



HOME HEALTH CARE SYSTEMS USING IOT BASED ON CLOUD

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Abstract: Today most of the applications based on IOT connected services. The ability to locate and connect the devices using sensors and communication protocols like RFID, the data stored in the cloud storage system. The stored data is processed and generate reports based on the present and past data. This will help the patients the relevant instructions to be following quickly cure health conditions and predict the future. The applications of IOT are discussed. We have presented one of the application is IOT cloud based health care system, in which the system collects the data from wearable sensor devices. These devices connected to the communication protocols to store the patient data in the cloud health care system. The system data is analyzes process, monitor, report the results. These results help the patient's recommendations by doctors, guidelines, instructions to cure the diseases with reduced cost. In future IOT cloud health care system can be extended to intelligent health care monitor and control system.

Key words: RFID, IOT, Intelligent, Cloud, Diseases and Control System.

1. Introduction

Internet of things is inter- networking of physical devices(i.e connected devices) and other items using electronics, software, sensors, actuators and other network connectivity devices. The evolution of IOT. Internet of Things broadly into five stages in year 1997 ARPANET In 1999 Auto-ID center founded in MIT., In the year 2000 demand for expedited logistic, using RFID tags for routing inventory and loss prevention, in year 2003- EPC Global founded in MIT, in the year 2005- Four important technologies of the internet of things, in 2008 IOT enable to reach real world physical objects, In 2010 used cost reduction applications used in surveillance, security, healthcare, transport, food safety, document management. Later the development of IOT based applications.

In future by 2020 ability the devices are located indoors to receive geological signals, locating the people using every objects, and efficient tele-operation and monitor control, software agents and sensor controlled devices using web applications. Virtual personalities operating in smart spaces using connect, communication with social, environmental, and user contexts. IOT objects are sensor controlled network infrastructure. IOT with sensor and actuator, technologies use as smart home, smart grids, intelligent

transportation and smart cities. [1, 3] Internet of Things connecting every objects using smart phone, internet sensor to the internet. These are communicated to applications and people for further processing. Internet of things world wise network of interconnected objects that are uniquely addressed using protocols. The system controls using wireless sensors, radio Frequency Identification (RFID) and other systems. [3]. [7,8] Applications of IOT are 1) smart home 2) Wearable 3) smart city 4) Smart grids, 5) industrial internet 6) connected car 7) connected health(digital health) 8) Smart retail 9) Smart supply chain 10) smart farming[6] Applications of healthcare IOT are mobile medical applications for example wearable devices. These devices allow the patients to capture health data. The data is communicated protocols to cloud systems and further analyzed. The Health monitoring system helps the patient's precautions, remedies and prescriptions. The rest of the paper is organized 2 related study, section 3 proposed model, section 4 Applications of IOT, Section5 Interpretations and discussions. and section 6 Conclusion.

2. Related Study

Problem Identification

Internet of things using Smart connected devices are used sensor to collect the health data and communicated to the cloud data server and internet. Cloud processing and visualization. Software agents and processing analyze and visualization systems. Design and develop a solution Intelligent IOT based health care systems collect health data, communicate process, store and suggest the disease stage and give guidelines to the patients, prevention, cure diseases with reduced cost. To collect the patient data using IOT based medical devices and applications. These can be connected to Health care IT system through online network. The data is analyzed in cloud and health monitoring system that the system will give guidelines and instructions to the patients.

Literature Survey

IOT connected every device. IOT cloud based technology to perform efficient operations using sensing devices. IOT of things is a global network connected virtual objects with standard communication using wired or wireless telecommunication. Challenges build system, minimize energy consumptions. Communication software demand hardware, storage and maintenance and application services. [3] Sreekath, et al [5][7][8] studied IOT health care wireless sensor networks. Connected health care environment update clinician work, improve patient care, safety, reduce cost, and continuous monitoring. IOT Medical devices via gateway secure cloud systems store, process, analyze and predict results for promoting medicines and cure health of patients. Healthcare devices used to patients. Continuous monitoring of health conditions and correlates the physiological parameters and health data for prediction and analysis are

- Use devices (Smart Phones or Tablets or Laptops/Desktops)
- Record the clinical data
- Provide treatment by doctor
- Reduce the healthcare cost by accuracy diagnoses using IOT devices.
- Patient monitoring system on IOT cloud architecture.

It has three layer approaches are:

- a). Data acquisition sensing and transmission: Record the patient data for example Temperature, blood pressure. etc
- b). Data concentration and cloudlet processing: The collected data is communicated to Data storage and cloud data processing.
- c). The cloud data centers connected via internet to cloud processing analytics visualization Systems. Cloud Processing Analytics are:

The processed data from layer two is further analyzed and predicted and reporting the information to doctor. Data acquisition: Sensors measure the patient information and communicated to data transmission components. Data Transmission components: These components are responsible for recording the patient house (or remote location) data with security and privacy and communicated via Smartphone Wi-Fi or IOT devices or Internet concentrator.

The storage processing device store the data and this is further analyzed data and reporting the condition of health to the doctor. The doctor will suggest the medical reports guidelines to the patients by IOT connected systems.[2] Sensors use by medical devices, remote and continuous monitoring of patients healthcare.

3. Proposed Model

The proposed IOT health care system has a sensor connected smart medical wearable devices. These devices connected to internet and cloud systems. [7] The cloud systems store, process, aggregate, analyze and services to the patients time to time. The following are some connected technologies gained and strength the need of services to patients and control the cost of applications. The figure.1. Shows the health care system services.

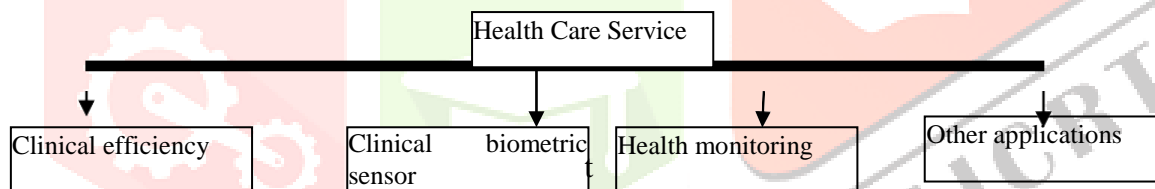


Figure: 1. Health Care System Services

- **Patient safety:** To provide the safety to the patients in hospital
- **Reduce the cost:** The health care system provides the users with affordable cost
- **Store the millions of records of patients:** The system is to store and maintain the health records of patients.
- **Analysis of real-time data:** The system is applying intelligent prediction algorithms to predict and monitor the patient health condition.

- **Predictions of diseases and remedies:** The system automatically predict the future Network of Sensors, Actuators, Mobile Devices, Internet of things for safety of billion of People.

IOT Enabled Controlled Health Care Systems

- Sensors
- Actuators
- Computing Devices
- Data communication capabilities
- Data Transportation.

The proposed model is shown in Figure.2.

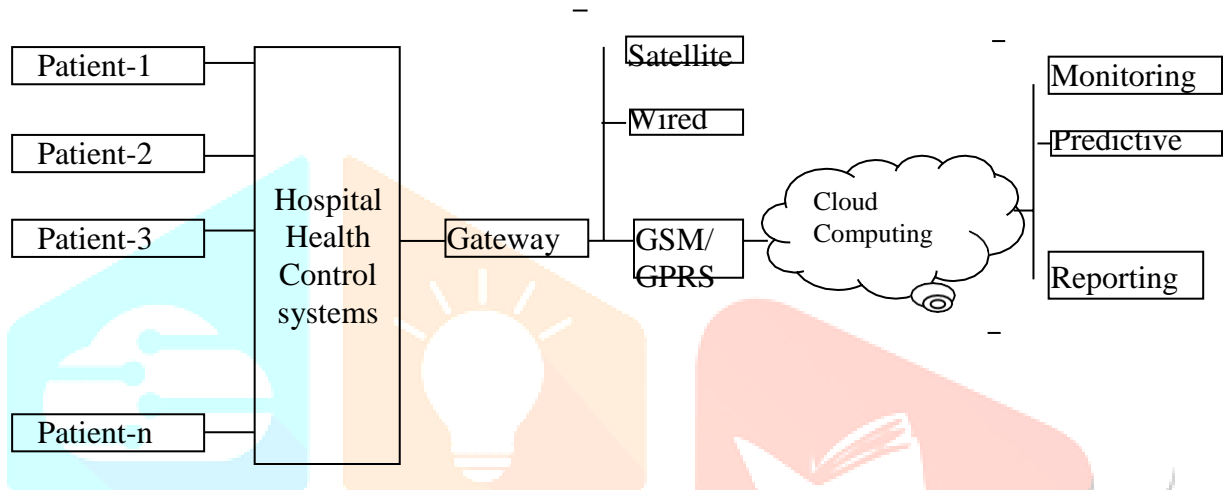


Figure: 2. IOT with Cloud Based Patient Monitoring and Reporting Systems

Health Management System is collected information following are:

- Patient Information
- Diseases and Emergency Cases
- Patient compliance and Treatment
- Medical devices and Diagnostic Devices
- IOT Sensors
- Mobile Users or Smart Phone Users
- Hospital Monitor and Management

Storage, visualization, daily activities, products and services, Optimize the operations and functions. Applications of IOT-Health Care Systems to connected devices will utilize the resources and provide quality of care, better clinical outcomes, reduced visits, emergency admissions, reduction of bed days of care, patient at home. Supervision by IOT connected devices. For example some Devices are Blood pressure, EGC, Hearth measuring devices, and Activity monitor: Time spent rest or sleeping, step counting, walking measure device, calorie

spent device, Safety monitors: Fall detection system, personal safety and tracking device, Medication Monitors: Smart pill dispenser, Medication adherence systems.

IOT Health Care Connected Medical Devices:

- Access real-time visibility of patient condition and activities
- Monitor compliance
- High performance computing
- Remote monitoring

4. Home Health Care System real data collected from hospital using IOT Devices.

Internet of things is a wireless network between objects. Usually the network configuration is Household Applications. Mobile receivers are communication between people and things [6].

.Internet to reach out into the real world of IOT, Microcontroller, Sensor, wireless connectivity, cloud based software/infrastructure and application development. [8] IOT the operations and functions dynamically controlled. Improve resource utilization; relationship between the human and nature dynamically control the operations - Intellectual entity by Human society, physical system. Transport, internetworking Accessibility, usability.

Wearable devices, home health monitoring devices, and provide better service. Solution allowing for remote monitoring system. IOT health care monitoring system shown in Figure.3 Future of IOT are Traffic issue, Production, Logistics, Retailing, Resource and power control, Daily life, traffic issue.

The main three core sectors used IOT

- Enterprise
- Home
- Government

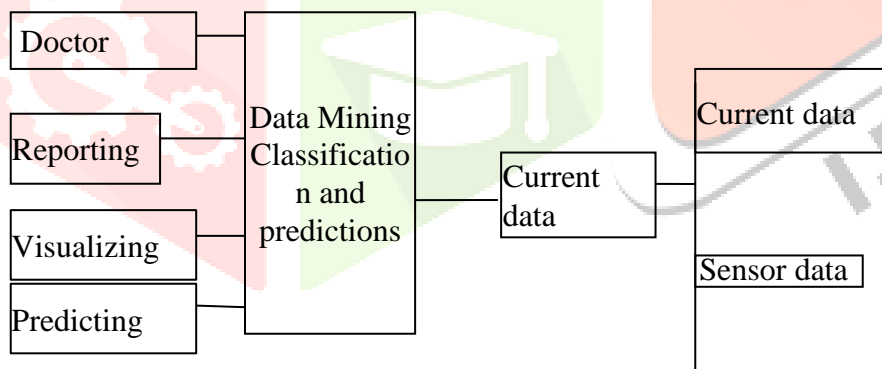


Figure: 3. Health Care Analytics Process using IOT System

5. Interpretations and Discussions

IOT Applications into various domains. The one of the most important section is IOT approach cloud based health care system is read the patient data using sensor controlled wearable devices. The devices communicated to cloud storage. The data is analyzed and reports, predictions by using the various techniques. The proposed model health care system has Clinical efficiency, Monitoring sensors and other applications. The figure. shown in 2. Patient monitoring and reporting system collects the patient medical data using wearable sensor devices and the communicated using protocols like GSM/GPRS wired /wireless networks to cloud storage and computing system. The data is further monitored, analyzed and reporting results. These results helps the doctors give guidelines suggestions to the patients to recover health with affordable cost. Health monitoring system includes patient information, diseases prediction, medical diagnostic devices, IOT sensor, mobile devices and other software services.

6. Conclusion

Internet of things various applications smart phone, smart cities, industrial internet, connected car, health care system and other applications. In future growth of IOT connected device in the world. As the study we have taken applications of IOT cloud based health care system provides data sensing and transmission, data storage and processing, and cloud process analysis proposed model shown in Figure.1 health care services, Figure.2 IOT based patient monitoring and reporting system, and Figure.3 shows the analysis process. In future we can extend the scope of the paper using data mining algorithms to classify the medical data and predict the future patterns based on the given present input and past data of the patient.

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