

Internet of Things: An Introduction

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ABSTRACT

The Internet of Things (IoT) is the collection of physical “things” or objects which includes devices, instruments, clothes, vehicles, buildings and other embedded items that includes sensors, actuators, software, electronics, circuits, and network connectivity that allows these objects to collect and exchange data. The Internet of Things enables objects to be sensed and managed remotely across the existing network infrastructure and creates opportunities for more direct integration of the physical world in to computer-based systems that results in improved accuracy and efficiency. The Internet of Things has brought revolution because of its popularity with its ability to meet the daily requirements of people from all spheres of life, and its indispensability to society at large have all combined to catapult the existing Internet to the next level.

KEYWORDS

Internet of Things (IoT), Wireless sensor Networks

INTRODUCTION

The phrase Internet of Things (IoT) refers to connecting various physical devices and objects throughout the world with the help of internet. The term IoT was proposed first in 1999 by Kevin Ashton at Massachusetts Institute of Technology (MIT). Kevin explained the Internet of Things (IoT) as uniquely identifiable connected objects with radio-frequency identification (RFID) technology. Nevertheless, the definition of the IoT is still in the construction process that is subjected to the various perspectives taken. This field is very

rapidly growing as it is significant in today's world. It deals with various layers used in IoT and some basic terms related to it. [1]

Figure 1 shows how IoT consists of various connected devices and adds to the human value.

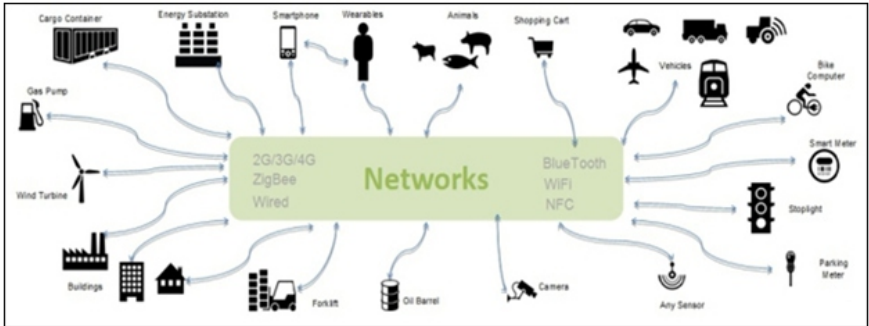


Figure 1: Internet of Things [2]

Architecture of IoT: The devices in the network must be connected to each other, which is a crucial prerequisite of an IoT. IoT system architecture assures the operations of IoT, which connects the real and virtual worlds. Many variables, such as networking, communication, and operations, go into the design of IoT architecture. During the designing of the architecture extensibility, scalability, and operability of devices should all be considered. IoT design must be adaptable for the reason that various items may move and need to interact with others in real-time. [1]

The 3 layer architecture of IoT: The 3 layer architecture of IoT primarily consists of basic three layers namely perception, application and network layer as shown in Figure 2.

1. Perception Layer: It is also known as physical layer that contains sensors, actuators, RFID tags and other necessary components required. This layer is responsible for sensing and collecting the required information from the devices connected to the network.
2. Network layer: This layer behaves as gateway and is responsible for routing of protocols, other server related data and the transmission of data.

3. Application Layer: It is the top layer which is responsible for the transmission of data to the required destination.[5]

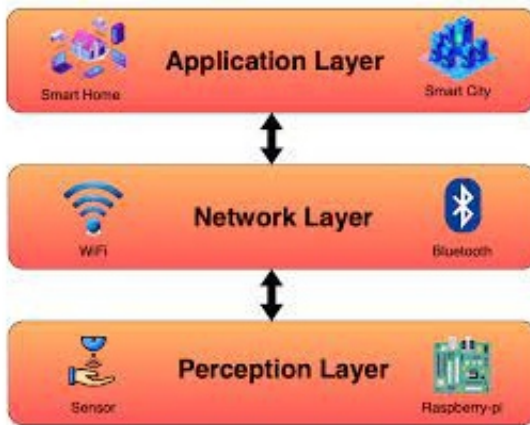


Figure 2: 3 layer architecture of IoT [6]

Applications of IoT: There are various applications of IoT varying from like home automation like small network to cloud applications like large network.[5]

1. Environmental Monitoring: Temperature, humidity, air pollution, and water pollution can all be sensed with a variety of sensors. Temperature is measured using sensors such as RTDs and thermometers. We can use dust sensors and gas sensors to investigate air pollution. Chemicals can be detected by using e-Tongue (electronic tongue) and e-nose (electronic nose) technologies. Pattern recognition software is used in these technologies. These are used in cities to keep track of levels of pollution of traffic. [7]
2. Home Automation: Domotics is the term for home automation or smart building. The many things in the home can be managed by utilizing a single hub, typically a smart phone (which incorporates sensors such as an accelerometer). That is, smart televisions, air conditioners, water heaters, lighting, fans, and other devices will be linked to the phone via NFC, Bluetooth, Zigbee, or other low-power

short-range protocols. [8]

Agriculture: In this industry, IoT is commonly referred to as Smart Farming. We can control the tractor's path with the use of GPS-enabled tractors. We can also operate the pump (set timing when to provide water to the farm) with the help of a simple integrated IoT device. The condition of the land can also be evaluated using soil sensors. [9]

3. Aqua-culture: In aquaculture, IoT has been utilised to manage the activity of radiators (used in fish tanks for oxygen supply). The farmer can obtain information about water by employing chemical sensors (temperature).
4. Health care: Involving IoT in clinical field can allow one to follow patient medical issue. The clinical sensors can be: 1) wearable and 2) sensors embedded in the body. Utilizing wearable sensors one can get information about various parameters like heartbeat rate, internal heat level, calories and so forth. The instances of wearables are fitbit, reflex. Other sort is sensors embedded inside the body. These are utilized when patients' wellbeing must be observed persistently. For instance by utilizing a sensor which is embedded in the human body the specialist can track and screen the patient heartbeat, beat rate and so forth.
5. Transportation and Logistics: IoT assumes a significant part in transportation and operations [10]. By appending RFID labels or scanner tags to the vehicle, the ventures can screen the continuous data of the vehicles [11], as area of the vehicle and others. Moreover, by improving the IoT capacities in transportation field one have some control over the speed of the vehicle. By laying out appropriate guidelines of IoT, we can improve IoT in different others fields like mining, wellbeing, traffic checking and so on [10,11]

CONCLUSION

IoT consolidates different sensing devices, embedded devices, networking models, communication models, pattern recognition etc. IoT is progressing with a very fact pace and future cannot be predicted with the use of IoT. As there is upgrade in the abilities of sensors, one can foster a decent IoT model and henceforth following 10 years or somewhere in the vicinity complete automation is conceivable with the assistance of IoT. This paper will provide a

base to the readers to know about the Internet of Things.

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