

# A Review Paper of “IOT” Communication Devices & Smart Applications

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**Abstract-** We are entering in a new era of technology that is called the internet of things. This means every device should be connected to the internet. The Internet of Things (IoT) is the network of different physical devices, vehicles and other objects which consists of a system which is embedded with sensors, actuators and network connectivity that provides collection and exchange of data. TheIoT allows us to sense and control the data remotely across existing network infrastructure by objects. it helps us to improved accuracy, efficiency, and economic benefit. The IoT is a rapidly increasing and promising technology which becomes more and more helpful in our daily life. As a result of a large volume of data generated and it is useful to make command and control on things so that our life can make safer and easier. Iot is a technology that provides smart work on smart grids, smart homes, and smart cities. Here we will understand the height rate development of IoT technology, significant of connected no. Of devices, the aim of IoT, the architecture of IoT and the application of IoT. iot is a very helpful technology to connect the billions of devices.

## I. INTRODUCTION

Internet of Things (IoT) term represents a general concept for the ability of different networking devices that help us to sense and collect the information. this device shares the data on the internet where it can be processed for various purposes. The Internet of Things is a complete network of different objects that are mainly supported by electronics devices, sensors, and actuators. This IoT network consists of three-layer. The first one is an object, second is a sensor, that senses the data and the third one is actuator from where information is transmitted in the form of the electrical signal to the cloud. Cloud is a storage network that can store the information. The Internet of Things is a combination of smart machines interacting and communicating with each other. Through the Internet of Things, people can connect. Internet of Things is a wireless network consists of Bluetooth radio frequency identification (RFID), Wi-Fi and telephonic data services. [1] There are various protocols which are used to connect the devices are MQTT (Message Queue Telemetry Transport),

HTTP (HyperText Transfer Protocol), COAP (Constrained Application Protocol), Advanced Message Queuing Protocol (AMQP) LoRaWan (Long Range Wide Area Network, Machine-to-Machine (M2M) Communication Protocol, Extensible Messaging and Presence Protocol (XMPP). [4] Currently, there are 9 billion devices are connected and it is expected to reach 24 billion devices by the end 2020. now a day 4G internet service is going to use for device connection but this speed will not be enough for the forthcoming IoT technology. 5G speed will be very essential for the next generation of IoT. IoT is a combination of both hardware and software components. Application on IoT extracts the information from lower-level data by filtering and processing. All information processing is structural, that make smarter performance. For example, consider a collection of raw data from different sensors that are meaningless till they all are connected this is only possible with IoT. IoT is very useful in home appliances, smart computers, automobiles, industry, health care systems, etc.

Application on IoT extracts the information from lower-level data by filtering and processing. All information processing is structural, that make smarter performance. For example, consider a collection of raw data from different sensors that are meaningless till they all are connected this is only possible with IoT. IoT is very useful in home appliances, smart computers, automobiles, industry, health care systems, etc. let's take on the example of home security i.e. we are not at home and some person is waiting for you outside the door and he is very important for us in that case if use IOT technology that we help us to know on our mobile .device is connected on the door will send the information of surrounding people. IOT is completely based on a real-time event. [2]

## II. TECHNOLOGIES USED FOR IOT

**RFID-** radio frequency identification is used to identify the moving object and also provide control and record of objects. It is also used to keep track of people. RFID is very useful in IoT to track the record of all connecting devices. It uses radio waves and electromagnetic waves to transmit the data. [4]

**Quick response code and Optical tags-** This is useful for low-cost tagging in our Phone, cameras decode QR code with the help of image-processing techniques. Firstly it is designed for the car industry. But now a day it has become popular for outside the car industry. It is fast, reliable and great storage capacity. It is useful in various applications like marketing, Document management, product tracing, etc. **Low-Energy Bluetooth:-** Bluetooth is a wireless technology for exchanging data. It is used for short-distance communication. It is a low power technology useful in IoT functions. It can create a personal area network with high security.[4]

**Low-Energy Wireless-Sensor** and other elements can lose the power during communication when using over long periods. During communications all elements must remain in listening mode. Low energy wireless can reduce the consumption and also extend the life of device through less use.[4]

**Radio Protocols-** ZigBee, Z-Wave, and Thread are radio protocols. They can create low-rate private area networks. These technologies are low-power but have the ability to offer high throughput. This increases the power of a small local device.[4]

### III. IOT FUNCTIONAL BLOCK

IoT System has several functional blocks that are used to sense, process and communicate via devices, sensor actuators, and data analytics.

**Devices:** IoT system is a combination of devices that have the ability to sense actuate the information and also provides monitoring and control on devices.

**Communication:** it provides the communication between different devices to make complete IoT system

**Services:** it provides services to control device monitoring, data publishing and devices discovery.

**Management:** It provides management of all the devices connected to IoT system.

**Security:** This block provides functions such as authentications, authorizations, and data security. In such a way it can secure the system.

**Application:** this is a medium to control and monitor various functions of IoT. Application is also useful to view, analysis the system status and proceeds with the data.[5]

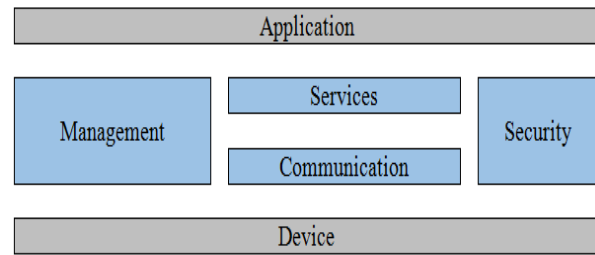


Fig 1: IoT Functional Block

### IV. APPLICATIONS

**4.1 Smart Lighting** - Smart lighting is very useful in saving energy. It uses LED lights and IP enabled lights. It is used for home to save energy by sensing the motion of humans and their environments. Accordingly, it controls the lights. Wireless devices, internet and sensor connected light can be controlled by mobile or web applications. With the help of these applications, we can also change the intensity and colors of light. Wireless sensor network provides the service for sensing illumination and adjust brightness according to user performance.[4]

**4.2 Smart Applications** - in our home, there is a number of applications like TV, refrigerator, music system, washing machine, lights, drier, etc. In a smart home, all the applications should be controlled and managed by remote control. With the help of IoT technology, we can make control on all the appliances by connecting the sensor and the internet with all. With the help of their connectivity, we can control all the things remotely. For example, a smart washing machine can be controlled by the user through a remote controller and will give the notifications after completion of the cycle. A smart refrigerator can keep the record of the stored item and provide an update to the user by tracking the record. It will give information about items when an item is low on stock. A smart TV can search for videos and movies on the internet.[1][2]

**4.3 Smart Agriculture** - we can improve crop yields while saving water by a smart irrigation system. We have some projects for agriculture to check the moisture level of the crop. In this type of project, the sensor senses the required level of water and gives information to a machine, if required automatically water pump will on and will provide irrigation.[5]

**4.4 Health & Fitness Monitoring** - IoT devices can continuously monitoring physiological parameters with the help of various wearable devices like belts and wrist bend. Wearable devices had a wireless sensors network known as a body area network. It uses body sensors that can measure body temperature, heart rate, blood pressure, electrocardiogram,

oxygen saturation. After measuring the data, it sends the data to a sensor for analysis. Health care providers analyze the data and send the information back to devices connected to our bodies. These devices alert us for our health condition.[5]

**4.5 Weather monitoring** -IoT based weather monitoring system collects the data from the attached temperature, humidity and pressure sensor, etc. and sends data to the cloud base system. Cloud can analyze the data by the cloud-based system and send weather alert to the subscribed user. Weather monitoring kit Aipi is capable of recording the information about temperature, humidity, air pressure, ultraviolet level, carbon dioxide, nitrogen level with the help of the internet.[6]

**4.6 Smart Road** - The main purpose is to provide a system in very reasonable cost. So in this work we are using the basic microcontroller. An Intelligent Highway system with (Weather Accidents Landslides and traffic) W.A.L.T.” which is an innovative concept to maintain safety on roads[7].

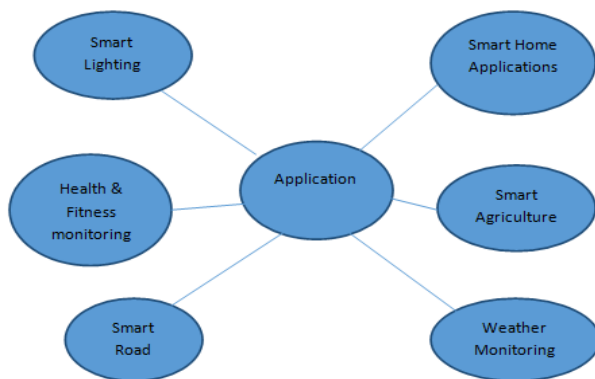


Fig 2 – Applications of IoT

## V. CONCLUSION

The IoT gives the smart direction to improve quality of life and enterprises’ productivity. It is a big distributed network of an intelligent network of smart devices, the IoT has the potential to provide extensions and enhancements to services like transportation, security, education, healthcare, and other areas. The future of IoT is not limited due to advance technology. GSM module, HC05 Bluetooth module, WiFi has made it possible to connect people and machines. there are a few challenges wit iot is security and reliability. Security is a major issue with iot technology because there are various devices that are connected with each other. iot is a versatile technology .it is a real-time service so connectivity needs the faster speed of the internet. for the future work 4G will not be sufficient for the speed and connectivity.5G will be very essential for this technology. With the help of IoT productivity will increase and various amazing things will

come by connecting the word. All Applications are making our life very smarter.

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