

## A Study on 'IoT' and its Medicinal Applications

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**ABSTRACT:** Medical diagnostic consumes a large part of hospital bills. Technology can move the routines of medical checks from a hospital (hospital-centric) to the patient's home (home-centric). The right diagnosis will also lessen the need of hospitalization. A new paradigm, known as the Internet of Things (IoT), has an extensive applicability in numerous areas, including healthcare. The full application of this paradigm in healthcare area is a mutual hope because it allows medical centers to function more competently and patients to obtain better treatment. The IoT device collects and transfers health data: blood pressure, oxygen and blood sugar levels, weight, and ECGs. These data are stored in the cloud and can be shared with an authorized person, who could be a physician, your insurance company, a participating health firm or an external consultant, to allow them to look at the collected data regardless of their place, time, or device. However, in most of countries internet access is available to people on systems and their mobile devices, so that the transferring of the information can be much easier and less costly through the internet.

## 1 Introduction

IoT (Internet of Things) is an advanced automation and analytics system which exploits networking, sensing, big data, and artificial intelligence technology to deliver complete systems for a product or service. These systems allow greater transparency, control, and performance when applied to any industry or system. The IoT is comprised of smart machines, objects, environments and infrastructures. IoT can automate patient care workflow with the help healthcare mobility solution and other new technologies, and next-gen healthcare facilities. IoT enables interoperability, machine-to-machine communication, information exchange, and data movement that make healthcare service delivery effective.

IoT systems applied to healthcare enhance existing technology, and the general practice of medicine. They expand the reach of professionals within a facility and far beyond it. They increase both the accuracy and size of medical data through diverse data collection from large sets of real-world cases. They also improve the precision of medical care delivery through more sophisticated integration of the healthcare system.

The Internet of Things (IoT) is the network of physical objects or "things" embedded with

electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator or other connected devices. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Internet of Things is the next big revolution of the world on digitalization of commercializing various modules/products. Everything is associated with the internet, some involves controlling and some involves monitoring the parameters from anywhere. The Internet of Things is today's most trending technology that stands alongside wearables and robotics.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has been more inclusive covering wide range of applications like healthcare, utilities, transport, etc. Although the definition of „Things“ has changed as technology evolved, the main goal of making a computer sense information without the aid of human intervention remains the same. A radical evolution of the current Internet into a Network of interconnected objects that low cost tagging. A phone camera decodes QR code using image-processing techniques. In reality QR advertisement campaigns gives less amount as users need to have another application to read QR codes.

iii. Bluetooth and low energy -This is one of the latest technique. All newly releasing smart phones have BLE hardware in them. Tags based on BLE can signal their presence at a power budget that enables them to operate for up to one year on a lithium coin cell battery.

One of the challenges of medical care is the distribution of accurate and current information to patients. Healthcare also struggles with guidance given the complexity of following guidance. IoT devices not only improve facilities and professional practice, but also health in the daily lives of individuals. IoT devices give direct, 24/7 access to the patient in a less intrusive way than other options. They take healthcare out of facilities and into the home, office, or social space. They empower individuals in attending to their own health, and allow providers to deliver better and more granular care to patients. This results in fewer accidents from miscommunication, improved patient satisfaction, and better preventive care.

The advanced automation and analytics of IoT allows more powerful emergency support services, which typically suffer from their limited resources and disconnect with the base facility. It provides a way to analyze an emergency in a more complete way from miles away. It also gives more providers access to the patient prior to their arrival. IoT gives providers critical information for delivering essential care on arrival. It also raises the level of care available to a patient received by emergency professionals. This reduces the associated losses, and improves emergency healthcare.

IoT applied to buildings and various structures allows us to automate routine residential and commercial tasks and needs in a way that dramatically improves living and working environments. This, as seen with manufacturing and energy applications, reduces costs, enhances safety, improves individual productivity, and enhances quality of life. Much of current medical research relies on resources lacking critical real-world information. It uses controlled environments, volunteers, and essentially leftovers for medical examination. IoT opens the door to a wealth of valuable information through real-time field data, analysis, and testing.

IoT can deliver relevant data superior to standard analytics through integrated instruments capable of performing viable research. It also integrates into actual practice to provide more key information. This aids in healthcare by providing more reliable and practical data, and better leads; which yields better solutions and discovery of previously unknown issues. It also allows researchers to avoid risks by gathering data without manufactured scenarios and human testing.

## **II.LITERATURE REVIEW**

In every organization there is always information desk that provides information, advertisement messages and many notifications to their customers and staff. The problem is that it requires some staff that is dedicated to that purpose and that must have up to date information about the offers advertisement and the organization. Due to IOT we can see many smart devices around us. Many people hold the view that cities and the world itself will be overlaid with sensing and actuation, many embedded in "things" creating what is referred to as a smart world. Similar work has been already done by many people around the world. The IoT refers as intelligently connected devices and systems to gathered data from embedded sensors and actuators and other physical objects. IoT is expected to spread rapidly in coming years a new dimension of services that improve the quality of life of consumers and productivity of enterprises, unlocking an opportunity. Now this time Mobile networks already deliver connectivity to a broad range of devices, which can enable the development of new services and applications. This new wave of connectivity is going beyond tablets and laptops; to connected cars and buildings; smart meters and traffic control; with the prospect of intelligently connecting almost anything and anyone. This is what the GSMA refers to as the "Connected Life". Describes the concept of sensor networks which has been made viable by the convergence of micro electro-mechanical systems technology, wireless communications. Firstly the sensor networks applications and sensing task are explored, and according to that the review factors influencing the design of sensor network is provided. Then the algorithms and protocols developed for each layer and the communication architecture for sensor networks is outlined.

Here they are using SMS based approach but different way. The system is designed to work independently without the need of any human operator and when a student or employee needs any information, they will need to send an SMS to this system which will respond with the information required by user. Many technical communities are vigorously pursuing research topics that contribute to the IOT. The purpose of research is to understand the feasibility of IoT in bus transportation system in Singapore. The Singapore, which is technically very advanced but still has scope of advancement in their transportation system. They made a system by using the IOT for the consumer to understand and evaluate different bus options in an efficient manner. Secondary research was used to predict arrival timings of buses as well as the crowd inside each bus. A three layered network construction of Internet of Things (IOT) communication method for high-voltage transmission line which involves the wireless self-organized sensor network (WSN), optical fiber composite overhead ground wire (OPGW), general packet radio service (GPRS) and the Beidou (COMPASS) navigation satellite system (CNSS).

The function of each layer of network, application deployment and management of energy consumption are studied. The method can meet the needs of interconnection between the monitoring center and terminals, reduce the terminals' GPRS and CNSS configuration and OPGW optical access points, and ensure the on-line monitoring data transmission real-time and reliable under the situation of remote region, extreme weather and other environmental conditions. Many technical communities are vigorously pursuing research topics that contribute to the IoT. Today, as sensing, communication, and control become ever more sophisticated and ubiquitous, there is significant overlap in these communities, sometimes from slightly different perspectives. More cooperation between the communities is encouraged. To provide the basis for discussing open research problems in IOT, a vision for how IOT could change the world in the distant future. Now in this era the IoT may be used in various research fields in this literature those may be classified as: massive scaling, creating knowledge and big data, architecture and dependencies, robustness, openness, security, privacy, and human-in-the-loop. Advantages:

- Employee easily gets important notice or information by message any time 24x7.
- Within a second organization can change notice or information by sending SMS only.
- Admin can change the display message or notice from any place or anywhere.

Disadvantage: If anybody wants information they have to do message and for every new information they have to send message again and again to the system.

Developed Digital electronic display board is fast gaining acceptance and application in different spheres of life which include educational institutions, public utility places and in advertisement due to the problem associated with construction of signposts and manual placement of papers on walls, buildings, and edifices which makes the environment look untidy. The design and development of a microcontroller based electronic scrolling message display board, which will be used to display messages and information in real-time via SMS. This microcontroller based electronic scrolling message display board offers the flexibility to a user to control the message or information displayed without recourse to geographical location of the user, provided there is GSM (Global System for Mobile Communication) mobile network. It therefore eliminates the inconveniences of physically going to the display board to manually input information using a computer system. The paper also incorporates a feedback mechanism from the remote display board to ascertain that the message sent by the user has been displayed.

It deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board which is synchronized using the GSM technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of pasting the message on notice board. This proposed technology can be used in many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers. Using various AT commands is used to display the message onto the display board. GSM technology is used to control the display board and

for conveying the information through a message sent from authenticated user.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management. However, in the past decade, the definition has been more specified covering a wide range of applications like healthcare, utilities, transport, etc. Although the definition of „Things“ has changed as technology evolved, the main goal of making a computer sense information without the aid of human effort remains the same. A radical evolution of the current Internet system into a Network of interconnected the objects that not only gathering the information from the environment (sensing) and interacts with the physical world, but also uses existing Internet standards to provide services for information transfer, analytics, applications and communications

### III.APPLICATIONS

This system is designed for a medical applications but it can be also used in various organizations like educational Notice board system or at Railway station, Bus stand and Air-port to display the information and notification. The IoT device collects and transfers health data: blood pressure, oxygen and blood sugar levels, weight, and ECGs. These data are stored in the cloud and can be shared with an authorized person, who could be a physician, your insurance company, a participating health firm or an external consultant, to allow them to look at the collected data regardless of their place, time, or device. In Industrial organization it can be also used. E-display system may be used to display Emergency message in Hospitals. Some areas where IoT frequently used

#### i) Remote medical assistance

In event of an emergency, patients can contact a doctor who is many kilometers away with smart mobile apps. With mobility solutions in healthcare, the medics can instantly check the patients and identify the ailments on-the-go. Also, numerous healthcare delivery chains that are forecasting to build machines that can distribute drugs on the basis of patient's prescription and ailment-related data available via linked devices.IoT will improve the patient's care in hospital. This in turn, will cut on people's expense on healthcare.

#### ii)Hearable

Hearable are new-age hearing aids which have completely transformed the way people who suffered hearing loss interact with the world. Nowadays, hearable are compatible with Bluetooth which syncs your Smartphone with it. It allows you to filter, equalize and add layered features to real-world sounds. Doppler Labs is the most suitable example of it.

#### iii) Ingestible sensors

Ingestible sensors are genuinely a modern-science marvel. These are pill-sized sensors which monitor the medication in our body and warn us if it detects any irregularities in our bodies. These sensors can be a boon for a diabetic patient as it would help in curbing symptoms and provide with an early warning for diseases. Proteus Digital Health is one such example.

#### iv)Moodables

Moodables are mood enhancing devices which help in improving our mood throughout the day. It may sound like science fiction, but it's not far from reality.

Thync and Halo Neurosciences are already working on it and have made tremendous progress. Moodables are head-mounted wearables that send low-intensity current to the brain which elevates our mood.

### Conclusion

IoT changes the way the facilities are delivered to the healthcare industry. These technologies improve the product, causing a larger effect by bringing together minor changes. The IoT promises to deliver a step change in individuals' quality of life and enterprises' productivity. Through a widely distributed, locally intelligent network of smart devices, the IoT has the potential to enable extensions and enhancements to fundamental services in transportation, logistics, security, utilities, education, healthcare and other areas, while providing a new ecosystem for application development. A concerted effort is required to move the industry beyond the early stages of market development towards maturity, driven by common

understanding of the distinct nature of the opportunity. This market has distinct characteristics in the areas of service distribution, business and charging models, capabilities required to deliver IoT services, and the differing demands these services will place on mobile networks. Connecting those smart devices (nodes) to the web has also started happening, although at a slower rate. The pieces of the technology puzzle are coming together to accommodate the Internet of Things sooner than most people expect. Just as the Internet phenomenon happened not so long ago and caught like a wildfire, the Internet of Things will touch every aspect of our lives in less than a decade.

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