

Internet of Things (IoT) Challenges and Future Directions

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ABSTRACT

The growth potential for the embedded industry is enormous. And the path forward is becoming clearer every day. It's time that we start building IOT systems, and provide value to our customers. The IoT is expected to connect 28 billion —things to the internet by 2020, ranging from wearable devices such as smart watches to automobiles, appliances, and industrial equipment. In this paper , we will take a look at different IOT solutions developed so far, their functionalities and technology used and thus conclude the various challenges to be focused on to give way to better solutions that will help the community.

Keywords: Internet of things ,RFID , IPv6,Wireless Sensor Network ,Smart home.

I. INTRODUCTION

Internet of Things (IOT)

The term of Internet of Things (IoT) was first invented in 1998 which is a network of networks where typically, a large number of objects or sensors are connected through communications and information infrastructure to provide value-added services. It assured in creating a world where all the objects around us are connected to the internet and therefore the communication to each other with minimal human intervention. The ultimate aim is to create a better world for human beings, where the objects around us understand our desire and hence act accordingly without any explicit instructions. According to another definition, The Internet of Things (IOT) has been defined in a variety of ways. Generally Speaking, it refers to a global, distributed network (or networks) of physical objects that are capable of sensing or acting on their environment, and able to communicate with each other, other machines or computers. Such 'smart' objects come in a wide range of sizes and capacities, including simple objects with embedded sensors, household Appliances, industrial robots, cars, trains, and wearable objects such as watches, Bracelets or shirts. All these things have certainly changed the entire look of the word 'connectivity'. From smart cities, environment, health, energy, vehicle, transport,

public safety to our daily essentials, Internet of Things has completely revitalized these areas.

II. FUNCTIONALITY OF IOT SOLUTIONS

IoT is sometimes understood as being synonymous with —smartll systems: smart wearable, smart homes ,smart city, smart environment, smart enterprises and so on. This Section discusses the functionality review of IoT solution available in different sectors.

Smart Wearable: Smart wearable are networked devices that can collect data, track activities, and customize experiences to users' needs and desires. Wearable solutions are designed for a variety of functions as well as for where on a different of part of body such as the head, eyes, wrist, waist, hands, fingers ,legs or embedded into different element of attire.Wearable devices can be classified according to two standards. One standard is based on product forms, including head-mounted (such as glass and helmet), body-dressed (such as coat, underwear, and trousers), hand-worn (such as watch, bracelet, and gloves), and foot-worn (such as shoes and socks). Another standard is based on product functions, including healthy living (such as sport wristband and smart bracelet), information consulting (such as smart glass and smart

watch), and somatosensory control (such as somatosensory controller).

1. **Smart Homes:** Smart Home is the integration of technology and services through home networking for a better quality of living. A lot of technologies related to Smart merging. Some smart home solutions also focus on assisting elderly Hand (Gloves) Finger(Rings), Wrist (Watch/Bands), Eyes(Glasses), Legs(Socks), Foot (Shoes), Head (Helmet),Body(Cloth), Waist(Band), Chest(Band) people in their daily activities and on health care monitoring.
2. **Smart City :** A 'smart city' is an urban region that is highly advanced in terms of overall infrastructure, sustainable real estate, communications and market viability. It is a city where information technology is the principal infrastructure and the basis for providing essential services to residents. There are many technological platforms involved, including but not limited to automated sensor networks and data centers.
3. **Smart Homes:** Smart Home is the integration of technology and services through home networking for a better quality of living. A lot of technologies related to Smart Software is already the key innovation driver in many industries and many new business models of the future will heavily rely on the use of such items.

WSN Technologies:

There are multiple candidates that can be selected as WSN technologies. Few of them are discussed here.

Wi Fi - The first obvious networking technology candidate for an IoT device is Wi-Fi, because it is so ubiquitous. Certainly, Wi-Fi can be a good solution for many applications. Almost every house that has an Internet connection has a Wi-Fi router. However, Wi-Fi needs a fair amount of power. There are myriad devices that can't afford that level of power: battery operated devices, for example, or sensors positioned in locations that are difficult to power from the grid.

III. CHALLENGES IN DEVELOPING IOT

1. Standards and interoperability

Standards are important in creating markets for new technologies. If devices from different manufacturers

do not use the same standards, interoperability will be more difficult, requiring extra gateways to translate from one standard to another. In addition, a company that controls different parts of a vertical market (e.g. the acquisition of data, its integration with other data streams, and the use of those data streams to come up with innovative solutions or to provide services) may dominate a market, stifling competition and creating barriers for smaller players and entrepreneurs. Differing data standards can also tend to lock consumers into one family of products: if consumers cannot easily transfer their data when they replace one device with another from a different manufacturer, they will in effect lose any benefit from the data they have been accumulating over time.

Security. As the IoT connects more devices together, it provides more decentralized entry points for malware. Less expensive devices that are in physically compromised locales are more subject to tampering. More layers of software, integration middleware

Trust and Privacy. With remote sensors and monitoring a core use case for the IoT, there will be heightened sensitivity to controlling access and ownership of data.

IV. CONCLUSION

The potential of the IoT appears to be great, despite the range of issues that need to be Addressed. It can be considered that new research problems arise due to the large scale of devices, the connection of the physical and internet worlds, the openness of the systems of systems, and continuing problems of privacy and security.

V. REFERENCES

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