

Possibilities of IoT devices in Smart Cities

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Abstract— Smart city plans and programs all over the world are made possible through the rapid implementation of the Internet of Things (IoT). The IoT is a modular way of combining different sensor devices with all ICT solutions. In 2020, it will link and implement more than 50 billion creation in smart cities. IoT connectivity is at the core of smart communities. IoT is architecture to support the smart city idea, aimed at promoting infrastructure for city and public administration using the most developed communication technologies. This paper establishes a general overview of the important, future scope and issues of IoT in smart cities. Implement of IoT with advanced technologies in cities will be helpful for the betterment of smart cities. Also, this paper outlines the fundamental difficulties and impediments of executing IoT advancements in keen city ideals models.

Keywords:- ICT, IoT

INTRODUCTION

The internet of thing is a network which consists of physical equipment, modern means of transport, homes, hospital and even electrical and electronic devices are connected digitally on a consistent basis to capture and exchange data. This exchange of data makes it easy for service providers to provide their services to customers. Such things have the significance and capacity to compose themselves and associate with another item without human interaction. These days a minimum of five gadgets for every individual is connected to the internet. The IoT concept aims to introduce the Internet even more comprehensively and immersive. In addition, it allows easy access and interactions with a wide range of devices, such as home appliances, sensors, and tracking cameras, detectors, monitors, actuators, and vehicles. Lots of sensor devices used in our environment like physical, chemical, biological, vibrate sensor, magnetic sensor, an electrical sensor, light sensor, etc.

The IoT will facilitate the creation of different applications that use huge amounts and diversity of knowledge created by an object to provide additional services to businesses, people and public authorities. IoT applications are varied and cover various areas such as domestic automation, medical services through mobile devices, manufacturing automation, senior health care, medical services, automated transport facility, smart grids and intelligent power control, traffic management, etc. The IoT architecture is subject to intelligent devices that are self-configured and integrated into a common network basis. In smart areas IoT devices can be defined as objects having digital identification in the sense of health, social, environmental and users, using intelligent interfaces for connecting and communicating. IoT's effect on consumer life is its main feature. The challenge has increased various projects for possible IoT systems recognition that are rarely incompatible. Therefore, in terms of a system perspective, an IoT network understanding is still required due to its innovation and complexity,

often together with the back-end network services and devices necessary. What's more, the IoT model Appropriation is additionally restricted to specialized difficulties by the nonappearance of a comprehensively and unmistakably perceived plan of action, that can pull in costs to improve the execution of such innovations. Smart cities are used to perform different functions such as lighting, traffic control, multi-city communication, power consumption, and pollution management. The main goal of smart cities will change the way we look at things. As far as many things are concerned, IoT can be said to influence everything from the trusted actions of everyday life to the most complex human feeling. In general, people benefit most from smart city applications and from the underlying ecosystem. The Smart City IoT-based systems can provide personal support for a citizen's daily routine. For example, remembering your next appointment to maximize the temperature of your room to make your coffee on time. Another example, Alexa is echo devices that have a brain, usually asking a question to Alexa and Alexa responds to you like if u want to play music than speak, Alexa plays the music for you. Another example is Smartwatch, which helps to consumer like alarm, amount of drink water, measure distance, measure beat, attend the call, etc., when person at the door than door open automatically by sensing of authorized human., It can acknowledge your own health if it is problematic and in case of emergency, report or alert your doctor. For smart cities, a formal definition is available. Devices can be implemented with IoT features based on the geographical location and measured by an analysis system. Sensor services may be used in many occurring programs, such as in bicycle surveillance, cars and public parking lots, to capture individual data. The remainder of the document is structured accordingly. Throughout Section II, we start to provide a description of IoT in the smart cities' context. We give a general overview of the definition and services of smart cities in Section III. Section V offers perspectives and analysis problems. The paper is concluded in section V and future research recommendations are given.



Figure 1 Need for smart cities

IMPORTANCE OF IoT IN SMART CITIES

As the total populace relentlessly increases, unmistakably the urban regions are the ones that are experiencing and should experience a lot more changes. Not exclusively does half of the Earth's populace live in urban regions today, yet it is evaluated that this rate will ascend to 60% constantly 2050 IoT implementation in smart cities will be helpful in different terms in those cities as it is moving towards the development .appointing the IoT in those areas will make the development more accurate, reliable and versatility is the concept where people can live more easy life in the less cost, effort and time.it will make the development process more effective.

ROLE OF IoT

A. Smart traffic

In the last decade, people are using their own private vehicles than public transport and which will cause more traffic problems. CCTV sustains that transmits vehicle-related information to city traffic the board focuses can be utilized to forestall traffic bottlenecks from happening . smart traffic can likewise be utilized to smooth out the open transportation traffic during times of heavy traffic. This must be done in light of the fact that transports occupy a great part of the road and are altogether slower than vehicles, heavy traffic can guarantee that each transport traverses the "green wave" along these lines fundamentally improving the traffic stream.

B. Smart Rails

Smart rails are furthermore one of the various potential results offered to us by the Internet of Things advancement. The idea behind the keen rails is to take the pile of the road traffic, ensure that suburbanites find the opportunity to wear downtime. This is finished by looking at most of the data assembled by methods for different sensors and cameras presented on the railroad stations in the course. This data is commonly used to perceive and separate the driving models. Besides, by looking at the information got by the f

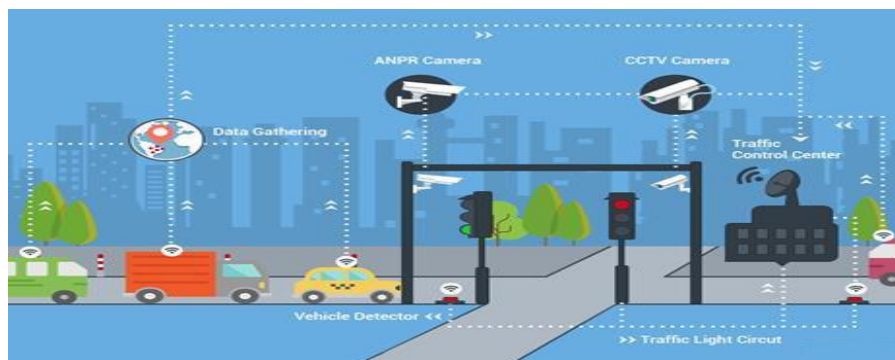


Figure 2 Smart traffic infrastructure

framework taking care of the traffic lights and transport plan, savvy rail the board framework can modify the calendar so travelers land so as to make a smooth change to transport. Smart rail executive's framework likewise deals with the well-being measures such notice signs and entryways at rail intersections, fencing and different signs and incorporating every one of the sensors connected to them into one framework, the security is brought to a totally new level. Synchronizing information from rail and vehicle traffic likewise enables the framework to ascertain to what extent the entryways at the rail intersections ought to be kept shut.

C. Smart Infrastructure

A city's framework is another zone where IoT can be actualized. This is all conceivable because of the improvement of innovations and advanced wealth. Because of these advances, for example, AI, 3D printing, mechanical autonomy, and little solid sensors, a framework can be conveyed, overseen and naturally controlled in a totally unique manner. This exceptional method for applying a more advanced framework made out of Machine Learning, Big Data, Sensors, IoT, Networks and so forth to physical foundation enables the frameworks set up to give a precise ongoing data feed. Quicker, less expensive and better basic leadership would then be able to be utilized in regions of physical foundation .



Figure 3 Smart city infrastructure

C. Smart Water Management

Huge urban areas put a gigantic strain on water supplies. This is the reason it has turned out to be critical to moderate water. IoT helps in water preservation by permitting water service organizations to utilize sensors devices that track water utilization, weight, physical measurement, and purity. Organizations and residents have immediate knowledge of the qualities, for example, normal water utilization per family unit and the capacity to contrast it with their flow one. Savvy meters are likewise utilized in homes to assist clients with determining their vitality utilization. This observing demonstrated to have a noteworthy monetary impact.

RECENT WORK

The integration of the IoT enabled devices with one another can lead to massive opportunities in the future. The smart devices will develop, enhance and improve the existing methods of operation.[4].As technologies are getting developed rapidly and people are getting too much help from

the technologies. Similarly, IoT in smart cities will be a benefit for people as they can get help in many things .according to the survey people are too much relying on the internet and technologies.Smart home solutions can be constructed by using the Launchpad board.These smart home solutions can also be used in smart cities to save private properties from intruders [2].Shrewd urban communities have turned out to be more astute than before gratitude to the late advancements of computerized innovations. A smart city is outfitted with various electronic components utilized by a few applications, similar to road cameras for perception frameworks, sensors for transportation frameworks, and so forth[8]. Likewise, this can spread the utilization of individual cell phones. In this way, by thinking about the heterogeneous condition, various terms, for example, the highlight of items, givers.on one hand, IoT will influence the different parts of the savvy city natives' lifelike wellbeing, security, and transportation. On the other hand, it can assume a significant job at the national level with respect to the approach choices (like vitality sparing, contamination decrement, and so forth.), remote checking, what's more, required framework[7]. On this premise, the IoT will help to give progressively proficient, financial and secure activity.The use of IoT in smart cities will help the nationals by taking care of some critical issues such as air quality,transportation, and vitality of humans.[1]Even though it sounds interesting to use the smart IoT devices in smart cities.There are some huge challenges like heterogeneity of the devices ,legal issues and privacy of an individual.[3]The smart IoT devices can be used to protect the environment cities by detecting fire in forests and make the authorities aware of any type of forest fire.[5] The safety and security of the residents is a very serious issue when smart cities are designed.The smart cities also need to be safe cities.Crisis management is a very important aspect of smart city implementation .[6]

METHODOLOGY

A. Smart IoT devices

Raspberry Pi is one the most renowned device which can be used to connect to the cloud .It can work as a full-fledged IoT node. It can easily control variety of actuators and can collect data from various sensors. Node MCU, Omega are some of the new devices which are available in the market for IoT .All the devices can perform a range of tasks and can also control devices

B. Radio-Frequency Identification

Smart devices can detect the radio frequency to identify the objects as well as humans too. The RFID tags can be used in the smart cities to provide better transportation services. The Smart RFID tags can be used to automatically detect the movement of vehicles. Such devices can be integrated with the smart cameras to provide the surveillance of the vehicles.

C. Internet

The Internet is a must have requirement for Internet of things to operate. The internet connectivity should be seamless and fast. To reduce the delay in processing the can data can be done by either increasing the bandwidth of the connection. Current wireless internet infrastructure need to be very effective for handling the new IoT device swarms.

D. Middleware

Most of the Because of certain issues identified with the heterogeneity of contributing things, to the confined stockpiling and procedure capacity. similarly, with regards to the huge arranged assortment of uses,the middleware expects a fundamental activity in the interconnection of the articles to the application layer.

ISSUES AND CHALLENGES

As innovation improves at a bewildering rate, urban communities need to improve their administrations as far as wellbeing, social insurance, transportation, and the general welfare of their inhabitants, However, the most testing part is verifying information from different assaults while keeping up low-unpredictability methods and calculations. Considering security worries to the arrangement of IoT as the fundamental wellspring of information gathering and transmission, assaults are grouped to recognize an appropriate plan of shielding against them.

A. Delay

The Internet of things includes small smart devices. These devices are not very powerful to process any data and they rely on the cloud servers to process the data. The time which it takes to get a response from a remote cloud server is unsuitable for real-time applications.

B. Limited processing power

In some instances, low processing power becomes a headache for IoT. The use of IoT devices for realtime applications is not a viable solution.

C. Security issues and privacy

As the information of people will be known for the other for example, if IoT is implemented then people can get information from one place to another and they can't get the privacy. Numerous difficulties remain with regard to sending. These varieties can be sorted into the accompanying measurements:

D. Innovation challenges with inclusion and limit.

- Digital security.
- Legislation and policies.
- Lack of certainty or reluctance shown by citizens (lack of clarity around benefits).
- Funding and business models.
- Interoperability.
- The existing framework for energy ,water, and transportation.



Figure 4 Challenges of IoT

CONCLUSION

IoT has a various scope in smart cities; in the above paper different role has been explained in detail manner. There are many opportunities in IoT like smart home, smart traffic, smart rail and so on. along with the opportunity, there are a lot of challenges must be resolved to implement IoT in smart cities The smart cities should use IoT devices to help mankind to get a more and better-connected world.

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