

Health Monitoring System Using Internet of Things(IoT)

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Abstract — The Internet of Things(IoT) with cloud computing is a new trend for efficient managing and Online Data Monitoring System for Various Appliances. In this paper we introduced that how patient can be monitor over the internet and in case of emergency get assistant from the doctor. Sensor, sensor nets and other perceptive technologies, communication network, internet and other transmission technologies, intelligence operations, intelligent process, in other words, a network which connected all the things in the physical world. From the architecture, the IOT consists of three parts-perceptual layer, Network layer and Application layer. At the bottom is the perceptual layer, composed by sensor and sensor network, the middle layer is the network layer composed by mobile communication network and the internet, the application layer is at the top , that is intelligence Operations and the intelligent processing. The IOT uses the ubiquitous network technology to establish a connection.

Index Terms— IoT, Cloud, Zigbee (IEEE 802.15.4)

I. INTRODUCTION

Development of health information management through mobile devices introduces several challenges: data storage and management, availability of heterogeneous resources, security and privacy and ubiquitous access are a few to mention. One solution for addressing all issues is the introduction of Internet of Things with Cloud Computing concept in healthcare systems.

A. Internet Of Things(IoT)

Internet appears everywhere in the world. IoT connects all things, so it is called ‘the internet of thing’. The Internet of Things (IoT), sometimes referred to as the Internet of Objects, will change everything. ^[1]. The Internet of Things (IoT) is a computing concept that

- Flexible Configuration
- Universal transport & internetworking
- Ubiquitous accessibility

describes a future where everyday physical objects will be connected to the Internet and be able to identify themselves to other devices. In other words, when objects can sense and communicate, it changes how and where decisions are made, and who makes them.

The Internet of Things (IOT) describes a worldwide network of intercommunicating devices. It integrates the ubiquitous communications, pervasive computing, and ambient intelligence.IoT has a 6A Connectivity's^[3]:Any thing, Any one, Any time, Any place, Any Service, Any network.Due to ubiquitous nature of IoT number of devices are expected to be connected to the Internet. The

- Formatting an intellectual entity by integrating human society and physical systems

embedded computing nature of IoT devices gets a low-cost computing network. Its ability to gather, analyze, and distribute data that we can turn into information, knowledge, and wisdom. 1997,The Internet of Things "is the 7th in the series of ITU internet Reports originally launched in 1997 under the title —Challenges to the networkl.1999, Auto-ID centre founded in MIT^[4].The term Internet of Things was first used by Kevin Ashton in 1999^[5].2008: first international conference of IoT.

B. Why Internet of Things?

- Dynamic control of industry and daily life
- Improve the resource utilization ratio
- Better relationship between human and nature



Figure.1 Internet of Things^[20]

C. Iot in Healthcare^[7]

- Digital hospital
- Telemedicine Management System
- Electronic health records
- Health Care Information System
- Care management & decision support services



Figure.2 IoT in Healthcare^[18]

- Product tracking & authentication
- Product lifecycle management
- Personal healthcare

D. Cloud

Cloud is virtual world. A cloud is just a special kind of data centre. Cloud may be hosted by anyone; an enterprise, a service provider, or a government. Cloud Computing is a term applied to large, hosted data centres, usually geographically distributed, which offer various

computational services on a —utilityl basis. Most typically the configuration and provisioning of these data centres, as far as the services for the subscribers go, is highly automated^[12], to the point of the service being delivered within seconds of the subscriber request.



Figure.3 Cloud^[19]

Cloud computing relies on sharing of resources, which is key requirements for IoT platform. The Cloud Computing is not only sharing the resources but also maximizing the resources. It is also location independent; the users access the cloud services from any location and with any devices through the internet connection. When we talk about the IoT platform then it should also be access from anywhere, any time.

E. Zigbee

ZigBee is a specification for a suite of high-level communication protocols used to create Personal area networks built from small, low-power digital radios. ZigBee is based on an IEEE 802.15 standard. Though its low power consumption limits transmission distances to 10–100 meters line-of-sight depending on power output and environmental characteristics.

.ZigBee devices can transmit data over long battery life and secure networking (ZigBee networks are secured by 128 bit symmetric encryption keys.)ZigBee has a defined rate of 250 Kbit/s, best suited for intermittent data transmissions from a sensor or input device.The ZigBee network layer supports star, tree and Mesh networking.

II. CONCEPTS

With the help of IoT we can communicate between physical world and digital world. In this context, advanced healthcare services are required to be made available through a network anytime, anyplace and to anyone.

A medical environment on the other hand concerns the utilization of pervasive and ubiquitous^[3] technologies for

delivering the services. Wireless technologies enable the real time transmission of data about a patient's condition to caregivers.

Here we are used IoT concept among with cloud computing for the patient monitoring application. For this purpose we are going to use different sensors, zigbee (IEEE 802.15.4), Intel Galileo Development Board, Cloud (one type of data center), and End User Devices.

Health Monitoring System

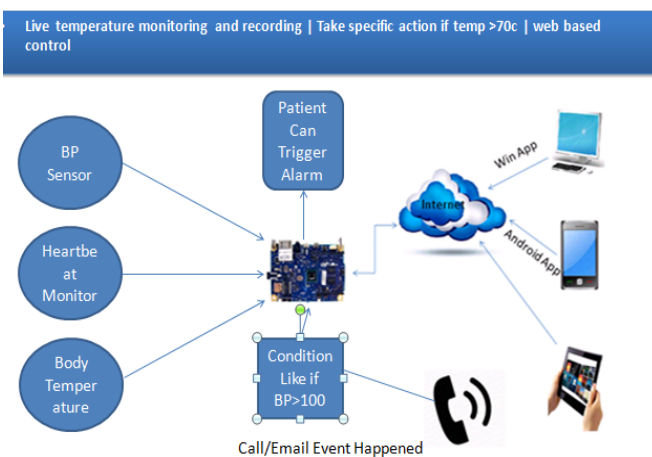


Figure.4 Block diagram

With the help of block diagram we should know how patient can be monitor over the internet and in case of emergency get assistant from the doctor. In this system data is collected from the different sensors after that data will send it to the cloud using Gateway^[16] and finally get a desire data with a security at end user device. Here patient can be monitor continuously (i.e. data comes from sensors), this data will send to the cloud (i.e. cloud is a big data centre; automatically data will collect to the cloud with the help of internet). Whenever you want to see that data you just hit the URL and get a appropriate data at the end user devices (ex: Laptop, Desktop, Mobile, Tablets, etc.). It's also give a security and authentication for better monitoring^[15] system. There are the different protocols^[11] for this application.

A. Key functions^[13]

- Monitor and record current data from the temperature sensors.
- Activate in-store alarms to alert employees when temperatures go beyond defined thresholds.
- If multiple events occur, use the Internet connection to alert remote personnel. These alerts can go to web-

enabled devices including PCs, smartphones, and tablets.

- Provide a web interface for control of the gateway and temperature sensors through a PC or Smartphone.
- Enable authorized users to remotely view live and past temperature data stored in a particular gateway or the data extracted from all gateways and collected in the cloud.

III. CHALLENGES

- Privacy – will be a huge issue when implementing IoT
- Identity - Online Fragmentation of Identity
- Efficiency – speed - person loses identity and is an IP address
- Decisions – do not delegate too much of our decision making and freedom of choice to things and machines
- Balancing

IV. ADVANTAGES

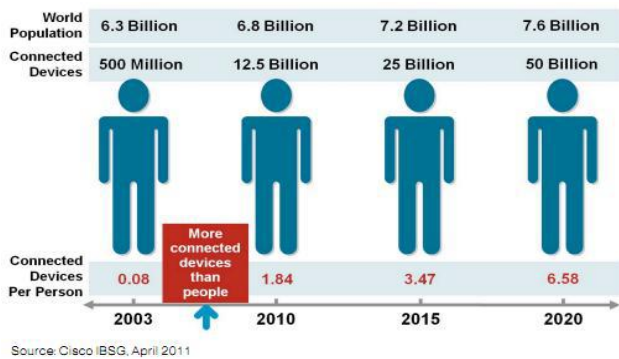
- Ubiquitous Network
- Better Security
- Flexible Configuration
- Reduced healthcare cost^[17]
- Intelligence
- Better Quality of Service^[11]

V. APPLICATION OF IoT

- Home Monitoring
- Industrial Monitoring
- Education
- Landslide and avalanche prevention
- Smart parking
- Traffic congestion
- Intelligent transportation systems
- Smart Metering
- Structural health
- Military & Forest Fire Detection
- Food & Hotel Management
- Air pollution and Many More.....

VI. SCOPE OF WORK

As we mention earlier, Internet of Things connects many things together. Now this idea will apply over the world and connects billions things together. Many of companies implement IoT with cloud computing in daily life conditions and also used in industrial area, Cars, Factories, Farms (Agriculture), Schools, Hospitals, Rail way Towers, Aero planes, Ships, Public Transports, Light house, Electricity Towers, Train and many more.

Figure.5 Future Internet^[6]

Cisco IBSG^[6] predicts there will be 25 billion devices connected to the Internet by 2015 and 50 billion by 2020. Hence IoT-Cloud is major evolution of now a days and its greater opportunity to built a new virtual world with the help of Internet of Things .

In this application IoT is a pervasive Technologies which is used for beneficial output towards the healthcare. it's give us a flexibility as well as surety.

VII. CONCLUSION

IoT-Cloud has to provide real-time data processing. The convergence of Cloud and IoT can provide huge opportunities^[11] for both technologies. For future business & research vision the cloud computing and IoT concepts is combined.

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