Overview study of IoT Healthcare Models

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ABSTRACT: In today's world the use of internet has been spread in every sector of the life.People in India have now turned to buying almost everything ranging from books, lifestyle accessories,electronic equipment, beauty products and even household items from the online mobile application.But the use of internet in the health sector haven't seen much improvement.This paper brings to light the use of IoT in healthcare and compares different architectures available in the market.These models help to improve the efficiency and decision making in hospitals.

KEYWORDS: Internet of Things(IOT),Arduino,ESP8266,Pulserate,Healthcare.

I. INTRODUCTION

Internet of Things (IoT) is the application of networking of physical devices and embedded systems along with the help of sensors and actuators which communicates to share knowledge and helps in attaining precision in various domains. Internet of things has flourished in many domains . IoT in healthcare is one of the most trending domains of today's

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generation. It has had a great impact on the medical discipline. It is basically integration of various sensors along with microcontroller like the Arduino(many versions are available), ESP8266 and so on. It plays a vital role in providing assistance to doctors in decision making in the case of emergency. It will also improvise the traditional measures taken to observe heart beat, pulse, blood pressure , motion and similar related parameters.

II. LITERATURE SURVEY

Healthcare is rapidly adapting to the use of IoT. Various models have been proposed to enhance the healthcare domain. Also the advancement in Cloud computing have greatly benefited IoT.
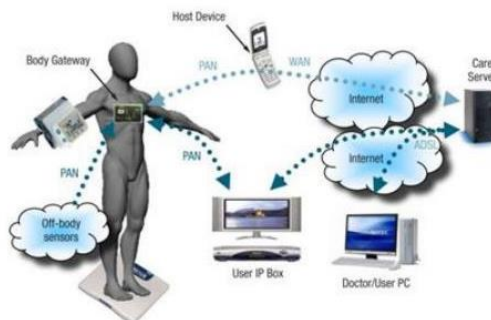

Fig 1.
Basic working of IoT in healthcare [1]

The above figure depicts the basic working of IoT in healthcare. The patient being monitored has the different sensors attached which read the parameters.This data which is read with the help of the sensors is sent through internet to the server for storage of the data.Doctor/User can access this server to analyses the data and take decisions as needed.
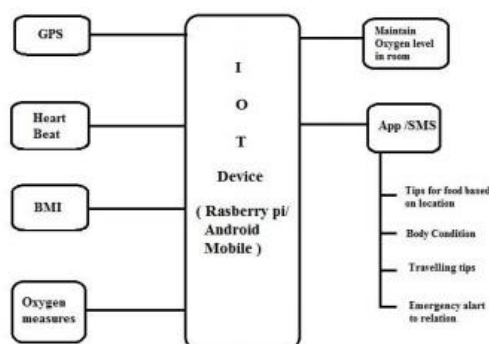

Fig. 2
IoT model with sensors [2]

Sensors are used for monitoring different parameters.The parameters that can be measured are heart beat, BMI, oxygen measures, body temperature,etc. Application can also be provided to help the patients and doctors to provide tips and body condition.Using the IoT device such as arduino or raspberry pi we can collect the sensor data and analysis can be done based on certain predefined conditions.Thus alerts and notifications can also be sent to the respective users on their smartphones.

Fig. 3
The confluence brought about by the IoT [3]

The above diagram shows how Arduino is connected to various sectors of the world. How IoT cloud takes up the data from various sectors and stores it and will update it at regular intervals of time as per the requirement of the field.
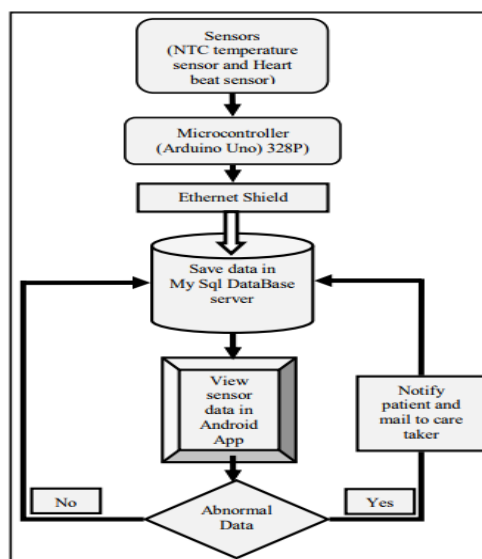

Fig. 4
Flowchart of the process [3]

In flowchart sensors are at apex. Sensors include NTC temperature sensor and heart beat sensor. These sensors will be connected to a microcontroller like the Arduino. Ethernet shield is used to protect entire setup from vulnerabilities. The data obtained from the Arduino with the help of sensors will be saved in the Sql database server. The data will then be accessed from the application developed. Notifications will be given to the patient.
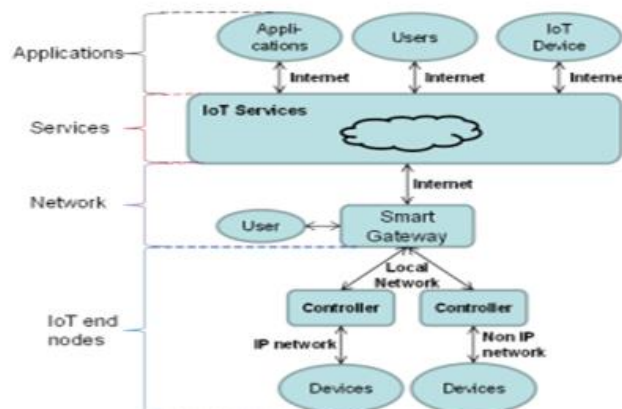
Fig. 5
Cloud Storage for IoT [4]

In the above proposed model there are four layers specified. The first layer is the IoT and nodes. This layer has devices which are the various sensors. These sensors are connected to the microcontroller through the IP Network. The controller will then be connected to the smart gateway through the local network. The second layer is the network consists of the smart gateway. The user will access the data through this gateway. The third layer will provide IoT services through the internet to the smart gateway. The last layer is the application layer. Here there will be applications, users , and IoT devices connected to the third layer via internet.
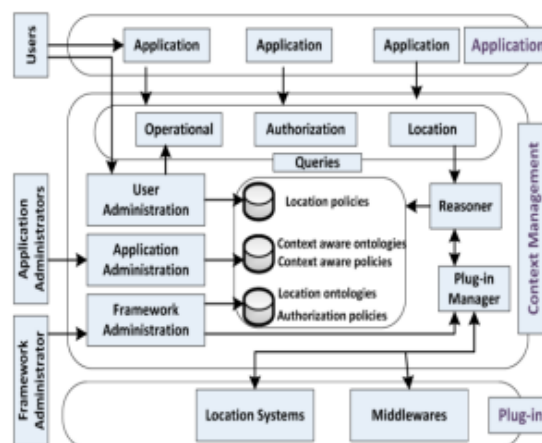

Fig. 6
Logical Structure of Healthcare [4]

The logical structure above explains how the the users are connected to the IoT healthcare systems through application.The system provides authorization of the user and gains the location of the user to alert the doctor/guardian in case of emergency.Queries are created and executed to store the data coming from the sensors. Administration of the system is done by the Application Administration and Framework Administration.

III. COMPARISON OF ALL MODELS

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Sr no.	Parameters	IoT model with Sensors	The confluence brought by IoT	Flowchart of Process	Cloud Storage of IoT
1	Role of Model	Sensors are used for monitoring different parameters.	It shows how Arduino is connected to various sectors of the world.	In flowchart sensors are at apex which include NTC temperature sensor and heart beat sensor.	In the proposed model there are four layers specified.
2	Features of First Layer	Using the IoT device such as arduino or raspberry pi we can collect the sensor data	IoT cloud takes up the data from various sectors.as per the requirement of the field.	Sensors connected to arduino. Ethernet shield is used as protection.	The first layer is the IoT and nodes.
3	Features of Second Layer	The parameters that can be measured are heartbeat, BMI, oxygen measures, body temperature,etc.	Storage and update at regular intervals of time as per the requirement of the field.	The data obtained from the Arduino with the help of sensors will be saved in the Sql database server.	The second layer is the network consists of the smart gateway.
4	Final Layer	Alerts and notifications can also be sent to the respective users on their smartphones.	Retrieval as per the demand of the user.	The data will then be accessed from the application developed.	The third layer will provide IoT services through the internet to the smart gateway. The last layer is the application layer.

IV. CONCLUSION

Sensors play a vital role in healthcare domain. These sensors include temperature sensor , motion sensor ,blood pressure sensor and so on . These sensors are integrated to the arduino microcontroller. The data is collected in a cloud storage or a sql database server .The data will be updated at regular intervals of time as per the guidance of the doctor .The patient can view the data on the dashboard , display monitor as per the implementation requirements. So keeping the track of all the details becomes easy ,compact and efficient .IOT in healthcare will enhance the healthcare domain .It will provide assistance to doctors in case of emergencies as well as help the hospitals to take better care of the patients.

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