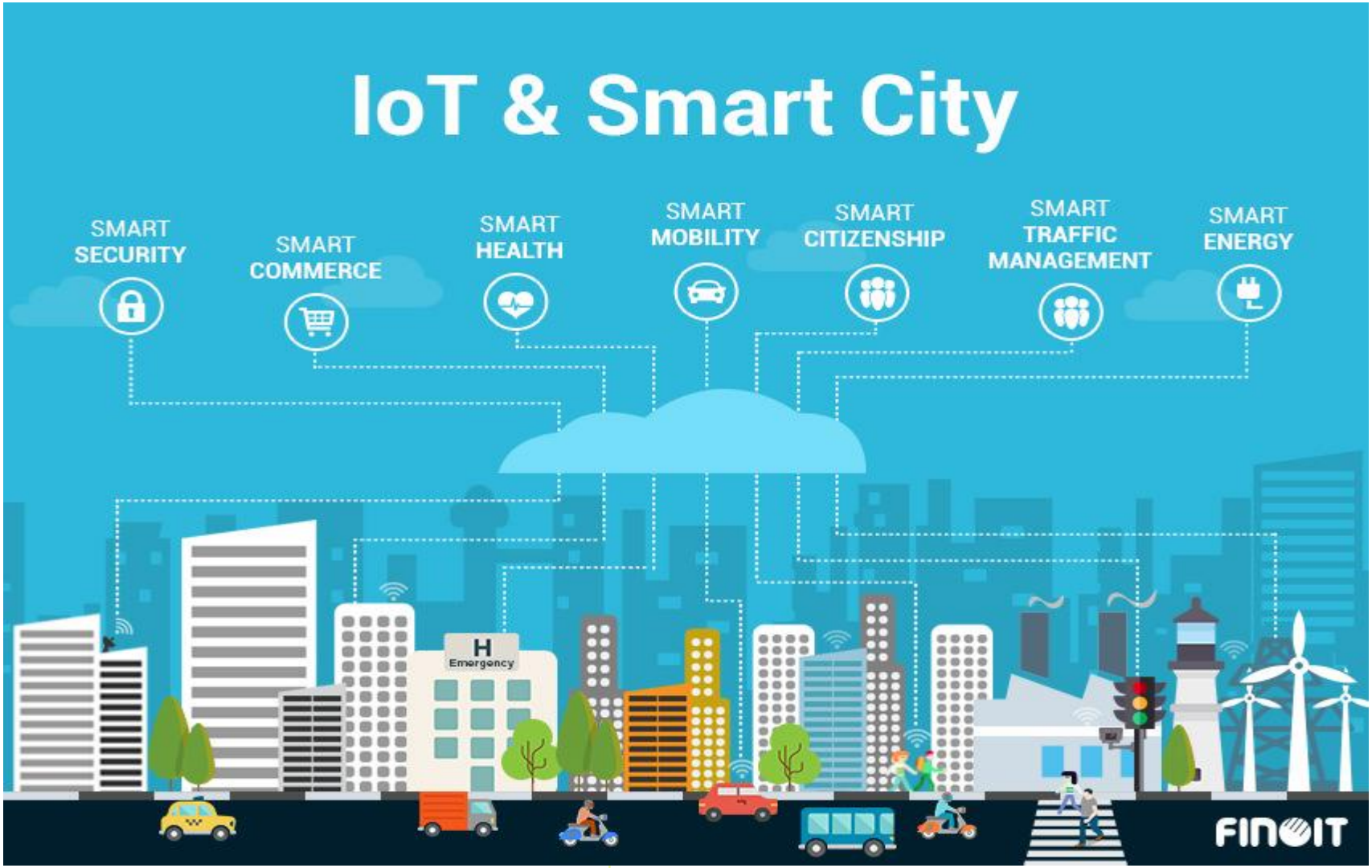
3. Smart Environment Monitoring and Control



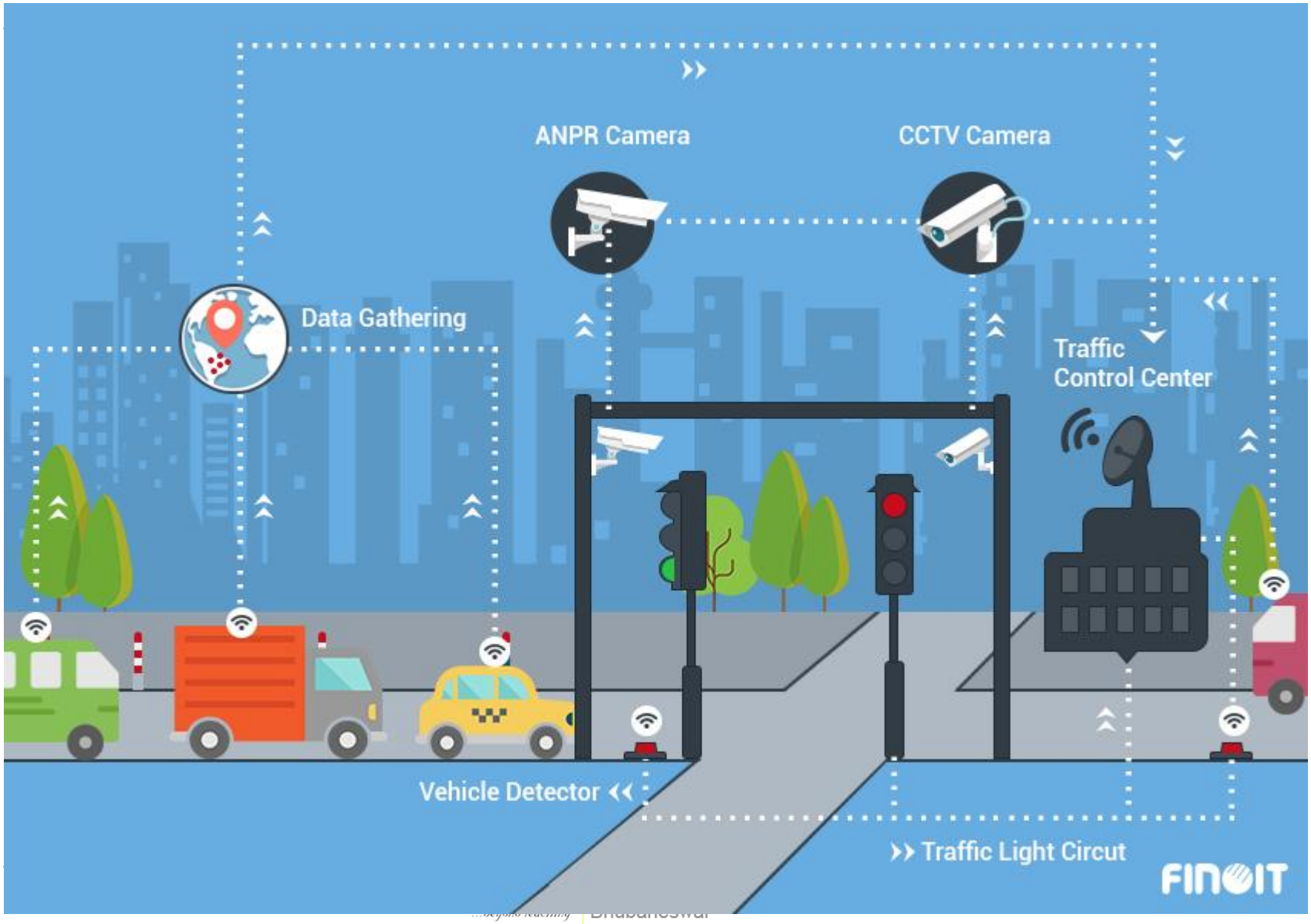
4. Agriculture: Smart Irrigation



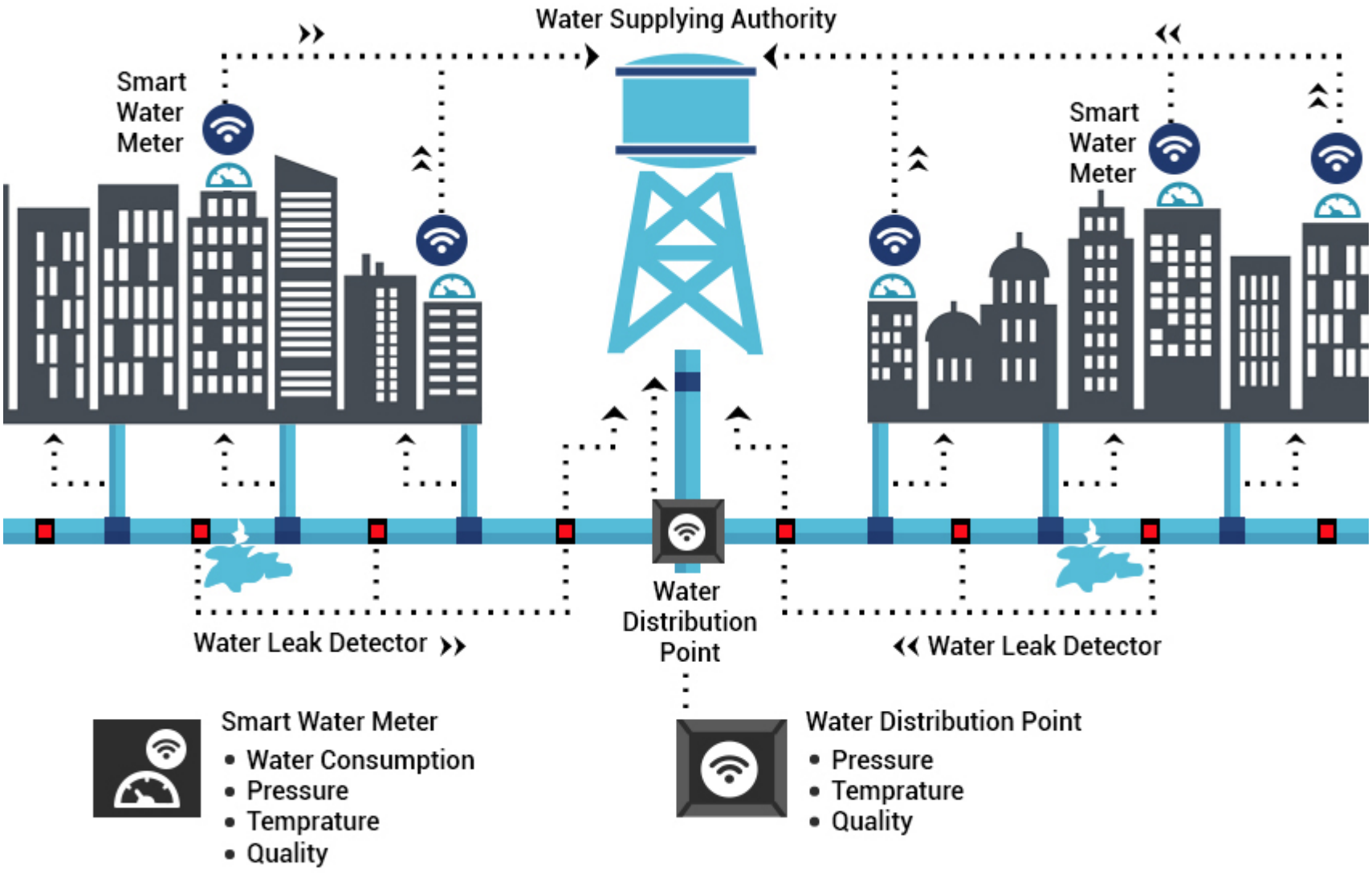
5. Smart City


IoT & Smart City
SMART SECURITY
SMART COMMERCE
SMART HEALTH
SMART MOBILITY
SMART CITIZENSHIP
SMART TRAFFIC MANAGEMENT
SMART ENERGY
H
Emergency
FINOIT

5.1. Smart City (Traffic)



5.2. Smart City (Water Management)



6. Industrial Automation

IoT Applications in Industrial Automation

- Smart tracking for products in-transit
- Notifies users on deviations in delivery plans

- Creates Digital Factories
- Improves Line-of-Command in work units

- Monitors in near real-time through out the supply chain
- Provides cross channel visibility into inventories

- Product Quality testing in various stages of Manufacturing cycle
- Packaging Optimization

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7. Smart Retails

Smart Shelves

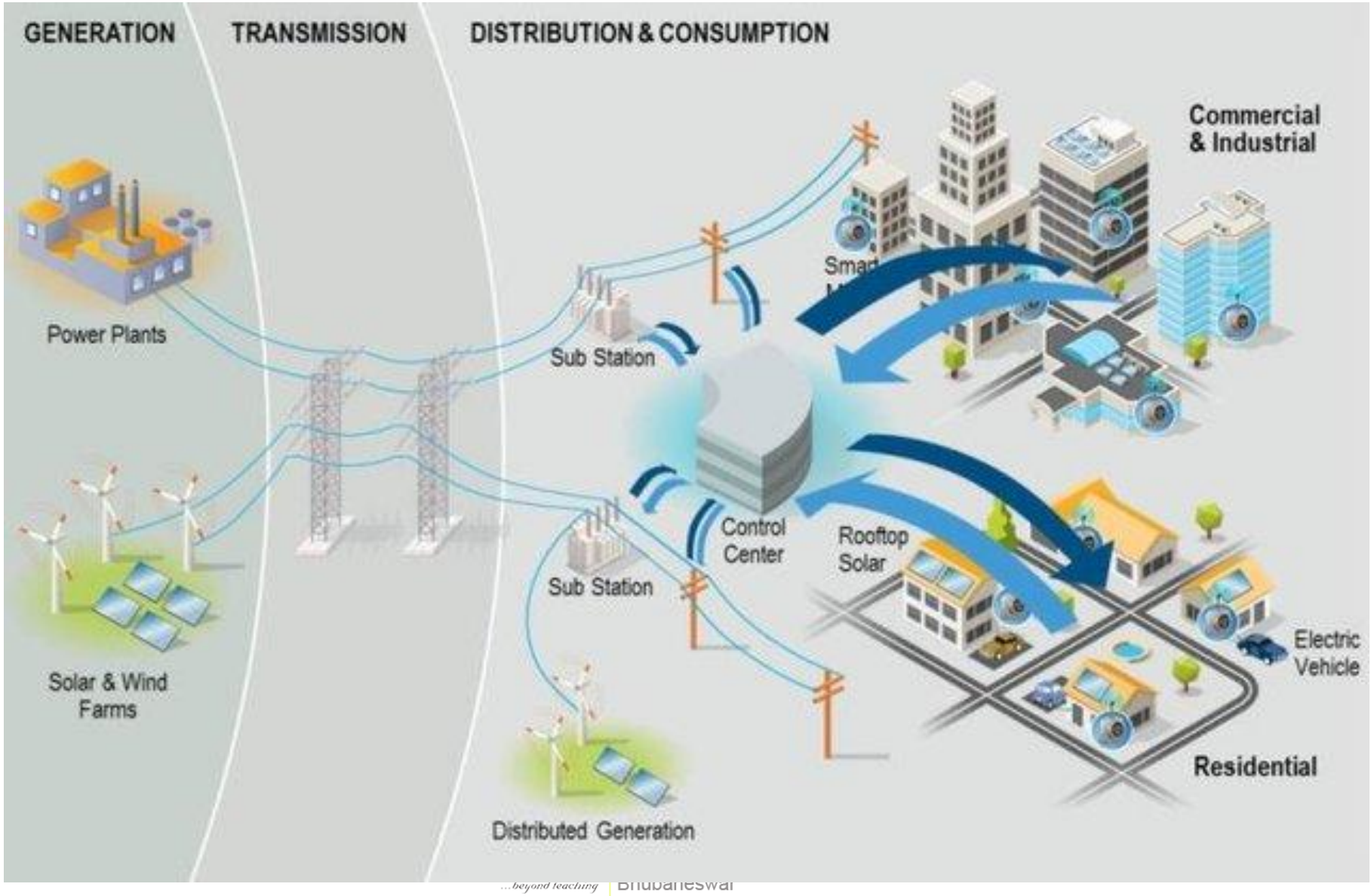

Capturing Store Insights for Timely Engagement
Gesture Recognition
Wi-Fi
Chokepoint / Precision Location
Digital Signage
Integrated Video Surveillance
Associate Tablet
Internet of Things
Customer Mobile
Continuous Channel Customer Interaction
Wisdom from the Cloud
Fog
Secure Big Data Infrastructure, Analysis, & Action
Big Data Repository
Fast Data Processing
Action Enablement

8. Healthcare

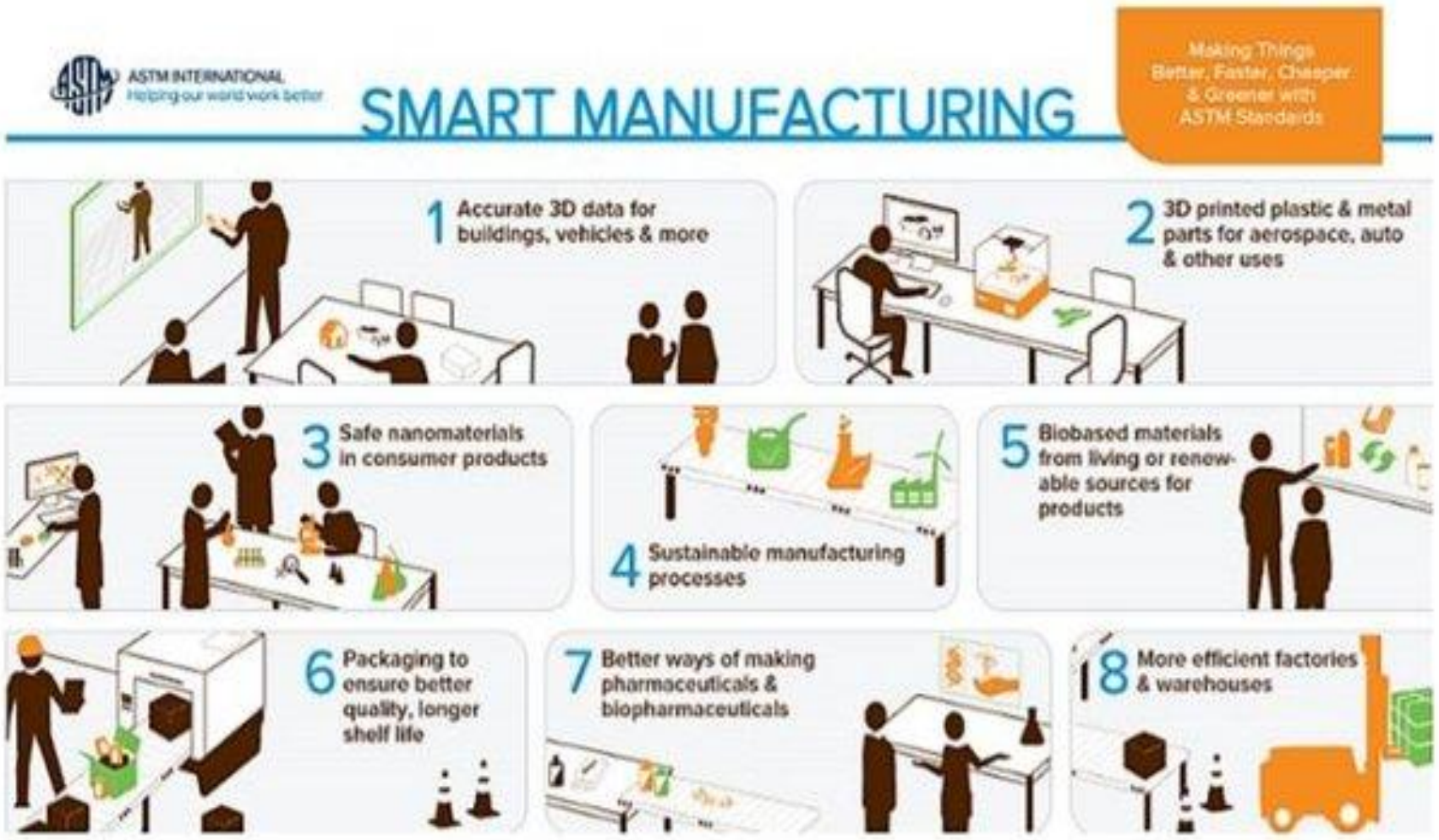
- Reducing emergency room wait time
- Tracking patients, staff, and inventory
- Enhancing drug management
- Ensuring availability of critical hardware

IoT has also introduced several wearable & devices which has made lives of patients comfortable. These devices are as follows.

9. IoT Applications – Smart Grid



10. Smart Manufacturing



THANK YOU