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DEVELOPMENT OF SMART HEALTHCARE MONITORING SYSTEM IN IOT ENVIRONMENT

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Abstract: :- Healthcare monitoring system in hospitals and many other health centers has experienced significant growth, and portable healthcare monitoring systems with emerging technologies are becoming of great concern to many countries worldwide nowadays. This paper proposes a smart healthcare system in IOT environment that can monitor a patient's basic health signs as well as the room condition where the patients are now in real-time. In this system, sensors are used to capture the data from hospital environment named heart beat sensor, body temperature sensor, room temperature sensor, CO sensor, and CO_2 sensor, blood pressure etc. In the traditional approach the healthcare professionals play the major role. They need to visit the patient's ward for necessary diagnosis and advising. There are two basic problems associated with this approach. Firstly, the healthcare professionals must be present on site of the patient all the time and secondly, the patient remains admitted in a hospital, bedside biomedical instruments, for a period of time. In order to solve these two problems, the patients are given knowledge and information about disease diagnosis and prevention. Secondly, a reliable and readily available patient monitoring system (PMS) is required.
 The main objectives of this system is to transmitting the patient's health monitoring parameters through wireless communication This paper uses Arduino Board as an IOT device that interfaces five sensors and read the patient health parameters. These health parameters will be sent to cloud. Doctor and caretaker can access these values from cloud.Proposed outcome of the project is to give proper and efficient medical services to patients by connecting , collecting , recording ,analysing and sharing data information through health status monitors which we include patient's heart rate, blood pressure, body temperature, room temperature and send an emergency alert to patient's doctor with his current status and full medical information.

Index Terms - - **IOT, Internet, Arduino, Sensors**

I. INTRODUCTION

Tracking of human body parameters has attracted significant interest in recent years due to its wide-ranging applications such as rehabilitation, virtual reality, sports science, medical science, surveillance, in recent times, wireless sensors and sensor networks have become a great interest to research, scientific and technological community. Though sensor networks have been in place for more than a few decades now, the wireless domain has opened up a whole new application space of sensors. Wireless sensors and sensor networks are different from traditional wireless networks as well computer networks and, therefore, pose more challenges to solve such as limited energy, restricted life time, etc. The objective is to allow the person to be monitored in a natural environment. For monitoring outside the laboratory, a wearable system must not only display the parameters but also record the data; the proposed approach uses the wireless sensor network concept with all the sensor nodes communicated to the coordinator wirelessly using Wi-Fi network protocol. The coordinator acts as a router which makes connectivity between sensor nodes and end device via internet, end device may be computer or mobile. Each sensor node is may equipped with accelerometer, temperature sensor, pulse oximeter SpO2 & heart-rate sensor and galvanic skin response sensor. The sensor nodes are attached to the human body and operate completely untethered. They are powered by battery. The small form factor and lightweight feature of the sensor nodes allow easy attachment to the body.

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II. LITERATURE REVIEW

during this section we have a tendency to area unit discussing concerning the Literature Review and a couple of connected work finished this project earlier.

1] Alok Kulkarni, Sampada Sathe (2014), care is associate rising patient-centric model of health data exchange, that is typically outsourced to be keep at a third party, like cloud suppliers. However, there area unit wide privacy considerations as personal health data could be exposed to those third party server and to unauthorized parties. To assure the patients' management over access to their own care s, it is a promising methodology to code the care s before outsourcing. Yet, problems like risks of privacy exposure, quantifiability in key management, versatile access and economical user revocation, have remained the foremost necessary challenges toward achieving fine-grained, cryptographically enforced information access management.

2] Mir Sajjad, Hussain Talpur (2015), currently a days there is want of a completely distinctive patient-centric framework and a gaggle of mechanisms for information access management to care s keep in semi-trusted servers. Different from previous works in secure information outsourcing, it focuses on the multiple information owner situation, and divide the users among the care system into multiple security domains that greatly reduces the key management complexness for house owners and users. A high degree of patient privacy is secured at the same time by exploiting multi-authority ABE.

3] K.Natarajan, B. Prasath, P. Kokila (2016), This theme conjointly allows dynamic modification of access policies or file attributes, supports economical on-demand user/attribute revocation and break-glass access below emergency eventualities. Extensive analytical and experimental results areaunit conferred that show the protection , quantifiability and potency of our planned theme.

4] Gaurav Sharma, Mehmet Aktas, Gonzalo Mateos, Burak Kantarci, Silvana Andreescu (2015), A project is initiated to subsume an honest spectrum of security problems among care by the european AIM/SEISMED Medicine/Secure surroundings for data Systems in medicine. A report on personal health records (HealthCare) was revealed, aiming at developing care s and care systems to place forward a vision that "would produce a private health record that patients, doctors and different health care suppliers might firmly access through the net in spite of wherever a patient is seeking treatment ."

5] M. Kozlovszky , Bartalis L , B. Jókai , J. Ferenczi , P. Bogdanov , Zs. Meixner , L Németh , K. Karóczka The aging population of industrial countries grows and this will increase conjointly among different things the health care prices. Transparently embedded remote health care will become a cost effective paradigm, which can solve most of the problems primarily centralized Health Care system's Currently, there is associate oversize variety of facultative technologies to measure the patient's physiological signals remotely.

6] With hand-held and laptop devices used as information acquisition (DAQ) systems we have a tendency to area unit able to collect very important data concerning the (elderly and demented) patients remotely.

7] Due to the assorted – in most cases proprietary and incompatible- sensing element technologies and solutions, it is a robust task to create generic, user friendly DAQ systems. There area unit already remote patient observance solutions accessible just like the golem based mostly My Fitness Companion , that is in an exceedingly position to support the next medical aid fields: Fitness, Diabetes, Asthma, Obesity, high blood pressure, CHD, or the I Care that provides medical steering, emergency alarm practicality and collects personal health data. different example is that the Microsoft Health Vault, that supports care of older persons (e.g.: neurodegenerative diseases, stroke etc.), in addition it provides on-line internet interface to manage (process health data.)

III. PROPOSED SYSTEM

The proposed system consists using Arduino microcontroller with Wireless Body Area Sensor Network. The sensors are used here Temperature sensor, Blood pressure sensor, Heart beat sensor. These sensors are placed on human body which are helps to monitor the health condition without disturbing the daily routine of the patients and these health related parameters are then communicated to physicians server using long range wireless technology.

The brief working of the above is explained with the assistance of some details as follows:
1) Start the Hardware, then sensor senses the physical parameter.
2) This physical parameter or Non-electrical get Converted into Electrical form.
3) After that, That Electrical data send Towards the Micro-controller then which will analyze.
4) And transmitted towards server or PC/ mobile and saved as files.
   Check the condition, if everything o.k. the message won't send otherwise data will transmit towards Doctor and/or loved one.

IV. Sensor used

1) Temperature Sensor : Temperature sensors enable accurate non-contact temperature measurement in medical applications. The most common applications for this type of temperature sensor is measuring human body temperature.
2) SPO2 Sensor : This sensor can be used for to estimate the oxygen saturation level in the blood.

3) Heart Pulse Rate Sensor : The heart sensor measure the pulse wave, which are changes in the volume of a blood vessel that occur when the heart pumps blood.
4) Posture Sensor : Posture sensor is used to sense the human body posture , means whether it is horizontal position or vertical position.

V. Hardware used

The Arduino Nano, as the name suggests is a compact, complete and bread-board friendly microcontroller board. Arduino Nano V3.0 Board is used in this project.
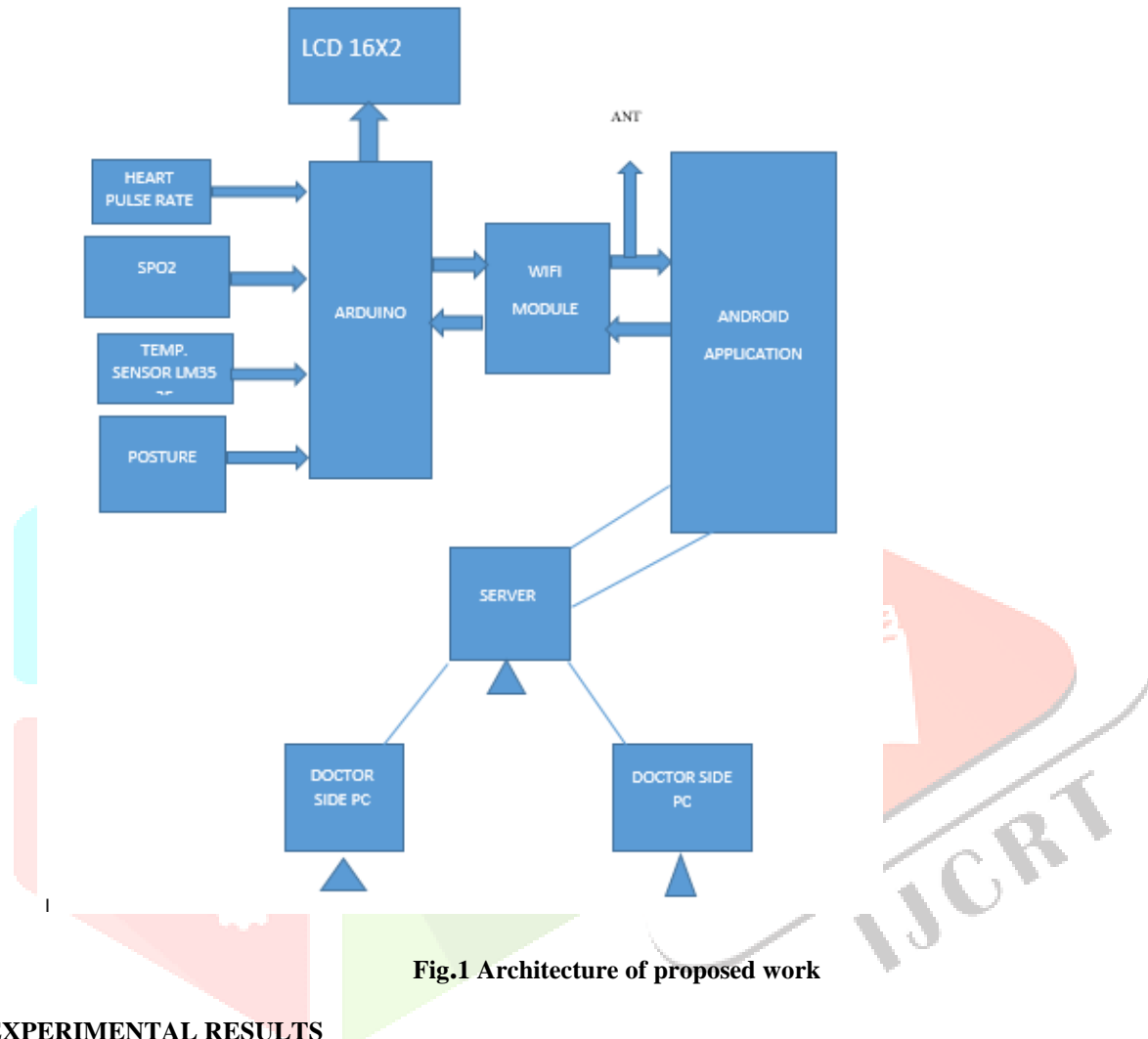

Fig.1 Architecture of proposed work

VI . EXPERIMENTAL RESULTS

 Now finally it is time to see our project result from sensor nodes that are ESP8266Sensor Node1 and ESP8266Sensor Node2, monitoring of human body parameters such as Temperature, Hart rate, Blood Oxygen level, Skin Resistance and Body posture. Here are the different screen shots of result which displays body parameters in the form of text values and graphical format.

Above Screenshots shows the test results which are obtained from the five various sensors for the five vital biomedical parameters of the human body of person.

VII. FUTURE SCOPE

In our Project "IOT Based smart heath care kit" the hardware part of system design is the sensor node which include digital & analog sensors, arduino nano board and node McU Wi-Fi modules, it is an important aspect of the design was miniaturization, so that the system was as nonintrusive as possible to the wearer. This was achieved by the use of wearable sensors module and nano boards with ultra low power operating devices which increases battery life for wearable sensor node. With some modification, the system can be made available commercially. Future improvements will focus on the use of embedded board which include microcontroller with Wi-Fi device on a single board instead of Arduino nano and nodeMcU boards. Again addition of more wearable sensors such as ECG, EEG, EMG, pressure, airflow in the system which improves the performance of the system. Depending on the applications such as sports, medical, physical exercise where system going to be used a provision of selection of sensors can be made, would allow the system to be more advance and more comfortable for the wearer.

VIII. CONCLUSION

The main idea of the proposed system is to supply better and efficient health services to the patients by implementing a networked information cloud in order that the experts and doctors could make use of this data and provide a fast and an efficient solution. The final model will be well equipped with the features where doctor can examine his patient from anywhere and anytime.

Emergency scenario to send an emergency mail or message to the doctor with patient's current status and full medical information also can be worked on.

ACKNOWLEDGMENT

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