

## **STUDY OF IOT TECHNOLOGY FOR SMART CITY IMPLEMENTATION**

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**Abstract-**The Internet of Things (IoT) is the inter-networking of physical devices, vehicles buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities.

### **I. INTRODUCTION**

Because of the rapid rise of the population density inside urban environments, substructures and services have been needed to supply the requirements of the citizens. Accordingly, there has been a remarkable growth of digital devices, such as sensors, actuators, smartphones and smart appliances which drive to vast commercial objectives of the Internet of Things (IoT), because it is possible to interconnect all devices and create communications between them through the Internet . In the past, it was difficult or even impossible to combine these digital devices. Likewise, gathering their information for day-to-day management of activities and long-term development planning in the city is essential. For example, some public transport information, e.g., real-time location and utilization, occupancy of parking spaces, traffic jams, and other data like weather conditions, air and noise pollution status, water contamination, energy consumption, etc. should be gathered continuously.

### **II. IOT TECHNOLOGIES FOR SMART CITIES**

The IoT is a broadband network which employs standard communication protocols. Things in the IoT involve smart equipment such as mobile phones and other facilities. IoT is empowered by the expansion of several things and communication equipment. Including foodstuff, appliances and landmarks that can collaborate to achieve a joint objective The main characteristic of the IoT is its effect on consumers' life In the concept of IoT, foodstuff, appliances and landmarks that can collaborate to achieve a joint objective. The main since the cabling cost for millions of sensors is expensive, the communication between sensors characteristic of the IoT is its effect on consumers' life. In the concept of IoT, since the

cabling should be wireless. Low-power standard communication is suitable for interconnection among cost for millions of sensors is expensive, the communication between sensors should be wireless. many devices. According to location and distance coverage, some networks are introduced as Low-power standard communication is suitable for interconnection among many devices.

### III. SMART CITIES PLATFORMS AND STANDARDS

The relationship between the physical and IT infrastructure constructs a novel machine-to-machine (M2M) communication for smart cities which along with new features of network drives smart cities' communication platforms. These platforms help to cover the communication requirements between heterogeneous access technologies and application suppliers. Moreover, these platforms help form the IoT with real world sensors and communication networks. One of these platforms which is being used widely is openMTC extracted from the latest ETSI standards for the smartM2M specification. The aim of the openMTC platform is to provide a compliant middleware platform for M2M applications and implementation of the smart city. The main standard for smart cities is IEEE 802.15 which is for wireless personal area networks. This standard consists of different parts including: 1—Bluetooth, 2—coexistence, 3—high rate WPAN, 4—low rate WPAN, 5—mesh networking, 6—body area networks, 7—visible light communication, 8—peer aware communication, 9—key management protocol, 10—layer 2 routing, 11—wireless next generation standing committee.

### IV. SMART CITY IMPLEMENTATION MODELS BASED ON IOT

**1. Smart Cities and Communities:** The successful implementation of the IoT may lead to the production of several services which interact with the environment. Therefore, it can present a number of prospects for contextualization and geo-awareness. Moreover, collective intelligence develops procedures for governing and giving the residents authority and power. Furthermore, a regular middleware can be obtainable for forthcoming services of the smart cities by applying the IoT. It is considered that sensor virtualization can be used to reduce the gap between existing technologies and the residents.

**2. Smart Traffic Service:** Major smart traffic services include smart parking services to prevent illegal parking and facilitate convenient parking [5], citizen participation-oriented illegal parking prevention services, and smart safe crosswalk services. Smart parking refers to the construction of a platform that enables real-time checking of available space and parking prices in areas that require parking and facilitation of reservation/payment through Web and mobile connections. The citizen participation-oriented illegal parking prevention service is an improvement of the illegal parking crackdown system of the traffic authority by allowing citizens (including victims of illegal parking) to conveniently report such violations through their smartphones. Furthermore, the smart safe crosswalk service can contribute to the prevention of pedestrian accidents and secondary car accidents by detecting pedestrians in children protection zones, and alerting pedestrians and approaching vehicles through electronic display boards.

## V. CONCLUSION

This study is significant in outlining general information about IoT, such as definition, market size, and status of IoT, which has become a hot IT topic nowadays, and in presenting applicable IoT business models to help business entities and research institutes participating in related projects build a smart city as part of the future vision of local governments by reflecting the new information paradigm of IoT.

## REFERENCES

- [01] [https://en.wikipedia.org/wiki/Internet\\_of\\_Things](https://en.wikipedia.org/wiki/Internet_of_Things)
- [02] Joo, D.Y and Kim, J.K.: Creative & active convergence model of IoT, Korea Institute for Industrial Economics & Trade, Korea (2014).
- [03] Bagula, A., Castelli, L and Zennaro, M.: On the design of smart parking networks in the smart cities: An optimal sensor placement model, *Sensors*, (2015), Vol.15, No.7, pp.15443- 15467.
- [04] Rathore, M.M.; Ahmad, A.; Paul, A.; Rho, S. Urban planning and building smart cities based on the Internet of Things using Big Data analytics. *Comput. Netw.* 2016, 101, 63–80.
- [05] Zhu, C.; Leung, V.C.M.; Shu, L.; Ngai, E.C.H. Green Internet of Things for Smart World. *IEEE Access* 2015, 3, 2151–2162.
- [06] Botta, A.; de Donato, W.; Persico, V.; Pescapé, A. Integration of Cloud computing and Internet of Things: A survey. *Future Gener. Comput. Syst.* 2016, 56, 684–700.