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IoT review paper

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ABSTRACT

Internet of things (IoT) gained a great attention from researchers since it becomes an important technology that promises a smart human being life, by allowing a communication between object, machines and everything together will peoples. The IOT sensors can use various types of connections such as RFID, Wi-fi, Bluetooth [7], and ZigBee [6], in addition to allowing wide area connectivity using many technologies such as GSM, GPRS, 3G, and LTE. Internet of things –enabled things will share information about the condition of things and the surrounding environment will people software system and other machines. Raspberry Pi works as a base station which connects the number s of distributed sensor nodes via Zigbee protocol, In this study, we designed a smart parking system (SPS) which enables the user to find the nearest parking area and gives availability parking slots in the respective parking area.

Keywords: *Internet of thing application design and development, Smart Environment, CPLE, Wireless sensor network.*

1. INTRODUCTION

Internet of Things (IoT) is a conceptual communication technology that combines many wireless communication systems together, such as Wireless Sensor Networks (WSNs), wireless local area network (WLAN), Long Term Evolution (LTE) and Global System for Mobile Communication (GSM), etc. Recently, the rapid progress of IoT increases the difficulties of multi-band antenna toward compact, low profile and board bandwidth for IoT devices. A new era of IoT (internet of thing) service which will connect everything is on the way. Over 12.5 billion devices were already connected in 2010 and about 50 billion devices will be connected by 2020 [1]. Today's world consists of several "things/objects". As the internet of things (IoT) [1]-[4], one of the smart world enablers targets to connect various objects (e.g., mobile phones, computers, cars, and appliances) with unique addresses, to enable them interacts with each other and with the world. A growing number of physical objects are being connected to the Internet at an unprecedented rate realizing the idea of the Internet of Things (IoT). The applications include transportation, agriculture, healthcare, industrial automation, and emergency response to natural and man-made disasters where human decision making is difficult. Among the bundle of applications enabled by the Internet of Things (IoT), agriculture and healthcare are cases for this research. Networked sensors, either worn on the body or embedded in our living environments, make possible the gathering of rich information indicative of our physical and mental health [6]. The IoT enables physical objects to see, hear, think and perform jobs by having them "talk" together, to share information and to coordinate decisions.

Definition of IoT

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

A thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low -- or any other natural or man-made object that can be assigned an IP address and provided with the ability to transfer data over a network.

IoT has evolved from the convergence of wireless technologies, micro-electromechanical systems (MEMS), microservices and the internet. The convergence has helped tear down the silo walls between operational technologies (OT) and information technology (IT), allowing unstructured machine-generated data to be analyzed for insights that will drive improvements.

2. SMART HOME

Smart Homes are homes which are powered by computing devices and information technology that connect various gadgets and instruments in the house to provide enhanced comfort, convenience, security, and entertainment to residents in a sustainable way. Once hailed as the domain of the super-rich, today most customers seek Smart Homes in some form or the other. The availability of a wide range of high technology products aimed at making life more secure, convenient and comfortable are steadily drawing more and more customers to the concept. The Smart Homes market is fast evolving in the Indian context. Initially, Smart Homes were marketed primarily as homes with advanced security features. The market is now evolving into newer areas like lighting systems, gas leakage detectors, fire detection systems, entertainment systems and energy efficiency systems. Therefore, Smart Homes, apart from providing better security, conveniences, and comfort to the resident, also provide significant energy savings. It is estimated that the Smart Homes solutions market in India is growing in India at a rate of 30 percent YOY. At this rate, the market will double in revenue every 3 years. The market is, therefore, likely to explode over the next few years. Experts believe that security, conveniences, and energy efficiency are spurring the growth of Smart Homes in India. With the growing number of working couples in India, especially in metros, more and more homes stand empty for a large portion of the day. This necessitates a large extent of home automation. Increased family incomes are supporting this need. The awareness of Smart Homes is very high amongst all the customers interacted mers interacted with. Almost all customers met with as part of this study were well aware of Smart Homes. This is universal in metros but slightly lower in non-metros.

3. SMART SCHOOL

The concept of “Smart School” in government primary schools introduced in Ahmedabad District with a vision to enable students to learn through technology, by technology in order to make education simple and interesting. However, the motto introduction of ‘Smart School’ is not only to build ‘Techno Schools but also to make the entire environment of learning ‘Smart’ by integrating the concepts of Pragna, activity-based learning (ABL), Building as Learning Aid (BaLA), Bulletin board, School Magazine, using the equipment of the school in proper manner experiments and exploration of the students and extra curricular activities live awareness about proper sanitation, habitat and environment. This is possible by introducing a single portable device which is both a computer and projector with in built interactive software with touch screen facilities with calibration. Internet connectivity through Vsat helps distance learning byBISAG telecast. Different modes are also placed so that students can not only learn but also feel and experience different elements of particular subjects. • Names of Schools where ‘Smart School’ is implemented i. Vataman Primary School ii. Pachham Primary School iii. Adinathnagar Primary School iv. Vidhyanagar Primary School v. Panar Primary School

4. SMART HEALTH

The coalescence of medical equipment into the network has already changed the methods of work in the healthcare industry. By 2020, the widespread introduction of high-tech methods in medicine will lead to the implementation of the smart hospital project.

This concept is based on optimization and automation of processes in the information-communication and technological environment of interrelated objects. The purpose of this environment is to improve existing procedures for the provision of advanced means of medical care and to open up new opportunities for medicine.

The "fourth industrial revolution” is also of fundamental importance. It consists of combining network devices with cloud computing methods and analyzing large data and artificial intelligence, which makes it possible to call such an infrastructure "smart."

Thinking of the smart hospital definition, we can say that it is a relatively new direction at the intersection of medicine, information, health, and business, which is related to the usage of information technology support for healthcare.

e-Health includes ten key principles:

●Efficiency.

●Quality improvement.

●Attention to personal data.

●Expansion of the patient's capabilities.

●Improving the relationship between the patient and the medical organization.

●Continuing education and professional development through information technology.

●Realization of safe data exchange.

●Expansion of the healthcare framework.

●Ethical standards.

●Accessibility for everyone.

5. SMART TRAFFIC

In the traditional traffic management system, ineffective traffic lights with predefined timers are used, along with manual control by police officers. Without taking an account of real-time traffic data for consideration, it can happen that a "green light" is granted to an empty lane while a lot of cars are lined up at a "red light" on the other lanes because the same time interval of green lights is granted to every lane. The proposed system consists of a circuit embedded in each vehicle in commutation. The users can interact with the system either through wired or wireless connection of their smartphone with the mounted board. This system uses Radio Frequency Identification (RFID) which plays a vital role in the research paradigm of the Internet of Things (IoT). Instead of using GPS (Global Positioning System), this system uses a more efficient LPS (Local Positioning System) for locating a vehicle with the help of localized workstations situated at optimal points. Data analysis involves the implementation of big data analytics with clustered workstations constituting a regional computing unit, which maximizes the throughput. The basic functionalities of the proposed system include 1. Smart Traffic Light Control System that works dynamically based on the concentration of vehicles in a specific region. 2. Parking Space Identification and Allotment System, with the placement of spatial sensors in parking lots that communicate the availability of spaces with the regional workstations. 3. Anti-theft System that automatically retrieves the location of a stolen vehicle and automatically disrupts the functioning of that vehicle.

Big data analytics is used for processing the terabytes of data received from the vehicles. The proposed system is quite advantageous with the use of local workstations consisting of regional processing units that receive data from each vehicle pertaining to a specific regional radius. These data are then reallocated based on the volume of incoming data using Hadoop MapReduce tool. This drastically reduces data traffic which would occur when a single centralized control unit is used for analyzing the data from each vehicle. Hierarchical clustering and density-based clustering techniques are used to process the data. Frequent pattern mining is used in order to derive results to enable efficient traffic management. Moreover, the efficiency of the system is maximized with the use of LPS (Local Positioning System) instead of (Global Positioning System) as the time complexity is reduced.

Apart from this, the proposed system also determines the various attributes of transportation along a road using supervised learning. The various attributes analyzed are the standard of roads, overall traffic flow, the average speed of vehicles in a particular road, travel path of a vehicle.

6. CONCLUSION

In this paper, we analyzed the solutions currently available for the implementation of urban IoTs. The discussed technologies are close to being standardized, and industry players are already active in the production of devices that take advantage of these technologies to enable the applications of interest, such as those described in Section II. In fact, while the range of design options for IoT systems is rather wide, the set of open and standardized protocols is significantly smaller. The enabling technologies, furthermore, have reached a level of maturity that allows for the practical realization of IoT solutions and services, starting from field trials that will hopefully help clear the uncertainty that still prevents a massive adoption of the IoT paradigm. A concrete proof-of-concept implementation, deployed in collaboration with the city of Padova, Italy, has also been described as a relevant example of the application of the IoT paradigm to smart cities.

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