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Review paper

A review of Internet of Things applications in building architecture

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Abstract

The current research was conducted with the aim of investigating the effects of the Internet of Things on people's lives and the future. The advent of the Internet of Things has created a global connection between people and things and raises questions about user privacy. Knowing the methods of familiarization and correct use of the Internet of Things is necessary for a better life of people in the society. Research shows that just using today's technologies that use the Internet of Things has had a significant impact on people's lives. Security in today's life is constantly under attack due to technical, legal and human problems, which will certainly be related to the Internet of Things related to tools in the field of health, automotive industry, municipal services, etc. The Internet of Things is the integration of the physical and digital worlds. In this technology, conventional devices are combined with digital technology to achieve a unique online identity and the ability to interact with the external environment. The emergence of the Internet of Things has brought about fundamental changes in human life.

Introduction

Now is the time when human societies have created an inseparable link with technology and information technology, which can be said without a doubt that these two cannot be separated from each other. Nowadays, according to the developments in the field of information technology, we are witnessing the emergence of new branches in various computer sciences, branches that have a mutual impact on people's lives and it can almost be said that life would be difficult and expensive without these things, conceptual internet It is almost new, but due to the speed of its growth, it should be said that it is an old concept, with the advancements of the Internet and computer networks, as well as the design and production of smart devices with the ability to connect to the Internet, an abbreviation called IoT was born, which is equivalent to the Internet. Objects (Menzhali and Muharrami Asl, 1331) At a time when human life in the age of technological progress was faced with a large amount of people's needs, scientists and designers were able to create a huge transformation with a new technology called intelligentization and make life comfortable for people. and raise the quality of life. But the needs of the users were not limited there and they wanted a better life and keep pace with the advancement of technology, which caused the designers to unveil a new science called the Internet of Things to meet the needs of the users and apply it in the process of smartening up their presence. Of course, considering that the Internet of Things was taking its first steps in the scientific and practical field, it was able to create another huge transformation in human life and become an inseparable part in the life of humanity, which, of course, its progress can also have the same impact as its emergence. It has more impact on human life and it is expected that its position will be more significant in all aspects of human life.

Connecting different devices to each other via the Internet is called the Internet of Things, which is currently an important issue. The purpose of the Internet of Things is the communication between software and physical sensors, computers, smart reading devices, healthcare systems, etc. It is predicted that the number of connected objects will increase significantly in the coming years. The arrival of the Internet of Things has caused a global connection between people and things and raises questions about the privacy of users, the Internet of Things is one of the emerging technologies that has

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attracted the attention of university and industry researchers. The main purpose of the Internet is to connect things, people, with each other to achieve common goals. In the near future, IoT is expected to be seamlessly integrated into our environment and humans will easily become dependent on this technology in their lifestyle. Any system security compromise will directly affect human life. Therefore, the security and privacy of this technology is the most important issue to be resolved. After the development and progress of the Internet and mobile communications, the Internet of Things has been studied as the next wave in the information technology industry and is considered as an important part of the future Internet. In it, countless objects will be intelligently connected with each other.

FIG.1: Internet of things

History of the Internet of Things

Until now, the general public thought that only these people are supposed to be connected to the Internet with the tools they have and personally benefit from its capabilities. But new concepts have been formed for more than a decade. These concepts have entered the market in the form of smart products in the last few years. Now we are talking about ideas based on which any physical object is able to interact with other objects by connecting to the Internet or with the help of other communication tools. The term Internet of Things was first used in 1999 by Kevin Ashton. He described a world in which everything, including inanimate objects, would have a digital identity of their own, allowing computers to organize and manage them. In the beginning, when "Kevin Ashton" coined the term Internet of Things, he probably had in mind only the use of identification chips based on radio frequencies, known as RFID. After about 15 years, the fundamental idea of "Kevin Ashton" has taken on more practical and broader aspects. The basis of the story is that devices (things) collect information on a huge platform with the help of different sensors and exchange data with each other through a combination of communication technologies of their time (for example, RFID at the time and Fi-Wi at the time). Internet Things are an integral part of the future of the Internet. New communication protocols also play a role as the foundation of this winding network. The task of these protocols is to ensure the interaction and complete integration of virtual and physical objects in the world around us. Computers, phones, televisions, sensors. , cars, refrigerators, even packages of food and medicine, are placed in this network of things. On the other hand, the issue of cloud computing is discussed. This concept goes hand in hand with the Internet of Things, because a huge part of the data of the huge network in question, It is located on cloud storage systems. The processing of these data is mainly done on powerful servers, outside of our devices. Therefore, the future of the Internet of Things depends on more and more developments in the field of cloud computing.

Applications of the Internet of Things

The Internet of Things can improve the quality of life in various fields, including medical services, smart homes, smart cities, industry, environmental and water protection, energy management and its consumption, etc. In this section, we briefly mention the applications of the Internet of Things in various fields.

Application of Internet of Things in the environment It is said that the Internet of Things can make the world around us greener. Environmental sensors can detect and report pollutants in the environment and water and other environmental resources. Internet of things can also play important roles in agriculture. For example, devices can adjust the amount of watering to plants and trees so that water consumption is saved and the plant receives the amount of water it needs. Needless to say, the proliferation of devices connected to the Internet can also cause damage to the environment. The production of devices connected to the Internet, the number of which will be very large, can cause the consumption of resources and energy. Each of these devices that are made must be replaced with newer devices after a while. Another point is that for the transfer of information between these devices of data or information centers, they will also consume energy.

The use of Internet of Things in the infrastructure of smart cities. The Internet of Things can be used in urban infrastructures such as bridges, subway lines, railways, streets, etc. to be informed about their condition and possible risks. One of the most key parts of the Internet of Things is its use in smart cities that people have thought about designing and building, and the Internet of Things will make this a reality. Also, the Internet of Things can be used in the service areas of cities and by coordinating different urban systems, it can do these things more effectively and efficiently for people.

Application of Internet of Things in Medicine Internet of Things applications can be used in various fields of medicine, including remote patient care system and emergency warning system. These things range from heart rate or blood pressure

measurement systems to health check systems, artificial pacemakers, or medical hearing aids, each of which work with their own programs and designs. In more advanced cases, the devices monitor the course of treatment and drugs and their dosage. Also, programs have been designed on the Xia Internet by which the doctor can monitor the patient after the patient is discharged from the hospital. It is not bad to review some possible scenarios regarding the Internet of Things. Imagine a store that is no longer worried about running out of products, because the warehouse's intelligent control system is aware of the stock of all products at any moment and even does the ordering itself. Imagine a world where you can set your refrigerator so that when the number of eggs in it reaches two, an order to buy eggs will be automatically sent to the store near your home; Or you can check whether your iron or gas stove is on or off with your smartphone from work.

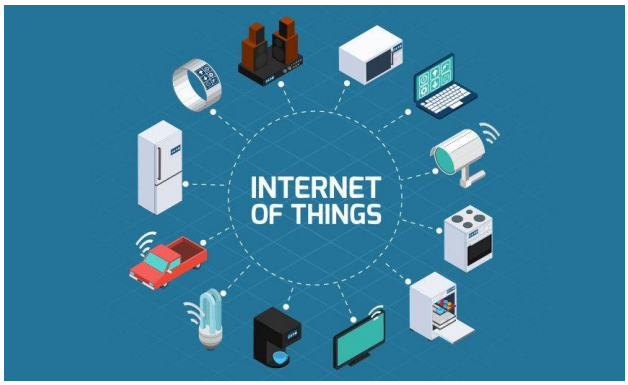

FIG.2: IoT 12 layers architecture

smart House

A smart home, also known as a connected home or e-Home, is an environment for living that has highly advanced automatic systems. A smart home is "smart" because its daily activities are controlled by a computer. A smart home includes many technologies through the home network to improve the quality of life. A smart home is a place that has highly advanced automatic systems to control and monitor light and temperature. Home appliances, multimedia equipment and security systems and many other functions. Internet of things plays an important role in building smart homes. Through the Internet of Things almost every object of our daily life in a house can be connected to the Internet. The Internet of Things enables the monitoring and control of all these connected objects regardless of time and place.

The motivation of creating a smart home

A smart city in an environment and infrastructure that depends heavily on the Internet for communication and services. Therefore, the Internet of Things is a key factor for creating smart cities. A smart home system, which is presented in this article, is part of a smart city. The motivation of this article is to propose a smart home system that can be implemented in smart cities.

Smart home functions

A smart home system consists of applications built on top of IoT infrastructure. Smart home applications can have the following main functions:

Warning system

The smart home system is able to understand its environment. and accordingly send alerts to the user through the registered device or account. Alert contains information about environmental data. This information may include the level of various gases in the environment. Warning of temperature, humidity, light intensity, etc. may be sent to the user regularly at a predetermined time. The alert may be sent via email, as a text message, tweets or any other social media.

Monitoring system

These are the most important functions of a smart home. A smart home is able to control its surroundings with the help of various sensors and camera feed. Monitoring is an important function because it covers all the activities of a smart home, which is the main need. And based on that, the next steps can be taken or a decision can be made, it follows up. For example, monitoring the room temperature and sending a warning to the user to turn on the air conditioner if the temperature exceeds the threshold.

Control system

This smart home function allows the user to control various activities. These activities may include turning on/off lights, air conditioners and appliances, locking/unlocking doors, opening/closing windows and doors, and more. The user can control everything from the same place or from a remote place. This function even allows the user to perform their own activity including turning off and on the air conditioner automatically when the room temperature is high/low.

FIG.3: Smart house

smart system

Intelligence or Home Intelligence (HI) is the most important function of the smart home and refers to the intelligent behavior of the smart home environment. This function is related to automatic decision making about various events. HI depends on the artificial intelligence (AI) mechanism built into the smart home environment. HI not only gives the brain to the smart home, but is also very important in terms of home security.

HI creates an integrated environment in the smart home. in which the artificial intelligence mechanism can identify and react correctly according to changing conditions and events. By detecting abnormal or unexpected events, HI can alert the user. and provide an immediate automatic response if desired. Some scenarios will automatically show the coffee as soon as the user enters.

Whenever you suspect activity in a house or building. Sends an alert to the user. Whenever you have a shortage in the fridge, it automatically orders items. It notifies the electrician or plumber whenever you need maintenance, etc.

Smart home programs

Although the application area of a smart home is only limited by human imagination. This article shows some of them which are described below:

Smart lighting

Smart lighting is used to save energy. which can be achieved by adapting the lighting to the environmental conditions and by turning off/on or reducing the light of the lights based on the user's needs. And as a result, the unnecessary use of energy is reduced. Also, saving energy helps to reduce costs. Smart lighting can be implemented with solid-state lighting (LED) or IP-enabled (Internet-controlled or wireless) lights. Smart lighting works by understanding the presence of people, temperature/humidity and LUX level in the environment.

Smart home appliances

Smart home appliances are used to collect information about the state of home appliances and easily control the appliances from inside the room or remotely. Also to schedule tasks at a predetermined time. And it is used for runtime integration between home appliances. Smart home appliances save energy and time.

Intrusion detection

Intrusion detection is used to alert the user via email and text message. The intrusion detection program can also send a detailed report with images or audio/video clips to the user. The main purpose of this program is to monitor suspicious activity in the smart home and warn the user and take necessary measures for security purposes.

Smoke/gas detection

This app is used for smart home environment for healthy living. And it can also be used for security. This software is used with optical detection, ionization and air sampling methods. This system can alert the fire station in case of fire and smoke. And inform the user about health risks via email/text. The things mentioned above are a few, but not the least of the applications of a smart home that are useful for improving safety and quality of life.

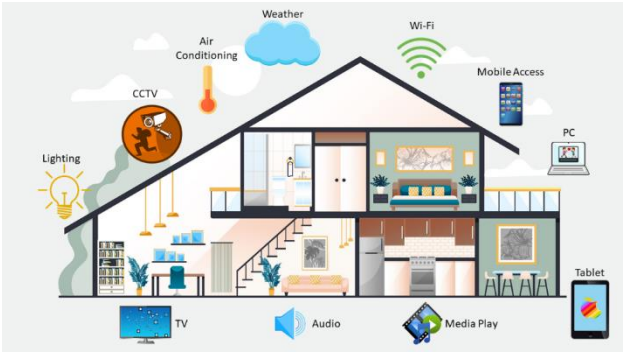

FIG.4: Smart things in smart house

Conclusion:

The current study was conducted with the aim of reviewing the effects of the Internet of Things in people's lives and the future ahead. Internet Objects is a new concept in the field of information transmission, monitoring and remote control of objects, creatures and equipment.It has been able to easily adapt itself to

different industries and infrastructures. The Internet of Things is an intelligent technology that It has the ability to connect anything in different places and times. The Internet of Things is developing at a very high speed Making changes in all dimensions of human life, so that according to predictions, by the year 2222, about 122 billion.The object will be attached to it. Today, more than two billion people worldwide use the Internet to browse the web, send and Receiving electronic mail, accessing multimedia content and services, playing games, using social networks, etc.They use it to do many other things. It can be predicted that in the next decade, the Internet will be a product integrated from classic networks and networked objects. Content and services will always be available Was. In this view, the conventional concept of the Internet as an infrastructure network fades away and is replaced by objects connected smart devices that form pervasive processing environments. The perspective of the Internet of Things opportunity-It creates many advantages for users, manufacturers and companies. The Internet of Things actually describes a world in which objects will be able to communicate and interact with other objects by connecting to the Internet. A world where All incompatible objects and devices are addressable and therefore controllable. internet of things It is considered the future innovation in the field of wireless technologies and has applications in many fields and areas Is. New technologies have penetrated into all aspects of human life, including their academic and educational life Internet and intranet of things can be mentioned from its newer aspects. The Internet of Things can be used in program elements.

Curriculum planning, including evaluation and control of space and place, as well as paying attention to individual differences, should play a role which is equipped with intelligent systems that can identify the individual differences of people in the form of separate reports Teacher or student performance monitoring systems in virtual environments. The emergence of the Internet of Things Fundamental changes have been made in human life. that in the future these changes will be more and their impact on human life More than ever. Many attacks such as:

message modification, traffic analysis, denial of service, eavesdropping, etc. may occur in the context of the Internet of Things, which can cause irreparable damages. Internet Objects in general refers to many devices including objects and other things in our environment that are connected to the Internet connected and make them smart. In general, the Internet of Things will dramatically change our lives in the near future. It will change and make many impossible things possible.

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