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INTERNET OF CITIES

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Abstract:

The concept of smart cities has been gaining attention globally for the past decade. A smart city is one that makes a conscious effort to use smart technologies (such as IoT and CPS) to improve the quality of life of its residents. The Internet of cities is a global network of smart cities. Such a network has hundreds of member cities around the world that could benefit, improve the health of local populations, and collaborate in order to improve cost and energy efficiency of city operation. This paper presents a brief introduction to the Internet of cities.

Keywords: Internet of Cities; Internet of Things; Smart Cities.

1. Introduction

The world is going through a period of rapid urbanization, with more than 60 percent of the global population expected to live in cities by 2025 [1]. The trend toward urbanization is undeniable. As the world population is growing at a rapid pace, it created tremendous pressure on cities. Modern cities face opportunities and challenges as their populations explode. These opportunities and challenges (such as job creation, economic growth, environmental sustainability, and social resilience) have created a market for smart city technologies.

2. Smart Cities

Smart city represents one of the prominent applications of Internet of Things (IoT). It is also described using many terms such as "cyberville," "digital city," "electronic city," "flexicity," "information city," "telicity," "wired city" [2]. Cities around the world are implementing smart initiatives and IoT solutions in their own way. The IoT is the technical backbone and key enabler of a smart city. IoT is a global network that interconnects things and people at any place and at any time, ideally using any media and any service. For example, a city may use IoT sensors to manage its traffic congestion and environmental issues. A city is considered smart when investments in human and social capital and modern communication infrastructure fuel sustainable economic growth and a high quality of life. A smart city is the product of accelerated development of new information technologies based on internet technologies and wireless sensor networks. It

is a new concept to managing the urban life, increase efficiency, and improve the quality of life of the citizens [3].

Smart cities require an integrated approach to IoT, connectivity, artificial intelligence, sensor networks, and other technologies. By interconnecting electronic devices distributed in houses, vehicles, streets, buildings, smart homes, smart parking lots, and other places, IoT-based smart cities can provide various kinds of services for the residents. The recent advancement of sensor technology has led to the generation of IoT data by smart cities. IoT enables smart solutions for energy, transportation, governance, environment, and quality of life in IoT-based smart cities. A major challenge would be to provide interoperable systems which can be reused and redeployed in all cities.

3. Network of Cities

A new framework is needed for understanding the future of cities in an age of sophisticated telecommunications. Such a network of cities is called Internet of Cities. The Internet of Cities consists of a global network of smart cities that securely collaborate in order to improve the quality of life of its citizens [4]. In other words, smart cities evolve towards the Internet of cities, where applications can interact and be exchanged between city paths. The Internet of Cities concept takes advantage of the fact that smart cities play a particular and unique role in the global economy. Such a network has hundreds of member cities around the world that could benefit, improve the health of local populations, and collaborate in order to improve cost and energy efficiency of city operation.

4. Applications

Many cities have begun smart city initiatives. Smart cities can use connected infrastructure and lighting to reduce costs and boost safety. The IoT is the key enabler and driver of different smart city services. It is the key to make many of the traditional communication approaches "smart."
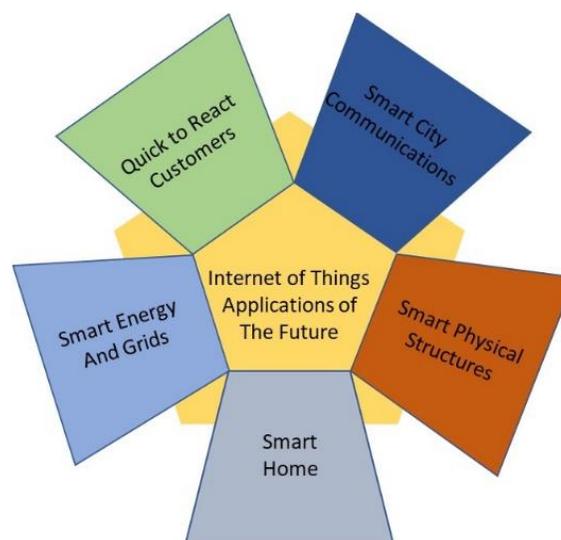

Figure 1: IoT potential for the smart cities [6].

Examples of smart city applications include smart living, smart economy, smart grid/ energy, smart transportation, smart vehicles, smart health, smart homes, smart building, smart retail, smart tourism, smart car parking, crime prevention and community safety, smart government, smart agriculture, condition monitoring and maintenance of infrastructure, disaster management and emergency [5]. Some of these applications are illustrated in Figure 1 [6].

5. Benefits and Challenges

There are many benefits that result from transforming a city into a smart one. Smart cities connect smart devices and provide tons of services to the citizens, officials, and government. They can use connected infrastructure to reduce costs and boost safety. Smart cities act as magnets for highly educated individuals and skilled workforces. Experts claim that smart cities could be efficient and more enjoyable places to live. The smart city initiatives have lofty goals of improving governance and enhancing quality of life for citizens. Smart cities offer untold benefits for government and citizens—service provision, quality of life, and security [7].

As smart cities evolve towards the Internet of Cities, we should consider common challenges and how to address them. Perhaps the greatest challenge facing the development of smart cities is developing global standards and platforms for connecting smart street lights, parking spaces, waste bins, etc. Developing such international standards for the smart city will take time. The volume, variety, and nature of data obtained from smart cities pose some challenges. Data privacy advocates are concerned that third parties given access to data may not be careful stewards. Data security is another critical consideration.

6. Conclusion

Smart cities have become an emerging innovative idea for academy, industry, and government. A lot of experts are still needed to implement the concept of smart cities successfully. It is plausible to use cloud computing to extend the scope and benefits of smart cities. As smart cities evolve towards the Internet of Cities, they are poised to make a significant impact on national development.

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