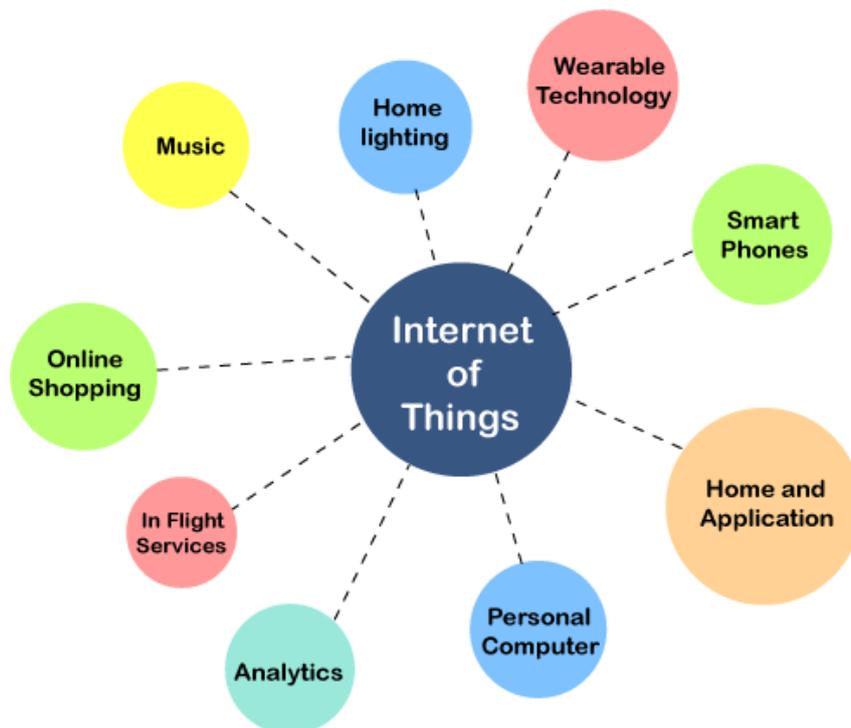


## UNIT V IOT APPLICATIONS

### 5.1.1 Business models for the internet of things

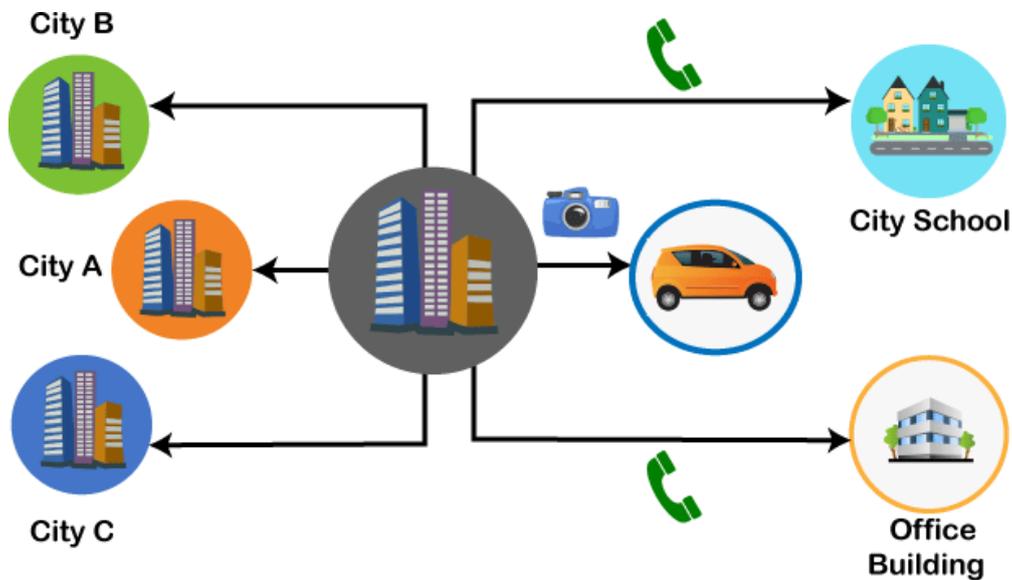
The **Internet of Things (IoT)** provides the ability to interconnect computing devices, mechanical machines, objects, animals or unique identifiers and people to transfer data across a network without the need for human-to-human or human-to-computer interaction. **IoT applications** bring a lot of value in our lives. The Internet of Things provides objects, computing devices or unique identifiers and people's ability to transfer data across a network without the **human-to-human** or **human-to-computer interaction**.



A traffic camera is an intelligent device. The camera monitors **traffic congestion, accidents** and **weather conditions** and can access it to a common entrance. This gateway receives data from such cameras and transmits information to the city's **traffic monitoring system**.

For example, the municipal corporation has decided to repair a road that is connected to the national highway. It may cause traffic congestion to the national highway. The insight is sent to the traffic monitoring system.

The intelligent system analyzes the situation, estimate their impact, and relay information to other cities connected to the same highway. It generates live instructions to drivers by smart devices and radio channels.



It creates a network of **self-dependent systems** that take advantage of real-time control.

### 5.1.2 Smart city

A smart city uses information and communication technology to improve the utility, share knowledge with the public, and provide strong sense of community support and local government assistance. Shrewd urban communities are those that make use of brilliant ideas and information as the required resources to address the maintainability issues that urban communities face. Many metropolitan areas are currently becoming more intelligent, utilizing information and innovation to advance transportation, energy consumption, wellness, and air quality, as well as to spur economic growth.

A great city's main objective is to streamline municipal operations, promote economic development, and address resident happiness through clever developments and data analysis. We intended to spend a great amount of time reading up on several shrewd urban groups in this post. As a result, some of the key boundaries that can be built include clever management, clever energy, clever building, clever flexibility, clever structure, clever invention, clever medical care, and clever residence.

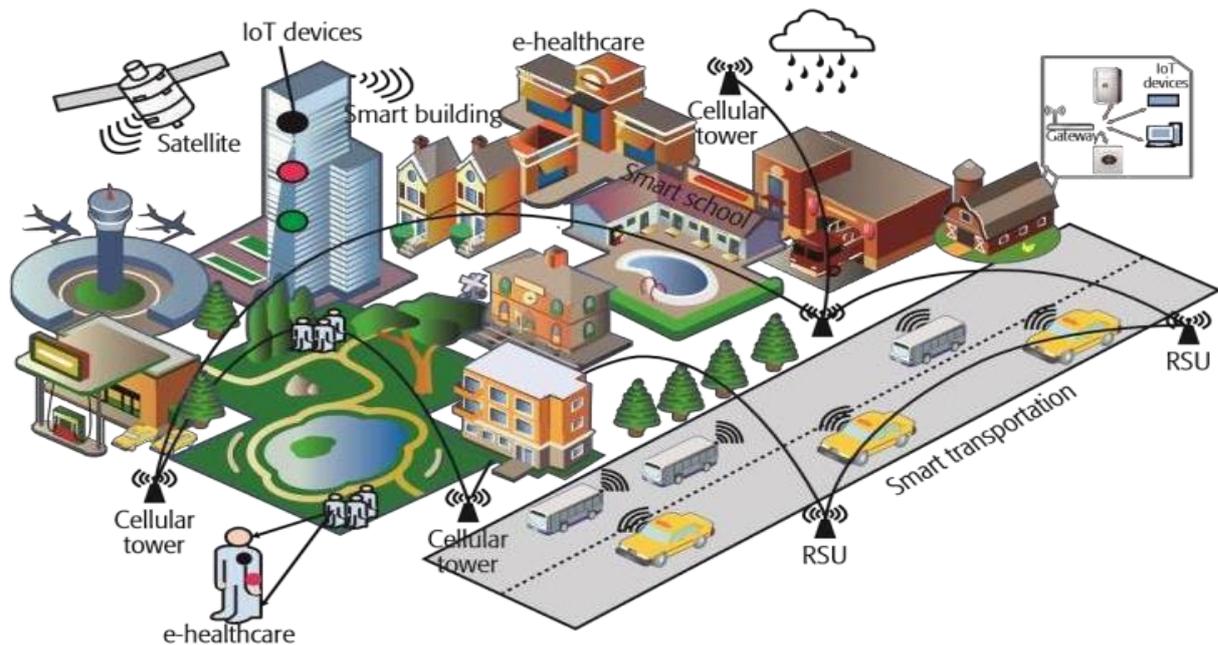
Urban areas collect and analyze information using IoT devices such as connected sensors, lighting, and meters. The foundation, public usage, and administrations, to name just a few, are all progressively developed in urban areas using this knowledge. Smart urban communities focus on improving the lives of their residents in such fundamental areas as strategy effectiveness, reducing waste and everyday problems, improving friendly and financial quality, and enhancing the social consideration of their residents.

## Advantages of Smart City:

- Automatic Switching of Street lights.
- Maintenance Cost Reduction.
- Reduction of light pollution.
- Keep the city clean.
- Improve traffic and reduce parking times.
- Reduction of manpower.

## IoT-based smart city

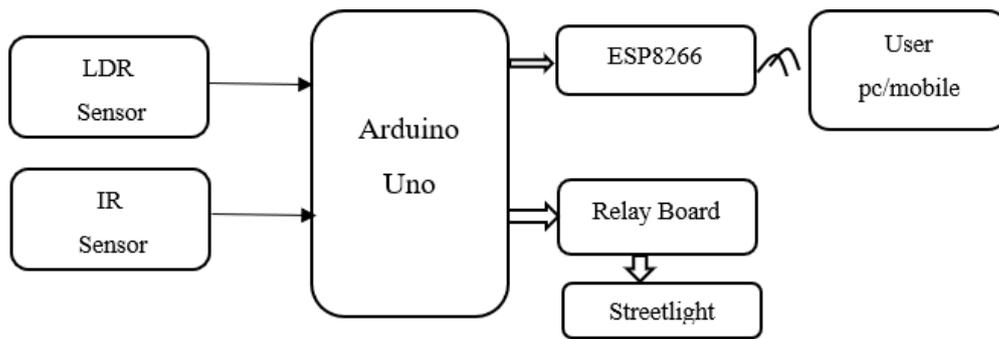
The following Figure provides an illustration of an IoT-based smart city.



An illustration of an IoT-based smart city

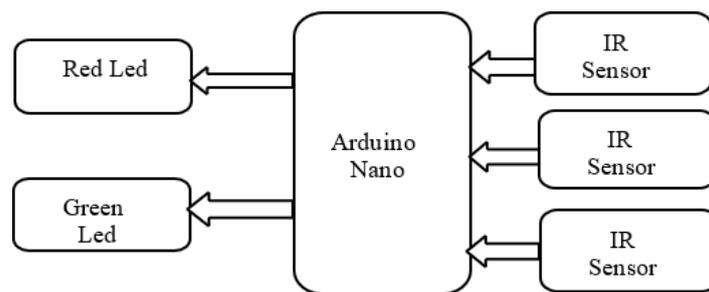
The IR sensors, LDR, PIC16F877A microcontroller, relay, UART, and Wi-Fi module make up the ingenious street lamp's construction. LDRs are light-dependent devices, and their blockage grows in the dark and shrinks when exposed to light. A light-dependent resistor has a high resistance when maintained dull. The vehicle that is passing the streetlight is recognized by an IR sensor. The streetlight bulb can be turned on and off during the transfer.

The Universal Asynchronous Receiver/Transmitter (UART) software on a microcontroller manages the PC's connection to the associated streetlight framework.



Block diagram of smart street lighting system [5]

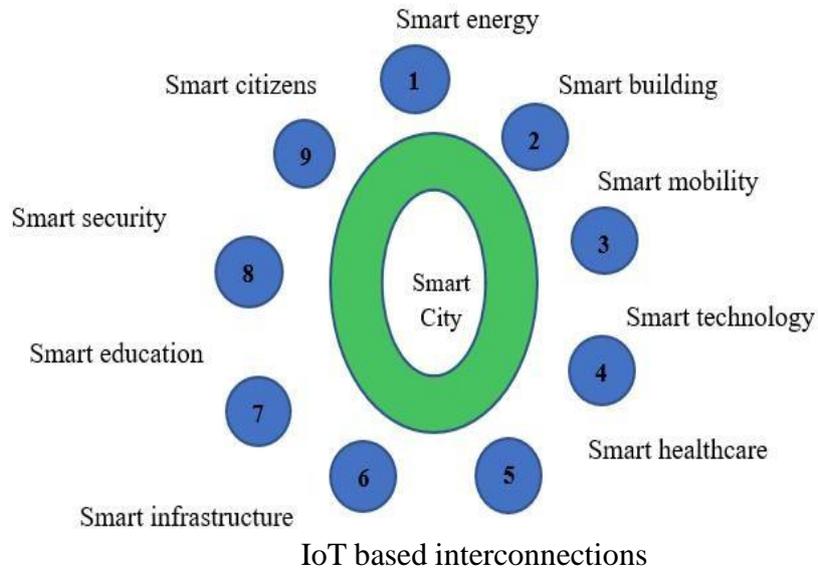
The clever street lamp's structure is made up of IR sensors, LDR, PIC16F877A microcontroller, relay, UART, and Wi-Fi module. LDRs are light-dependent devices whose blockage expands in darkness and decreases when light shines on them. When a light-dependent resistor is kept dull, its resistance is quite high. An IR sensor identifies the car that is driving past the streetlight. During the transfer, the streetlight bulb can be turned on and off. A microcontroller with software known as a UART (Universal Asynchronous Receiver/Transmitter) controls a PC's connection point to its connected streetlight framework.



Block diagram of smart parking system [8]

It is divided into three areas. The parking area is the first, and it includes an IR sensor and Arduino devices. With the aid of these devices, the client establishes a connection with the halting location. Without the aid of an RFID card, the user is unable to enter the parking space. The cloud-based web administrations, which serve as a go-between for the client and the stopping region, are covered in the following section. Depending on whether a parking space is available, the cloud is updated. The user can view the admin to see if the cloud services are available, and the admin manages the cloud services. The user side is the third section.

Heterogeneous hardware permits the mechanization of comparative and customary workouts using the IoT stage in homes and buildings. The execution of administrations via web interfaces is undoubtedly possible when transforming items into the information of apparatuses that are completely connected via the Internet. Huge numbers of sophisticated home applications use sensor networks. The government (at the municipal, state, and federal levels) should deploy IoT services in all crucial issue areas to enhance government information systems and administration.



The latest developments in computerized innovations have made shrewd urban regions even more shrewd than previously. A smart city has sensors for transportation systems, road cameras for perception systems, and other electronic components that are used in numerous applications. Additionally, this may increase the use of personal cell phones. This way, different concepts like article highlights, givers, inspirations, and security standards should be investigated while accounting for the diverse climate.