International Journal of Advanced Technology in Engineering and Science
Vol. No.08, Issue No. 09, September 2020
www.ijates.com
ijates
ISSN 2348 - 7550

Health Care Monitoring System in Internet of Things (IOT) by Using RFID

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ABSTRACT

Healthcare industry has perpetually been on the forefront in the adoption and utilization of information and communication technologies (ICT) for the efficient healthcare administration and treatment. Recent developments in ICT and the emergence of Internet of Things (IOT) have opened up new avenues for research and exploration in the all fields including medical and health care industry. Hospitals have started using the cell instruments for communication intent and for this intent intern et of things (IOT) has been used and fused with wi-fi sensor node reminiscent of RFID, NFC tag and small sensor nodes. The usage of a cellular agent in healthcare procedure underneath wi-fi community environment gives a chance to explore improved services for patients and staffs reminiscent of medical professionals and nurses given that of its mobility. In this paper novel method to utilize it IOT within the field of scientific and crafty wellness care are presented. The majority of the survey exist about the different health care approaches used in the IOT, similar to, wireless well-being monitoring, U-healthcare, E-healthcare, Age-friendly healthcare techniques. This paper describes and proposes a complete monitoring existence cycle and effective healthcare monitoring system designed by using the IOT and RFID tags. The experimental results in this paper show the robust output against various medical emergencies. In this system to get the veracious evaluation results, supervising and weighing the health status of patient and to increase the power of loT, the combination of microcontroller with sensors is presented.

Keywords-mobile agent; RFID; body sensor; remote monitoring; internet o/thing; smart health care; etc

I. INTRODUCTION:

In rural area most of the peoples does not gets appropriate approach to health monitoring and clinics. So it is necessary to design the effective health monitoring system. A tiny wireless device is a resolution bound with loT can form a conceivable way to regulate patients distantly rather than dating the actual clinic. The unusual tiny transducers are transplant into the human to aggregate the details through which system get human fitness data

security and for analysis for treatment. The collected data is then send to remote station via divergent communication technologies (like as 3G/4G enabled base station or Wi-Fi network with Internet. From data came from internet the medical professionals can seize conclusion and consequently furnish services centrally [12]. Main advantage of this electronic healthcare is it provides a superb leisure to sufferers and healthcare contributors, and also enhances the first-class showing existence. In this electronic healthcare the privacy of the patient is not taken into consideration but it is essential in case of patient and this is the major disadvantage of this system. To avoid this disadvantage the RFID technology is used. It manages the patients documents with its mobility and usability. Also the main advantage of RFID is that it resist all kinds of attacks and threats so less noise are presents in signal.

Information Technology has seen rapid cross platform and cross functional developments for instance sensor, Nanotechnology and bio-industries. In hospitals, generally the E-healthcare system is used for getting the information of patient [10]. Exceptionally, living e-healthcare approach has been accomplished within cabled conversation among distinguished fields for instance network protocol and database in hospice atmosphere. There has been an increase in healthcare system's use of the mobility characteristics and wireless communication and emergence in technologies has enabled smart appliances and gadgets with mean appraising energy to exploit wireless sensor nodes [1]. In the new epoch of technology and wireless communication, the tremendous rise in electronic devices made smart phones and tablets has become the most popular and fundamental tool of day to day life. Advancements in Internet of Things (loT) are mostlyused for connecting the different devices like as sensors, appliances, vehicles and other objects. All these devices may equip with radio-frequency identification (RFID) tag, sensors, actuators, mobile phones and many other [\8]. By using loT, all these devices are connected to establish the communication between them and efficiently access the information. The main favour of loT is to swell the profit of Internet with remote control talent, data sharing, eternal connectivity and many more. The healthcare servers keep electronic medical records of registered users and provide different services to patients, medical consultants and informal caregivers. The patient's consultant can access the data from office via internet and examine the patients' history, current symptoms and patient's response to a given treatment. Once WBAN network is con figured, the health care server manages the network, taking care of channel sharing [2], [17].

loT was firstly introduced by Kevin Ashton in 1999, he connects the different sensors to physical object and transmits the information to the internet. The IOT technological know-how is in this day and age served in explicit realms of existence together with digital oilfield, residence and erection automation, wise Grid, digital clinical remedy, wise haulage and so forth [7], [2]. RFIDs function the radio frequency tags to learn actual counters, and a RFID sensor passes knowledge among a reader and an object furthermore is [2] detect, trace and classify [3]. IOT science can yield enormous knowledge about individual, time, things and space. Even as uniting the present Web science and IOT defame a radical use and huge quantity of area set on base charge

sensors and wireless communication. Internet protocol v6 and Cloud aid the progress of amalgamation of web and IOT [4]. It is endowing extra potentialities of knowledge assembling, info treatment, and administration and various novel services. IPv6 is used to recognize an object which connects to IOT by a unique addressing scheme.

II INTRODUCTION TO IOT AND RFID:

In this section presents the introduction to IOT. The Internet of things (IOT) is used in different vehicles, mobile phones, physical devices etc. The devices that uses the IOT also called as smart devices or connected devices. The IOT can be communicate with different devices like as sensors, electronics software, embedded systems, actuators, etc. Apart from these devices the RFID, barcodes, QR codes, Ambient Intelligence and mobile Computing, uses the IOT. All of these devices are used for collection of the data and to exchange of the data. The Global Standards Initiative on Internet of Things (IOT-GSI) introduces the IOT in 2013 [4]. IOT allow things to be sense and prohibited distantly across presented network infrastructure. So it creates the opportunity for more direct combination for real time systeminto digitized systems, and consequential in enhanced effectiveness, correctness and cost-effective usefulness. Meanwhile IOT operates with sensors and actuators then this tools fits petition furthermore common group of cyber tangible mechanisms, which also encompass technology for instance intelligent transportation, smart cities and smart houses. Every article is exclusively particular by means of its embedded computing system yet is skilled to correlate inside handy Internet foundation. Veterans guess that the IOT will dwell of nearly billions of items in future. IOT devices are to allow remote health monitoring and emergency notification systems [7].

In this paper the RFID Tags are used to establish the wireless communication. The RFID tags are simple chips which are used for the identification of objects. The RFID reader sends a question signal to the tag and receives mirrored signal from the tag, which is then passed to the database for storage purpose [5]. Figure 1 shows the RFID Network using Sensor. In this figure the RFID tags send the signals to the static node receiver, the static node receiver sends the signal to the mobile base station, directly to the mobile phone. Then by using the GPRS and through the internet it is pass to the server for display purpose.

In the Smart healthcare system the loT and RFID plays an important role. In this system the different sensors are embedded in the patient body and according to the signals from the sensors, RFID and loT the patient can be monitor. The RFID tags commits entity recognition involuntarily through evaluation the tag, that joined to objects [8]. There are two types of RFID tags are presents viz. active RFID and Passive RFID.

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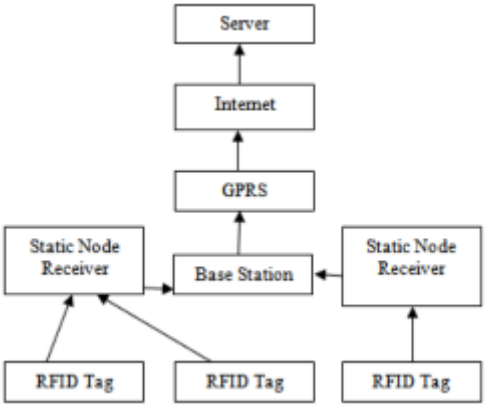

Figure 1.RFID network using sensors.

Usually passive RFID tag utilized for negligible power consumption, RFID tag reader yield the power though which it energetic for transmission with reader. Essential goal of sensor network to prominently acquiring data from context and ships it to the domestic cache warehouse [2]. loT allows to users to use to surf the Internet cordlessly with various equipment, e.g., tablets, [18] smart phones and handheld electronic appliances. 2G/3G/4G are the GSM standards for communication exploited by Internet. L TE 4G or 3G networks are required in RFID based network. Practicing such competences, solitary get statistics linked to caseshealth and drive up to distant base station furthermore reckoning and repository [5].

III. DEVELOPMENT OF SYSTEM:

This section reports the components used while developing this system. This venture configuration comprises of association between micro controller and actuator to procure faithful estimation, and watching and evaluating the cases condition eventually grows the strength of loT in healthcare. Types of sensors used are ECG sensor, Blood Pressure sensor, Temperature sensor, Motion sensor, EEG sensor and Blood Glucose sensor. The combination of micro controller with the smarts sensors offers advantages like as incorporated precisionanalog capabilities, small power consumption and easy for designing GUI's. The Figure I shows patients healthcare model by using IOT. It consists of the sensors which are attached to human body, Microcontro11er, Analog to digital converter (ADC), wireless devices like as Bluetooth, RFID, Mobile Phones, Wi-Fi system, Internet devices and doctors/nurses, hospitals, emergency team, Ambulance, Government Agencies, etc. which provides the facility to thepatients for their healthy fare [9]. The sensors continuously collect the information from the patient's body to get the patient details. In case of any emergency, these wireless devices can distantly report the physical condition of the patient to his doctors and/or relatives. In such condition the doctors and hospitals can respond with emergency medical services such as ambulance or provide the necessary actions to the relatives for aiding them to help the patients [11].

In Figure I different sensors are attaches to the patient's body to measure the different parameters like as EEG, blood pressure, Body temperature, Blood Glucose, ECG and Motion. The signals generated from these sensors are in analog form making it necessary to be converted into digital form for which ADC is used. These digitalized signal form the ADC are forwarded to RFID/Bluetooth device through microcontrollers. RFID/B1uetooth devices wirelessly transmits these signal to the mobile phone for the transmission of data through intern et to the specific destination. The internet either uses the base station or internet for the transmission purpose. All these operations can be done into four different layers and providing different services to each other for combined functioning as shown in Figure 2.

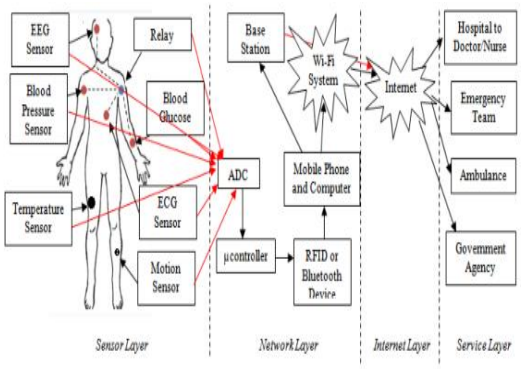

Figure 2. Healthcare monitoring model using IOT

A. Sensor Layer

This is first stratum of this system which is the essential part of the proposed system. As shown in figure there are different sensors presents such as EEG Sensor, Blood Pressure Sensor, Temperature Sensor, Blood Glucose, ECG Sensor and Motion Sensor. Each of these sensors monitors and collects respective information and transfers it to the next layer, i.e. network layer.

B. Network Layer

This level performs a significant task in conversation which is used for attaching appliances to network by means of divergent protocols like as 2G, 3G, 4G, with Routers. Network level moreover promote dissimilar message passing standard protocol suite such as WAN for 3G, MAN for 4G IEEE 802.20, ITU G.992. I - ITU G.992.5.

The Bluetooth set up the connection between two devices. When two devices are demanding to be paired, they are actually searching transmit and receive data between two Bluetooth devices [9]. The data send and received at a time is equal to 720 Kilo bytes per second.

The Wi-Fi was invented by NCR corporation/AT&T in Netherlands in 1991. By using this technology we can exchange the information between two or more devices. WiFi has been developed for mobile computing devices, such has laptops, but it is now extensively using for mobile applications and consumer electronics like televisions, DVD players and digital cameras [10]. Android is [19], [10] the most popular operating system in the smart phone. Google reprieves the code below theApache pennit which is exercised by Android OS for touch screen gadgets. Java language is exercised for creating android functionality [8]. Analog to digital adaption is an electronic course in which endlessly capricious wave is reformed, except amending its basic content, through a multilevel wave. The microcontroller exercised in this scheme is ATmega32 is an 8-bit exalted achievement micro controller of Atmel's Mega A VR clan. Atmega32 is bottomed on reformed RISC (Reduced Instruction Set Computing) framework with 131 vigorous commands. Lots of the commands perform in single machine iteration. Atmega32 can function on a supreme frequency of 16MHz.ATmega32 has 32 KB programmable flash memory, static RAM of 2 KB and EEPROM of I KB. The perseverance iteration of flash memory and EEPROM is 10,000 and 100,000, respectively. It has32 Programmable I/O Lines and intrinsically 8 channel 10 bit ADC. C. Internet Layer This layer establish the connections between the network layer and service layer. D. Service Layer In this layer the direct the data came from the internet is directly access by the doctors/nurse, emergency team, ambulance and government agency. According to this information the above professionals may effortlessly supervise the cases, outlook prescription details, and furnish central assist in the event of necessity. Network stratum assist various protocols and proficiencies for accessing web utility for carrying information to the devices.

IV CONCLUSION:

Though, the present electronics health systems do not use mobile phones, tablets or PC to transmit essential data related to the patients' health. In this proposed system we propose the information of a patient's health to the medical professionals via smart phones using loT. This approach will virtuously supervise the anatomical arguments of the cases and any variations in the pre-set parameters will trigger alerts been send to the medical professional. Therefore this electronics healthcare has the capability of worldwide acceptance. Also the proposed approach may accumulate facts of patient and it can reclaim by more interested party in coming year.

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