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GROWING IMPORTANCE OF IOT IN TODAY'S WORLD AND ITS APPLICATIONS

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Abstract: Internet of Things (IoT) represents the next phase of the internet revolution. The technology makes it possible to bring physical devices to the digital realm. Internet of Things (IoT) is quite a vast concept, but we can summarize it as an ecosystem that consists of smart objects with networks, sensors and processing technologies. It integrates and works together to create an environment providing smart services to end-users. IoT is an emerging technology platform that enables various devices around us to communicate with each other through sensors, connected via the internet to make our lives easier. IOT make objects 'smart' by allowing them to transmit data and automating of tasks, without lack of any physical interference. In this paper we have discussed different applications of IoT for users, IoT advantages and research challenges. The main objective of this paper is to provide overview and usage of Internet of Things (IoT), recent development of IoT applications. Lastly the paper focuses on challenges involved in IOT.

INTRODUCTION

The Internet of things, often known as IoT, has successfully impacted our everyday life in recent years to the point where even non-technological people have begun to make use of the ease, comfort, and vital information they offer. Over the past few years, IoT has become one of the most important technologies of the century. Now that we can connect everyday objects—kitchen appliances, cars, thermostats, baby monitors—to the internet via embedded devices, seamless communication is possible between people, processes, and things. It makes our lives so much better and will probably continue to do so. Currently, the applications of IoT cover adverse areas including manufacturing or the industrial sector, agriculture, health sector, smart cities, security, and emergency services among many others. All these applications are somewhere based on the IOT and these applications must make a communication path to transmission of the data which may lead many security concerns. The main purpose of this research is to explore various IoT applications to understand the variety of recently announced IoT application approaches.

APPLICATION DOMAINS OF IOT

I. HEALTHCARE

IoT deals with healthcare through its connection mechanisms. Devices like smartwatches or fitness bands or stress detectors are a great example of IoT applications that involve the welfare of the public. The use of wearables or sensors connected to patients, allows doctors to monitor a patient's condition outside the hospital and in real-time. Through continuously monitoring certain metrics and automatic alerts on their vital signs, the Internet of Things helps to improve the care for patients and the prevention of lethal events in high-risk patients. Another use is the integration of IoT technology into hospital beds, giving way to smart beds, equipped with special sensors to observe vital signs, blood pressure, oximeter and body temperature, among others.

II. SMART FARMING

Agriculture is always the need-in-hour service and with the due increase in population, its demand rises too. Farmers can use smart IoT farming applications for optimizing a lot of different activities such as determining the best time to harvest plants, creating fertilizer profiles based on the chemistry of soil, and sensing soil nutrients and moisture levels. However, there are many innovative products on the market geared toward forward-thinking farmers.

III. WASTE MANAGEMENT

Traditional waste collections are complicated and costly since a fleet of trucks drives along busy streets using inefficient routes. Fill levels of garbage containers differ for each container: ranging from overflowing, partially filled and empty. IoT sensors can monitor fill levels for conventional bins and send the data to the relevant department of the city hall. With that information, the garbage truck routes can be optimized for trash collection. The growing use of the Internet of Things (IoT), smart devices and sensors, and machine-to-machine (M2M) connectivity has the potential to reduce unnecessary expenses that occur due to operational inefficiencies in trash collection processes.

IV. SMART PARKING SYSTEM

Car parking is a major issue in modern congested cities of today. There simply are too many vehicles on the road and not enough parking space. This has led to the need for efficient parking management systems. Innovative smart parking technology combined with IoT connectivity helps solve this problem. Installed IoT sensors determine where empty parking spaces are located. This IoT data is transmitted over a wireless connection to a cloud server. All the data from the parking lot is collected and analysed in real-time to produce a map of available spaces made available to those looking for a space.

Drivers looking for a parking space can refer to the real-time smart parking map and be guided to the nearest vacant space. Advanced systems can reserve these spaces and take electronic payments from the drivers.

V. PET CARE

The Internet of Things industry is truly human-centric and is intended to simplify our daily and professional lives and make them safer. However, there are some examples of IoT devices that you can use to care for your cats, dogs, and other beloved pets. These IoT solutions come in the form of such smart wearables as IoT-powered collars, tags, and even smart feeders and interactive cameras. With these devices, you can understand your pet better, measure its activity and calorie intake, as well as notice undesired health changes in their early stages.

Busy pet owners can benefit from IoT-powered monitors and cameras that help you interact with your four-legged buddy even when you're away. IoT devices also notify you when your pet is having a meal and when you need to fill the feeder.

VI. ENVIRONMENTAL MONITORING

The internet of things is being used to manage the changes in the environment over a period of time and helps in reflecting upon these changes. The world exploits the natural resources daily and IoT offers ways to ensure that the resources do not go extinct. IoT uses techniques such as Precision farming, Infrastructure Monitoring, Inventory Management and Air pollution Monitoring to make sure that the pollution levels are in check and everything is running smoothly.

VII. SMART HOMES

Smart home systems achieved great popularity in the last decades as they increase the comfort and quality of life. The IoT significantly improves the way you can control and monitor all the processes taking place at your home. The fridge can notify you if your yogurt gets spoiled in two days or can add milk into the shopping list.

Every day the IoT application collects data about the way your household works, processes it and shows you the most significant insights. The smart home security system is a great tool for protecting your property since it provides total control of everything inside and outside of your house. Security cameras, smart locks, as well as motion, smoke, and other sensors — all these gadgets work together and notify you if something goes wrong.

ISSUES IN IOT

Though IOT has been a boon in many ways, it also poses certain challenges. The main challenges are privacy, reliability, data confidentiality and security. A vehicle attached with RFID tag leads to lack of privacy for the passenger in the vehicle. IOT in healthcare can also lead to dangerous consequences such as the data present in the health status can be changed by an intruder, hence giving the doctor wrong information. The current methodologies to deploy technology in the environment sector are expensive and difficult to maintain. An individual's right to privacy should be protected. Strong security and sound privacy solutions will lead to better acceptance by public. There should be laws and policies to curb the misuse of IOT technology. Global Standards need to be developed for the spread of this new technology.

1.Data Security

Some IoT devices collect highly sensitive information. In the healthcare industry, the data collected by IoMT devices include protected health information (PHI). Internet-connected cameras, voice assistants, and similar tools can monitor peoples' activities and conversations. IoT devices used in manufacturing have access to sensitive information about manufacturing processes and procedures.

2.Compatibility

At the core of the IoT concept, all devices must be able to connect and communicate with each other for data to be transferred. The IoT industry currently lacks any compatibility standards, meaning that many devices could all run-on different standards resulting in difficulties communicating with one another effectively.

3.Lack of encryption

Although encryption is a great way to prevent hackers from accessing data, it is also one of the leading IoT security challenges. These drives like the storage and processing capabilities that would be found on a traditional computer. The result is an increase in attacks where hackers can easily manipulate the algorithms that were designed for protection.

as universe of the study. On-financial firms listed at KSE-100 Index (74 companies according to the page of KSE visited on 20.5.2015) are treated as universe of the study and the study have selected sample from these companies.

The study comprised of non-financial companies listed at KSE-100 Index and 30 actively traded companies are selected on the bases of market capitalization. And 2015 is taken as base year for KSE-100 index.

4.Increased cost and time to market –

Embedded systems are lightly constrained by cost. The need originates to drive better approaches when designing the IoT devices in order to handle the cost modelling or cost optimally with digital electronic components.

Designers also need to solve the design time problem and bring the embedded device at the right time to the market.

5.Connectivity

It is the foremost concern while connecting devices, applications and cloud platforms. Connected devices that provide useful front and information are extremely valuable. But poor connectivity becomes a challenge where IoT sensors are required to monitor process data and supply information.

Conclusion

Technology today not only pushes past barricades we once thought insurmountable but also moves us towards a world where equal access to the internet and its resulting technological marvels will be available to everyone. It is used in many applications in healthcare, agriculture, smart buildings, transportations etc. Though IOT is used in many domains, its path to success is not smooth. There are many privacy and security issues that need to be addressed. If these issues are addressed, then Internet of Things will definitely be the global mantra. We hope that more research in the future will lead to the IoT trend. IoT will continue to evolve in many ways which will amaze and astound us, ultimately creating a truly limitless potential for everyone. In this paper, different various potential application domains of the internet of things and the related research challenges are discussed. We hope this paper will be useful to researchers in the security field by helping identify the major issues in IoT security.

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