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Real Time Health Guard Monitoring System for Oldster

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ABSTRACT: Time to time health watching is incredibly essential due to these issues. A contemporary thought is health watching of a patient wirelessly. It's a significant development in medical arena. Thus paper supports the live monitoring of the patient that's done by the doctor unceasingly while not really visiting the patient. Health professionals have developed a superb and cheap health watching system for providing more well-off living to the patients stricken by varied diseases. Leading technologies like wireless communications, wearable and portable remote health monitoring device decreases the visits of doctors to the patients constantly as the information regarding patient's health directly reaches to doctor's monitor screen from anywhere the patient resides. Doctors will save several lives by conveyance them a fast & valuable service. In this, Internet-Of-Things is changing into a significant platform for several services & applications. Raspberry Pi not even as a sensing element node however conjointly a controller here. Paper proposes a generic health watching system as a revolution to the progress created in this department.

KEYWORDS: Raspberry Pi, Internet-Of-Things, Health Condition, Temperature and wetness sensing element, accelerometer& biometric pressure sensing element

I.INTRODUCTION

Proper application of wireless technology has the potential to extend effectiveness, decrease prices, and customarily improve the standard of tending. Wireless sensor devices ought to be designed and created in an exceedingly manner that ensures that the device won't compromise the clinical condition or safety of a patient, or the security and health of the user or the other person, once the device is employed on a patient conjointly any risks related to the employment of the device ought to be acceptable risks once weighed against the meant profit to the patient and compatible with a high level of protection of health and safety. The key sanctioning issue of IoT is in medical and health care [3][7] [13]. IoT devices area unit want to collect, monitor, assess and send word the patient with the data [1][5][6]. in keeping with Borgia, the penetration of IoT devices in medical and health care includes Remote observance medical parameters, medical specialty, Medical instrumentation trailing, Secure and access the indoor surroundings, good hospital services & diversion services. The remote observance of a patient by the doctor remains a difficult task. To analyse the health condition of the patient, numerous medical parameters area unit required regarding the patient. Grouping the parameters and human action them to the doctor through the correct networking channel is another difficult task. Fig: 1 shows different applications of IOT.

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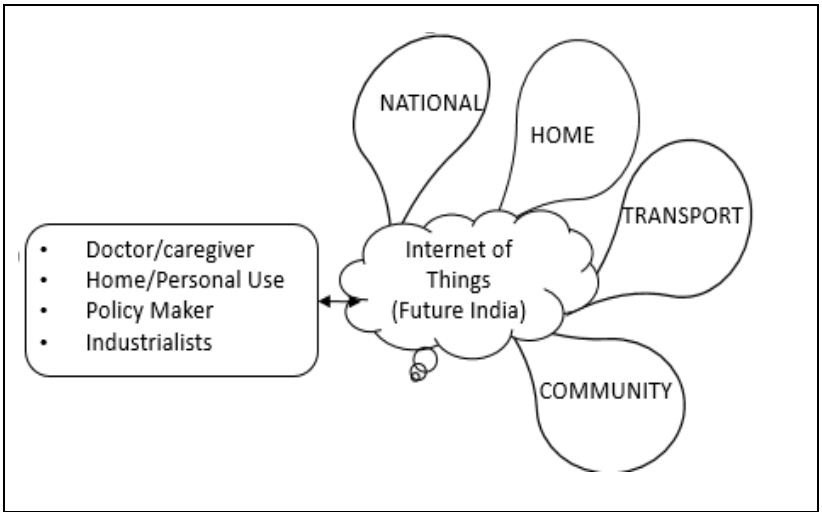

Fig:1 Internet of things

Healthcare employees have faith in a continuing flow of knowledge so as to manage their patients effectively [4]. In past, this data was delivered to every ward through one pc station, that is cumbersome, long, and takes valuable time off from observance and caring for patients. period access to patient charts, laboratory results, and medical histories will be created out there through wireless devices at the side [2] There are edges in reducing work and gratuitous human traffic. Less time is needed inputting notes and longer out there to pay with patients. Connecting patients to monitors and monitors to native space networks needs an outsized range of cables. This wiring is mostly inconvenient and notably difficult if a patient must be mobile or a patient is stationary however the layout of kit (operating table, anaesthesia instrumentation and monitors) is rearranged [8].

II. LITERATURE REVIEW

Mohammad et al. [11] have proposed a system for Web based health monitoring of patient remotely by doctor. Health sensors such as heart beat, body temperature etc. were interfaced with Arduino microcontroller board for further processing to measure various health parameters. ZigBee was used for communication between Arduino & raspberry pi.

Saha et al. [12] proposed health system that monitors vital health parameters. Data is transmitted via WI-FI module through network. Data can be accessed anytime to get information about current health status of patient in case of any abnormality alert are sent via buzzer. Arduino Board, WIFI module esp8266 &temperature sensor were used. Cloud computing password protected Wi-Fi module handled authentication & security of patient details.

ArunaDevi.S et al. [13] proposed an efficient Patient Health monitoring system to monitor status of the patient irrespective of the presence of the doctor. The system collects information like temperature, blood pressure and pulse rate of the patient and updates the same to the doctor. 8051 microcontroller was used here.

III. PROPOSED SOLUTION AND DISCUSSION

In this paper we have proposedprototype for live monitoring of the patient that's done by the doctor unceasingly while not really visiting the patient. Traditionally it is very difficult for the oldster / patient to physically visit the hospital and get their check-up done. The proposed system overcomes drawbacks such as time &cost for health check-up. Thus cost effective & easy accessible system is being developed. So, Medical practitioner/caretaker can check the health data on real time basis from anywhere using cloud computing [14].

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The system is designed using raspberry pi & different health sensor such as **DHT11, ADXL345, and BMP180** for measuring different parameters related to health. IOT Platform is being using so that data can available online to doctors as well as caregiver [6]. Data flow diagram is shown in fig: 2. In this sensor node Pi Board is interfaced with various healthsensors and code written in python for reception of data from various sensors. It is incorporated as one of the part of sensor node. Data was transmitted to Master node through in built Wi-Fi (IEEE 802.11) in raspberry piand successfully stored in database of master node. With the help of cloud computing data was transmitted to Thingspeak for online monitoring.

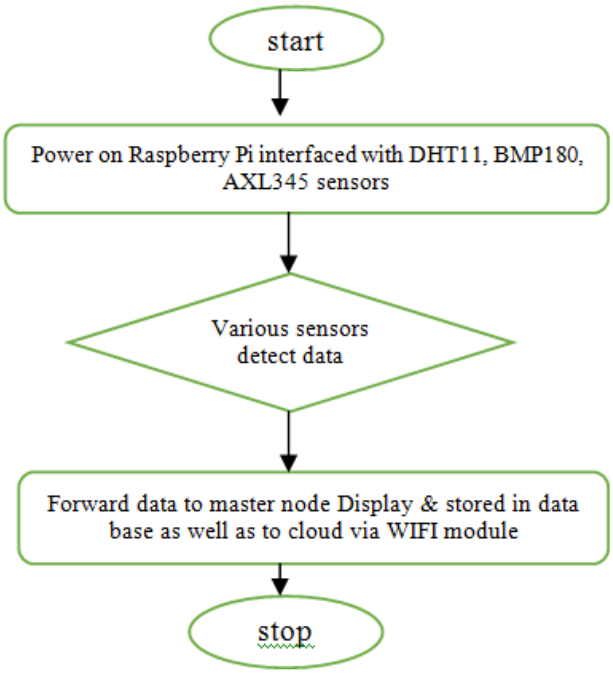

Fig2**:** -Data Flow diagram

IV.HARDWARE RESOURCES

Raspberry Pi low cost credit-card-sized laptop is used here. It is a capable little device that enables people of all ages to explore computing. It's offered anyplace within the world, and may operate as a correct microcomputer or be accustomed build good devices. The "Pi" derives from the first plan to form a little laptop to run solely the Python programming language. It's good for application wherever we want a laptop however don't need abundant process power, need to save lots of on house, and keep the prices low. Fig.3 shows the Raspberry Pi board used [9].

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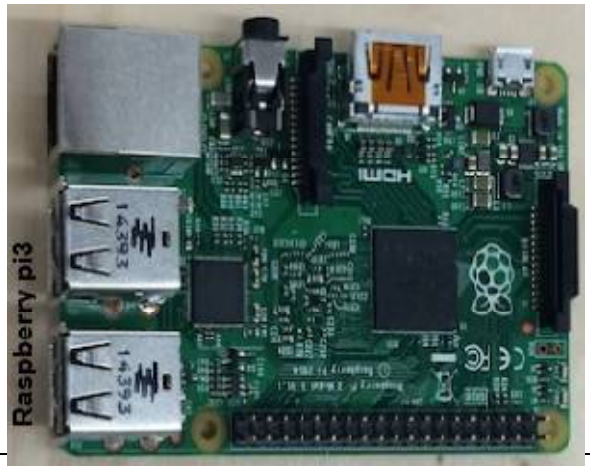
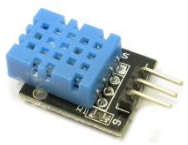


Fig.3 Raspberry Pi

Various Sensor devices used here can be seen in fig: 4. The **DHT11** may be a low-priced temperature and wetness device. It isn't the quickest device around however its low-cost value makes it helpful for experimenting or comes wherever you don't need new readings multiple times a second. The device solely needs 3 connections to the Pi. +3.3v, ground and one GPIO pin. It's straightforward to use with raspberry pi. **ADXL345** is additionally a triple axis measuring device however with a touch of various specifications. it's free fall detection likewise as double/single faucet detection in it. It uses I2C protocol for communication. **BMP180** used to measure biometric Pressure at high altitude. Featuring many properties such a system may become IOT based so that patient health can be known by doctor sitting at different geographical location.



DHT11

ADXL345

BMP180

Fig: -4 Sensor Devices

Communication Module:

Wi-Fi Network Structure (for communication the Wi-Fi network of Raspberry pi has been employed. Table 1shows the summary of Networking Protocol used:

Table 1

	Max. Nodes per Master	Peak Current Consumption	Range	Data Rate	Topology	Relative Cost
Wi-fi:IEEE 802.11b	32	-100mA	100m	54 Mb/s	Star	Medium

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For the gateway, a Raspberry Pi single board computer has been used. The operating system used is a low cost, low power Linux-based system that, in this case is Raspian. A Python script has been developed to send and receive data to the Raspberry Pi [9]. fig 5 shows the architecture layout.

V.ARCHITECTURE LAYOUT

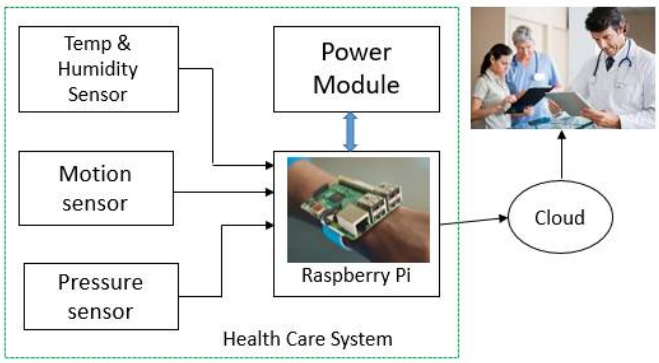

Fig-5Health care system layout

VI. HARDWARE IMPLEMENTATION & METHODOLOGY USED

Fig6. Shows the interfacing of sensors to the Raspberry Pi. The GPIO pins of the pi are connected to the sensors. various sensors were interfaced with pi board and coding was done in Python for communicating with various sensor &Arm processor.

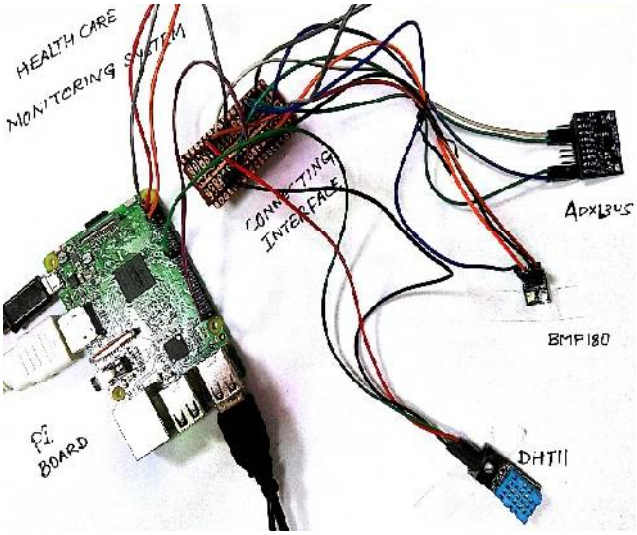

Fig 6. Interfacing of Raspberry pi board to the sensors

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VII. EXPERIMENTAL RESULTS

The various sensor readings of accelerometer, humidity, temperature and Barometric sensor are as shown in the Fig.7 & 8below:

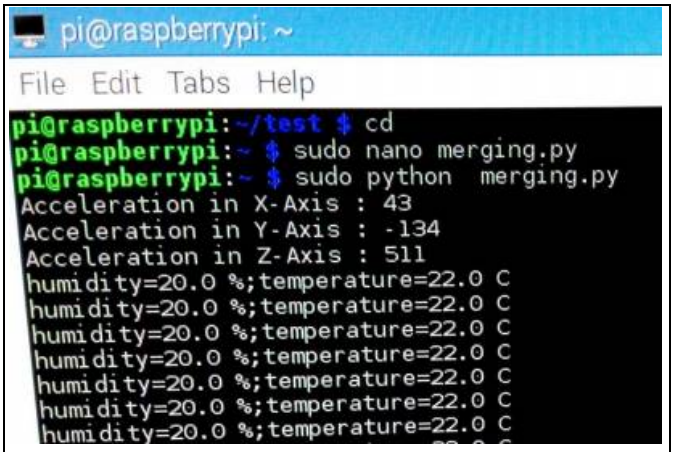

Fig. 7 Readings from DHT11, ADXL345

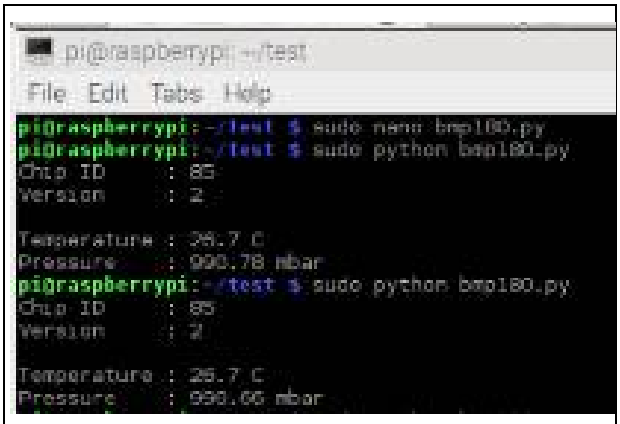

Fig.8 Readings from BMP 180

Master Slave Configuration: - Our Sensor Node-6 was one of the Heterogeneous Slave node for data transmission to Master Node as shown in Fig 9 & 10. Fig: 11 shows 3D packaging.

Fig 9:- Heterogeneous Node-6

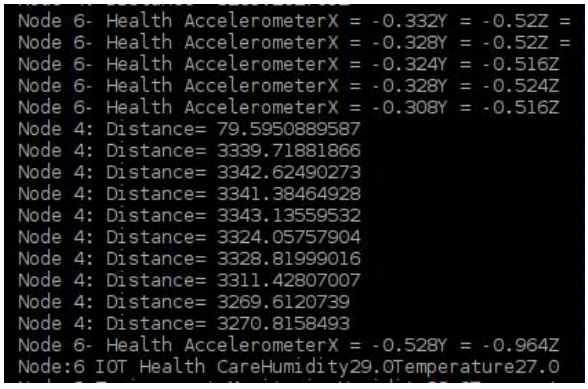

Fig 10:- Master Node

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Fig 11:- 3D Packaging

Data to Cloud

Thing Speak Server was used here to send data to cloud. We have used local Wi-Fi of Raspberry Pi board for communication to cloud server. ThingSpeak is associate open supply web of Things (IoT) application and API to store and retrieve information from thing using the HTTP protocol over the web or via a neighborhood space Network [10]. ThingSpeak permits the creation of sensing element work applications, location pursuit applications, and a social network of things with standing updates. Simultaneously real time data was received for all the sensors to thing speak. Graph of various Sensors shown in fig 12

Fig 12. IOT enabled Sensors displaying data in the fields created

VIII. CONCLUSION&FUTURE

This was a prototype version for IOT Health Guard System for Oldster. We have successfully received data from various health sensor devices and sent over the cloud via thing speak. Doctor can remotely monitor the patient details and easily prescribed as per data. Major goal was to give medical facilities for old aged person sitting at home. The device will help Doctor to know about patient who can't come to hospital by itself. This is a very low cost solution. In

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this project device was not standalone. It was prototype model realized & hardware was tested in lab and satisfactory results were obtained. Medically proven wearable body sensor standalone devise has to be made so that regular updates of patient can reach to Medical practitioner.

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