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Smart Health Monitoring Using IOT

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ABSTRACT: An imperative piece of our life, web has empowered numerous machines and gadgets we use in regular daily existence to be observed and controlled remotely through Internet of Things(IOT) innovation.IOT was first proposed by Kevin Ashton in 1999. It is a correspondence arrange in whichphysical items are interconnected with one another or with bigger frameworks. This system gathers billions of information from the distinctive gadgets and changes them into usabledata. Web of things as effectively discovered use in zones, for example, brilliant leaving, keen agribusiness checking, water use the board, crash maintaining a strategic distance from vehicles, etc. IOT innovation has pulled in much consideration as of late for its capability toease the strain on medicinal services frameworks brought about by a maturing occupants and an ascent in constant sickness.The wellbeing checking frameworks are picking up their importance as the Fast-developing all-**i**nclusive old occupants expand requests for caretaking. Savvy wellbeing checking framework manages persistent observing wellbeing states of a matured individual who can't deal with himself. In such a significant number of cases patients discharged from the healing centre'still they are unequivocally encouraged to be under rest and in perception for some period time, in such cases this proposed framework is especially useful. Difficulties that we looked in human services IOT framework incorporates android application for breaking down continuous information through visual portrayal, combination of GSM module for two-way correspondence, security, wearable sensors, precision on taking the readings from the sensors and low power task.In this way, we have proposed a standard model for application in future IOT medicinal services frameworks.

KEYWORDS: AES Algorithm for securing the data, wearable sensors- DHT11, Pulse sensor, touch sensor, vibration sensor, GPS, power supply, wi-fi, SMS application, web page.

I. INTRODUCTION

In past decades there were less innovations created, there was no English drugs. Individuals would live for over 100 years, however now human life expectancy has decreased to 60 years because of current life. Henceforth there is a requirement for wellbeing checking framework. In this way, our primary point is to deal with an individual without wasting time. As there is a development in advancements and expanded number of medical issues, we have taken an activity to lessen these issues by utilizing rising innovations. The past declaration contains just portable registering gadgets which stores PC executable guidelines and a processor that executes PC executable directions. The distinctive attributes of internet of things in the medicinal services framework is consistent observing of the patient through checking different parameters like estimating pulse, blood rate, temperature and furthermore better outcomes from the historical backdrop of steady checking. Numerous gadgets may be available in doctor's facilities particularly in ICU's. There could be couple of circumstances where the specialist probably won't be cautioned in time when there is crisis, in spite of 24 hours of checking. Additionally, there may be botch in sharing the information or data to the master specialist and concerned relatives and relatives. The innovation that updates these highlights is as of now accessible yet isn't reasonable by a large portion of the general population in creating nations, for example, India. Consequently, the answer for these issues is the augmentation to the present gadgets which don't have these facilities.
The core meaning of the IOT is very simple, the cluster of devices connected to the internet that can interact with each other and various applications .it is the future of the internet with a wide global network infrastructure where physical

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and virtual things are connected to each other through internet. With vast development in wireless technology, IOT is gaining lot of attention.

The proposed framework exhibits Remote Health Monitoring System controlled by raspberry pi. Raspberry pi is a little card measure single board microcontroller. Raspberry pi utilizes ARM processor which is likewise utilized by most current cell phones. In the proposed paper a framework is intended to ceaselessly screen the required parameters, for example, pulse, circulatory strain, body temperature and sweat. This data is stored on the cloud server and which will be stored in the web application for continuous monitoring. The thought may not be new one but rather we propose a precise and modest technique for the framework utilizing Raspberry pi. The principle target of this framework is to constantly refresh the information on the web and send a ready content back rub to the advisor specialist and in addition to the guardian if there is any crisis. In this proposed framework there is execution of GPRS module to follow the patient's area.

The main aim of developing the system can be summarized below:

- To obtain real time information about the patient through IOT.
- To provide IOT based healthcare solutions anytime and anywhere.
- To keep the data secured.
- To store and display history of patient’s data.

II. RELATED WORK

[1] Smart Mobile Health Monitoring System and Related Methods:In one perspective, the paper presented in 2014 presents exposure incorporates portable processing gadget. The versatile registering gadget incorporates a memory that stores PC executable guidelines and a processor that executes the PC executable guidelines. The execution of the PC executable guidelines empowers the versatile registering gadget to get biometric information recognized by a sensor coupled to a body of a patient; process the biometric information to screen a wellbeing status of the patient; In another angle, the present exposure incorporates a framework for brilliant portable wellbeing checking that incorporates a sensor and a versatile registering gadget. The sensor is coupled to a patient and arranged to distinguish biometric information related with the patient. The portable figuring gadget incorporates a memory that stores PC executable directions and a processor that executes the PC executable directions. The execution of the PC executable directions permits the versatile registering gadget to get the biometric information from the sensor; process the biometric information to screen and analyse a medicinal state of the patient, or analyse an infection of the patient; and give remedial input identified with the wellbeing status and no less than one of an movement of the patient and a body position of the patient.[2] IOT Based Health Monitoring System Using Android App: The past work done in 2015 includes ProsantaGope et al.clarified in the paper "BSN-Care: A Secure IoT-based Modern Healthcare System Using Body Sensor Network" about the Body Sensor Network progressions as one of the middle advances of IoT upgrades in therapeutic administrations structure. In this system a patient can be watched using a social affair of unassuming powered and lightweight remote sensor hubs. [3] Ubiquitous Monitoring Environment for Wearable and Implantable Sensors (UbiMon):A pervasive observing framework is displayed for persistent checking of patients under their normal physiological states. The framework gives the engineering to gathering, assembling and examining information from various biosensors. Especially, the idea of BSN hub is actualized which could frame the reason for remote shrewd modules for wearable and implantable sensors. Notwithstanding the physiological parameters, the setting mindfulness viewpoint is additionally incorporated into the framework to improve the catching of any clinical important scene.[4] Secured Smart Healthcare Monitoring System Based on Iot:Innovation assumes the real job in medicinal services for tangible gadgets as well as in correspondence, recording and show gadget. It is imperative to screen different medicinal parameters and post operational days. Subsequently the most recent pattern in Healthcare specialized strategy utilizing IOT is adjusted. Web of things fills in as an impetus for the human services and assumes unmistakable job in wide scope of social insurance applications. In this task the PIC18F46K22 microcontroller is utilized as a portal to impart to the different sensors, for example, temperature sensor and heartbeat oximeter sensor. The microcontroller gets the sensor information and sends it to the system through Wi-Fi and thus gives continuous checking of the human services parameters for specialists.

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III. PROPOSED ALGORITHM

AES Algorithm for Security:

Description of the Advanced Encryption Standard (AES):
Step 1:Encryption Process:
Here, we limit to depiction of an average round of AES encryption. Each round contain four sub-forms. The first round procedure is delineated beneath –

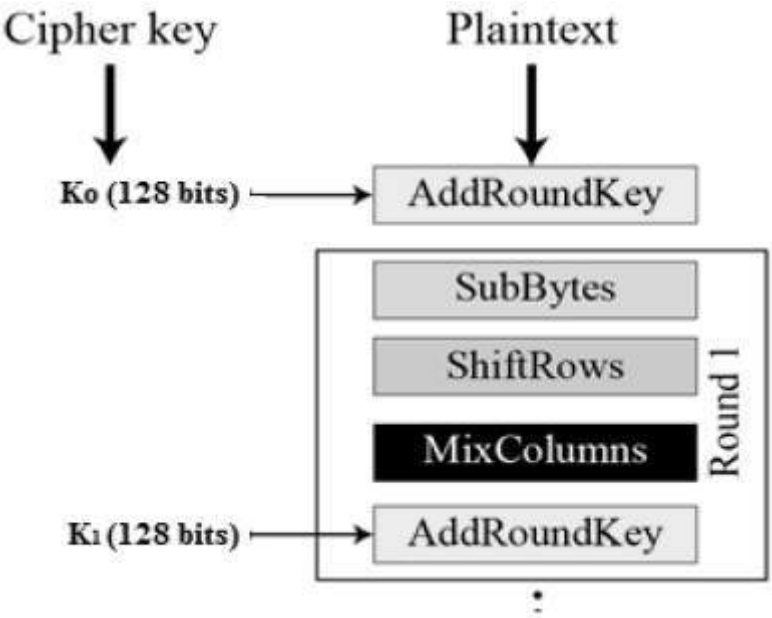

Fig.1. Steps of AES algorithm

- First Round Process
- Byte Substitution (Sub Bytes)

As shown in fig.1. The 16 input bytes are substituted by looking into a fixed table (S-box) given in structure. The outcome is in a grid of four lines and four segments.

- Shift rows

Every four lines of the grid is moved to one side. Any sections that 'tumble off' are re-embedded on the correct side of line. Move is done as pursues −
First line isn't moved.
Second column is moved one (byte) position to one side.
Third column is moved two positions to one side.
Fourth column is moved three positions to one side. The outcome is another grid comprising of a similar 16 bytes however moved as for one another.

- Mix Columns

Every segment of four bytes is currently changed utilizing an exceptional scientific capacity. This capacity takes as information the four bytes of one segment and yields four totally new bytes, which supplant the first section. The outcome is another new lattice comprising of 16 new bytes. It ought to be noticed that this progression isn't performed in the last round.

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- Add round key

The 16 bytes of the framework are currently considered as 128 bits and are XORed to the 128 bits of the round key. On the off chance that this is the last round, at that point the yield is the ciphertext. Something else, the subsequent 128 bits are translated as 16 bytes and we start another comparable round.

Step 2:Description Process:
The procedure of unscrambling of an AES ciphertext is like the encryption procedure in the switch request. Each round comprises of the four procedures led in the turn around request –Include

- round key
- Blend sections
- Move lines
- Byte substitution

Since sub-forms in each round are backward way, not at all like for a Feistel Cipher, the encryption and Description Process calculations should be independently executed, in spite of the fact that they are in all respects firmly related.

IV. PROPOSED METHODOLOGY

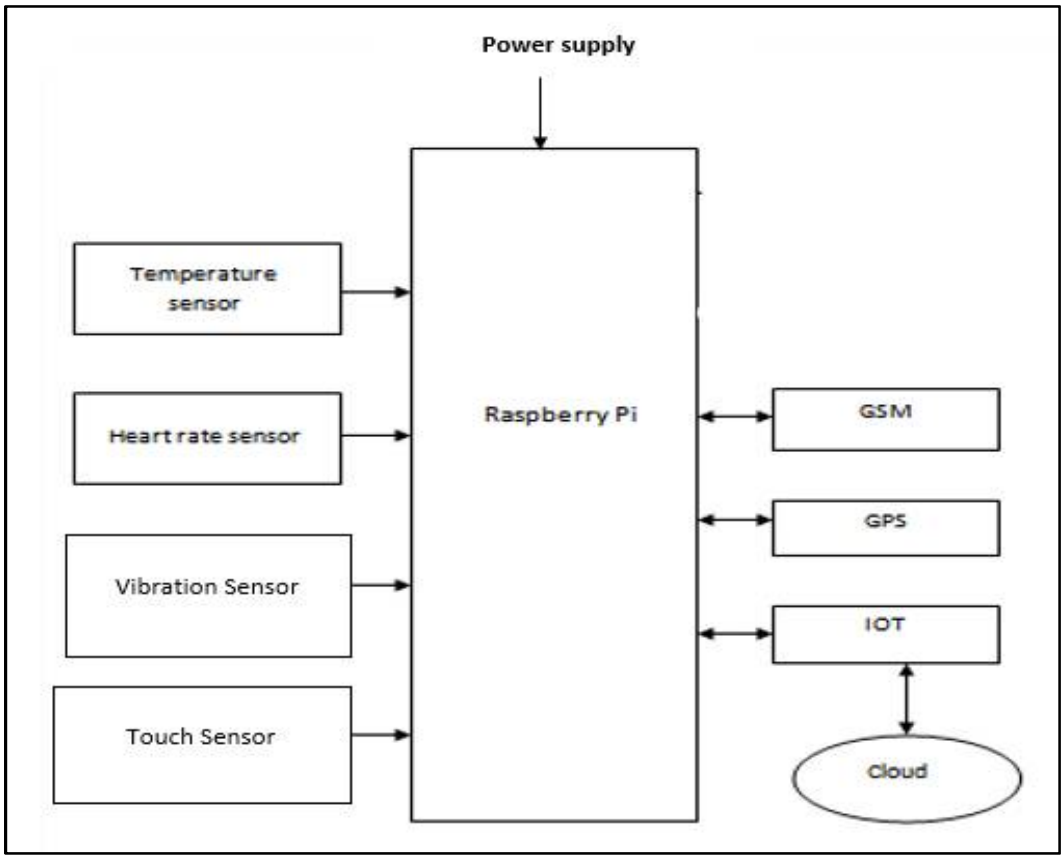

Fig.2. System Architecture

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In the proposed figure.2. we have temperature, Pulse rate, vibration sensors which are monitored using Raspberry Pi and Arduino board. These sensors signals are connected to the Arduino. Raspberry Pi is a Linux based operating system works as a small pc processor system. Here patients body temperature, pulse rate is measured using respective sensors and it can be monitored in the screen of computer using Raspberry Pi as well as monitoring through anywhere in the world using internet source. GPS is also connected with the Arduino to track the patient location by the doctor if any emergency. The proposed method of patient monitoring system monitors patient's health parameters using Raspberry Pi. After connecting internet to the Raspberry pi it acts as a server. Then the server automatically sends data to the website. The continuous monitoring of data is stored in the webpage. Using IP address anybody can monitor the patient's health status anywhere in the world using laptops, tablets and smart phones. If these parameters go abnormal it will automatically send alert SMS to the doctors and guardians through an SMS application.

V. SIMULATION RESULTS

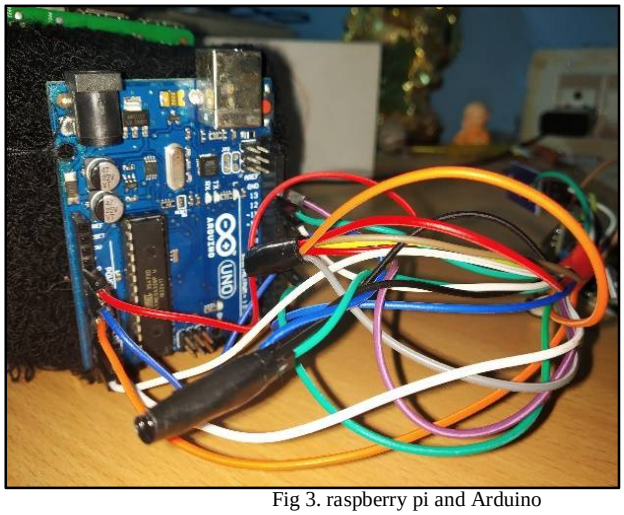

Fig 3. raspberry pi and Arduino Connected with sensors

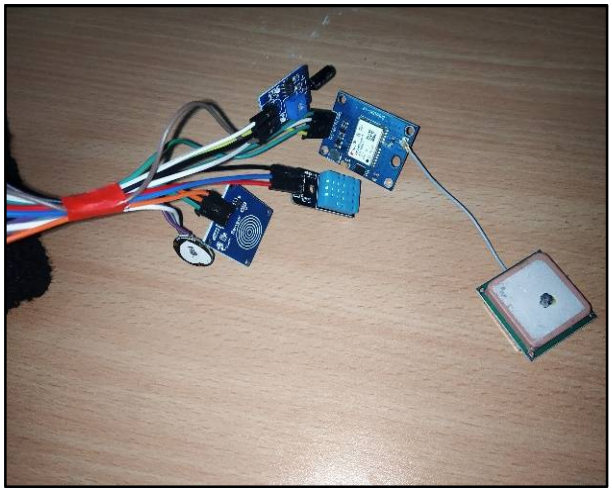

fig 4. Different types of sensors

From the fig.3. the Arduino Uno Board collects the analog signals from all the sensors and convert them into digital signals and send it to the raspberry pi.The Raspberry pi collects data and send to the server which intern sends the data to be stored in the cloud. The sensors that are used in fig.4. are as follows:

- DHT11
- Pulse sensor
- Vibration sensor
- GPS sensor
- Touch sensor

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Fig 5. Web page for storing data receiving

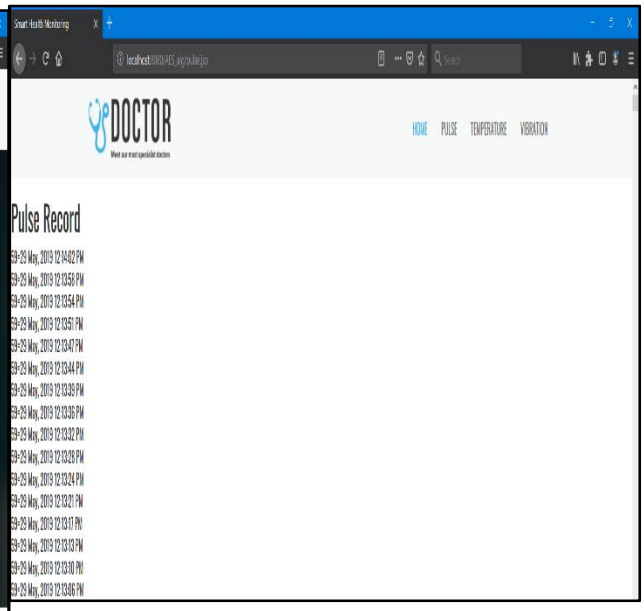

Fig 6. pulse data collected from the sensor from sensor

Figure 5. and 6. Tells about the web page for storing the continuous monitoring of the data. The pulse sensor, vibration sensor and the temperature sensor is used to check the patient's health continuously all the data will be displaying on the web page screen.

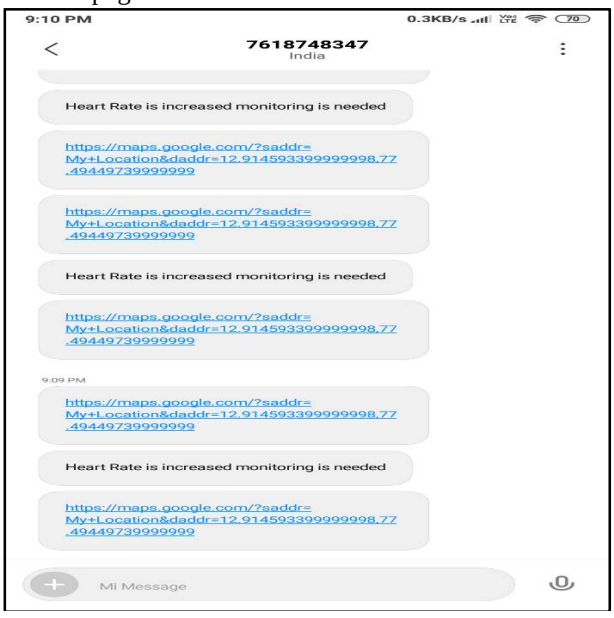

Fig.7. text msg and location sent to the Doctor and guardian

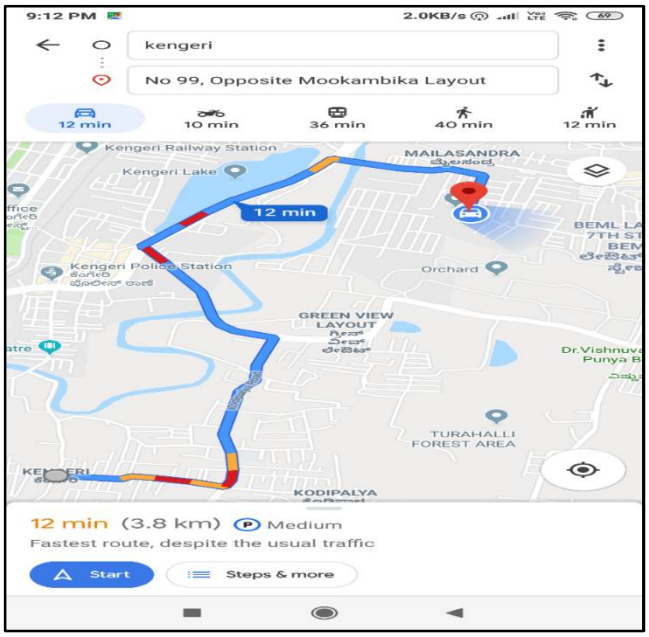

Fig.8. Displaying of the patient location if any emergency

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If the threshold limit is exceeded, a text message and location is sent to the doctor as shown in fig.7 and fig.8., so that he can arrive in time if any emergency.

VI. CONCLUSION AND FUTURE WORK

The Smart Health Monitoring System is developed mainly for the bed ridden persons who can't take care of themselves and need a guardian for all their needs. The Smart Health Monitoring is used for recording and continuous monitoring of the patient's health.

The health of the patients is recorded using the various body sensors. The Arduino Uno Board collects the Analog signals from all the sensors and convert them into digital signals and send it to the raspberry pi.The Raspberry pi collects data and send to the server which intern sends the data to be stored in the clouds. The server monitors the data and if the data exceeds the threshold limit it immediately sends an alert message to the guardian and the doctor. The Smart Health Monitoring System also has a new feature of sending the Location of the patient to the guardian and the doctor using the GPS module and also use GSM module for the SMS which contains the alert message including the Location of the patient. In future, the system can be modified for few more advanced features like two-way communication between the doctor and the guardian for an immediate aid to help the patient and by using advanced controllers and sensors. More advanced and fast system can be developed with more focus on implementation of right mechanical parts and their designing.

REFERENCES

1.B. G. Ahn, Y. H. Noh, and D. U. Jeong. Savvy seat dependent on multi pulse location framework. In 2015 IEEE SENSORS, pages 1– 4, Nov 2015.
2. S. H. Almotiri, M. A. Khan, and M. A. Alghamdi. Versatile wellbeing (m-wellbeing) framework with regards to iot. In 2016 IEEE fourth International Conference on Future Internet of Things and Cloud Workshops (FiCloudW), pages 39– 42, Aug 2016.
3.T. S. Barger, D. E. Dark colored, and M. Alwan. Healthstatus checking through examination of standards of conduct. IEEE Transactions on Systems, Man, and Cybernetics - Part A: Systems and Humans, 5(1):22– 27, Jan 2005. ISSN 1083-4427.
4. I. Chiuchisan, H. N. Costin, and O. Geman. Receiving the web of things advances in social insurance frameworks. In 2014 International Conference and Exposition on Electrical and Power Engineering (EPE), pages 532– 535, Oct 2014.
5. A. Dwivedi, R. K. Bali, M. A. Belsis, R. N. G. Naguib,P. Each, and N. S. Nassar. Towards a viable social insurance data security show for human services foundations. In fourth International IEEE EMBS Special Topic Conference on Information Technology Applications in Biomedicine, 2003., pages 114– 117, April 2003.
6. M. S. D. Gupta, V. Patchava, and V. Menezes. Social insurance dependent on iot utilizing raspberry pi. In 2015 International Conference on Green Computing and Web of Things (ICGCIoT), pages 796– 799, Oct 2015.
7. P. Gupta, D. Agrawal, J. Chhabra, and P. K. Dhir. Iot based keen human services pack. In 2016 International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT), pages 237– 242, March 2016.
8. N. V. Lopes, F. Pinto, P. Furtado, and J. Silva. Iot design proposition for incapacitated individuals. In 2014 IEEE tenth International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob), pages 152– 158, Oct 2014.
9. R. Nagavelli and C. V. Master Rao. Level of infection plausibility (ddp): A mining based factual estimating approach for malady expectation in human services information min-ing. In International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2014), pages 1– 6, May 2014.