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## Health Monitoring System

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### ABSTRACT

Most of Health monitoring systems will place a major role in society. It can provide a good quality of life for the people. This paper will discuss monitoring the health conditions continuously. It will take physical parameters using different on-body sensors which are blood pressure, spo2,adxl345 By using these biosensors, we can detect the high/low Blood pressure, anemia and the position of the person (if he/she falls). If any of the sensors is crossed the parameters that we already have given then it will send a message to the respective ambulance, hospital, or caretaker at the same time it will diagnosis by displaying the medicine names in LCD.

### 1. Introduction

The unpredictable growth of the “Internet of Things” is changing the globe and therefore the speedy drop by value for typical IOT components enables the public to introduce new styles and product reception. IOT is employed in observation patient’s health, for creating a good home and good town. The surprising occurrence in the patient’s area unit monitored by using this Raspberry pi device without consuming more time. The combination of Raspberry Pi and IOT becomes a replacement innovation technology intending system. Raspberry Pi is acting as a tiny low clinic which consumes less time when compared to the routine approach to the doctor personally.

This paper specialized sensing element is employed to observe the patient’s health rate, after diagnosis, it displays the medicine details on the Led screen of the device One of the key learning platforms for IOT is that the Raspberry Pi. This Raspberry Pi may be a widespread platform because it offers a complete UNIX server in a very small platform which is low cost and highly effective.

The Raspberry Pi conjointly permits interfacing services and actuators through the final purpose.

In the present world, health is one of the main challenges for humanity. As the population increases day by day, there is also an increase in the number of diseases like heart, lung, chronic, sleep diseases. As the number of diseases increasing, it is difficult to monitor every patient at the right time. Mainly there are two challenges, Doctors must be present on site of the patient all the time, and patients need to admit to hospital for every small disease So in many cases family members serve as primary care assistants. Doctors visiting, hospital visiting every time is expensive and time-consuming to overcome this challenge, here this paper proposes a Health care monitoring system using Raspberry. Raspberry is a flexible, fully constrained, and programmable small computer device. The health monitoring system is used to monitor the health condition of the people by using on-body sensors. In this project, we are using three types of on-body sensors. To detect the abnormal conditions of the person's health. According to WHO calculations, most of the yearly death's ratio is increasing day by day with many health issues, like high/low blood pressure, lack of oxygen in the blood. The affected people are maximum above 50 years(aged). In many cases lack oxygen in the blood, low blood pressure will lead to diseases like Asthma, heart disease and chronic obstructive pulmonary disease(OPD), so this is designed for aged people to diagnosis them when they got infected with low/high blood pressure or decreasing of oxygen levels in the blood. In this, we are using MEMS (micro-electro-mechanical system) to detect the angle of the patients, when they are in observation. if they fall immediately action would be taken with the respective in charges by sending a message. in this project, we will blood pressure sensor and spo2 sensor which can detect and analyze the patient abnormal situations based on the parameters that we have given to the respective hardware. When the abnormality of a person's condition will detect it will send a message to the respective caretaker or emergency team (ambulance, hospital).By using these two sensors and MEMS system we will implement a wearable device that can be portable .meanwhile the system will also diagnosis the patient through displaying medicine names and intimate what type of treatment should be done as well.

## 2. Literature Survey

[1]Alexandros patella Paula's, student member, IEEE, and Nikolaos g.bourbakisfellow, IEEE Prognosis: A wearable health monitoring system for people at risk, methodology & model Using several on the body and Intra-body sensors for monitoring the patient's health who are suffering from chronic disease, elderly population, and emergencies. Using these sensors made a portable wearable device.

[2] Android-based health care monitoring system (2015) (Maradugu Anil Kumar et al) describes, The system provides low power consumption and highly portable for health care monitoring of patients and can reduce the

utilization of expensive facilities. Doctors can easily access the patient's information at anywhere from his android device.

[3] Health care monitoring system (2017) (Devashri et al) describes, Real-time monitoring of the health condition of patients is possible. Using Android device doctors can check patient's temperature, spo2, heart rate, ECG, etc. All the readings of the vital body parameters of the patient will be accessed by doctors through the mobile device.

[4]Heart beat and temperature monitoring system for remote patients (2017) (Vikram Singh R Parihar et al) describes, Heartbeat was measured with the help of photodiode and bright LED, and the temperature was measured by using temperature sensor LM35.

Wireless communication was preferred because it gives greater mobility to the sensor equipment and reduces the cost wherein there are multi transmitting sections.

### 3. Design And Implementation

#### HARDWARE TOOLS

- Raspberry-pi 3 model-B
- ADXL345 MEMS
- SPO2 SENSOR
- PRESSURE SENSOR
- GPS Module
- GSM Module
- SPEAKER

#### A) The Hardware model:

The proposed model has a Raspberry pi 3B+ interfacing with a blood pressure sensor, spo2 sensor, (MEMS) Micro electromechanical system, GPS, GSM, and LCD. These sensors are used to detect the abnormal conditions of the person's health and the MEMS is used to detect the angle of the patient if is he/she fall. GPS module is used to detect the location of the patient. And the GSM module is used to send the message about the patient situation finally the LCD is used to display the medicine name when an abnormal situation is detected.

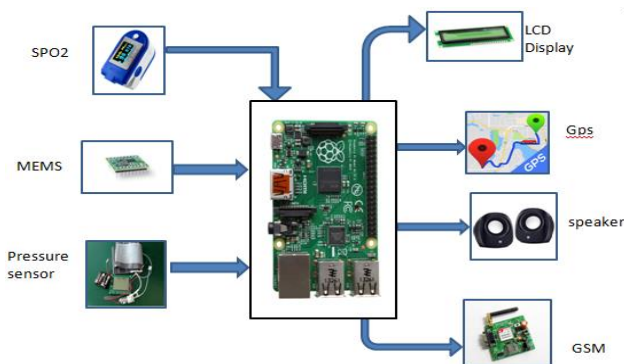


Figure1: Hardware model of the proposed system

### **i) Blood Pressure Sensor**

Pulse is the weight of the blood in the corridors as it is siphoned around the body by the heart. At the point when your heart thumps, it agreements and pushes blood through the conduits to the remainder of your body. This power makes pressure on the supply routes. Pulse is recorded as two numbers—the systolic weight (as the heart thumps) over the diastolic weight (as the heart unwinds between pulsates). The unit which quantifies this is known as the Sphygmomanometer. Observing circulatory strain at home is significant for some individuals, particularly on the off chance that you have hypertension. Circulatory strain doesn't remain a similar constantly. It changes to address your body's issues. It is influenced by different elements including body position, breathing or enthusiastic state, exercise, and rest. It is ideal to quantify circulatory strain when you are loose and sitting or resting. Pulse is the speed of the heartbeat estimated by the quantity of compressions of the heart every moment. The pulse can differ as indicated by the body's physical needs, including the need to assimilate oxygen and discharge carbon dioxide. It is normally equivalent or near the beat estimated at any fringe point. For grown-ups 18 and more seasoned, an ordinary resting pulse is somewhere in the range of 60 and 100 beats for each moment (BPM), contingent upon the individual's state of being and age. For kids ages 6 to 15, the typical resting pulse is somewhere in the range of 70 and 100 BPM, so these are the boundaries to distinguish the patient's unusual conditions dependent on the various kinds of figurings of circulatory strain for the patient's evil wellbeing.

### **ii) MEMS Accelerometer**

MEMS (micro electro mechanical system), can be used in different applications as Accelerometer, internal measurement units, MEMS magnetic field sensor, an inertial navigation system (INS), real-time clock, biosensors for medical & health-related technologies (these are embedded in medical devices). In this project we are using ADXL345 accelerometer which contains 3 axis these three axis x, y, z here the z-axis is opposite to gravity and the x is perpendicular to the gravity so initially, we assigned values, for example,  $x=0, y=0, z=1$  if we rotate to the down direction the z will be negative value so it will change from -1 to 1 similarly x, y also changed based on this calculations it will detect the fall down on patient in this project.

### **iii) SPo2**

Spo2 stands for "serum pressure oxygen saturation" or "peripheral capillary oxygen saturation" or generally we call it "peripheral capillary oxygen saturation". It will calculate the percentage of hemoglobin which contains oxygen in oxygenated hemoglobin. As a protein of oxygen in the blood known to be found in RBC. It will help to turn the blood into red color. In this project whenever the light passes to the fingertips it absorbs light through vessels or capillaries of the fingers & then it will gives the value of spo2 measurement that is the each RBC is made up of 98% oxygenated & 2% of non-oxygenated hemoglobin if the value of spo2 is below 90% that it would be a sign of poor

blood oxygenated/hypoxia so then it will calculate the percentage of saturation of hemoglobin in arterial by arterial flow pulsation. The factors that can affect the spo2 while measuring skin conditions, pigment wounds, scar tissue, tattoos, nail polish, hypothermia & anemia. Normal spo2 values vary between 90%&100%. In this project, we are using transmissive technology, which transmits red& infrared light from the finger to photo detector. It is the most commonly used form of clinical pulse oximetry

During rest position we can use for the device to measure the oxygen level in the blood which is better than any &also low blood flow will cause an error.

#### 4. Location updating and sending message

We have connected GPS & GSM modules to raspberry pi using switching circuit, GPS to detect the location then GSM is used to send a message to respective Hospital or Ambulance or caretaker.

#### 5. Diagnosis through LCD

It is connected to raspberry pi for diagnosis to displaying the medicine name and when any abnormal condition takes place

#### 6. Flowchart

The process of the project is explained in the below flowchart.

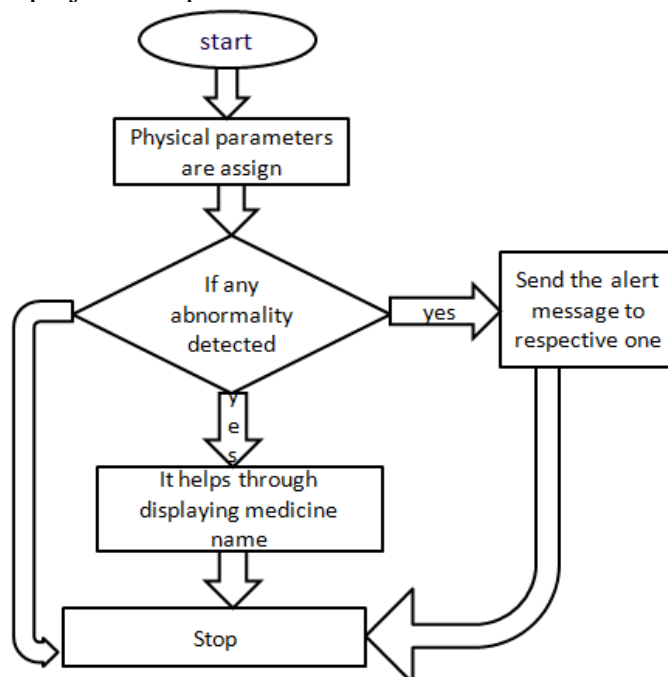


Figure2: The workflow of proposed system

Initially values takes from on body sensors, if any different parameters with respective to given. Then it will send message to respective one ,if there is any

emergency it will diagnosis patient through displaying medicine name and basic instruction.

### 7. Experimental Results

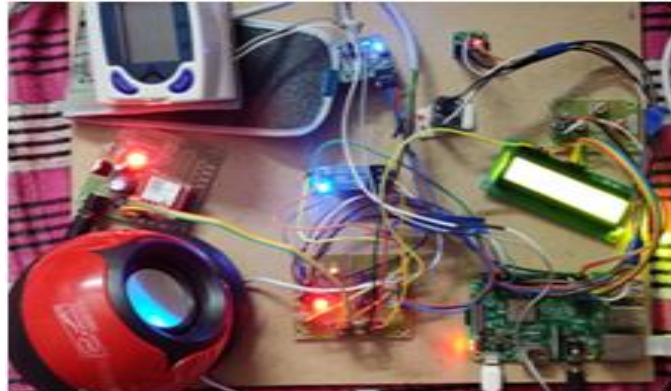


Figure3:setup of the proposed system

Detection output: After turning on the system the on body sensors are continuously monitoring data of blood pressure, oxygen levels in blood and position of the person (is he fall down), if there is any abnormal data compare to given data in software the system is alert as shown in below figures.

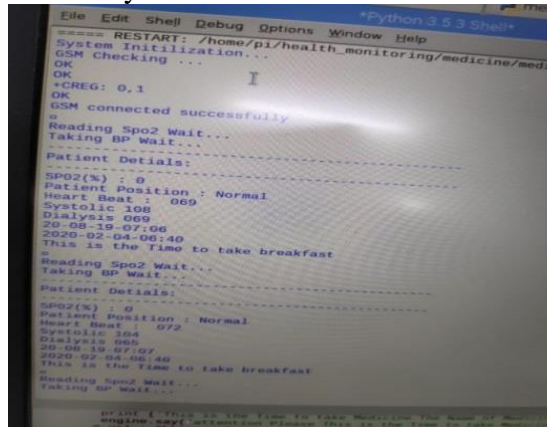


Figure4:After initialization taking the parameters from patient

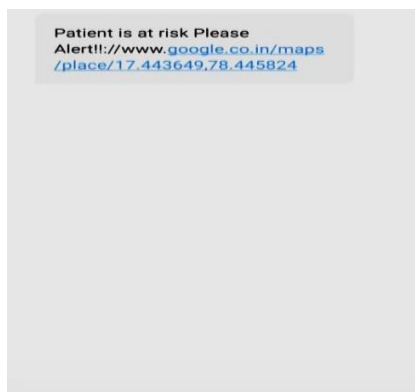


figure5:message sends to hospitals, caretakers.



17°26'37.1"N 78°26'45.0"E

17.443649, 78.445824

Figure6: message sends with location

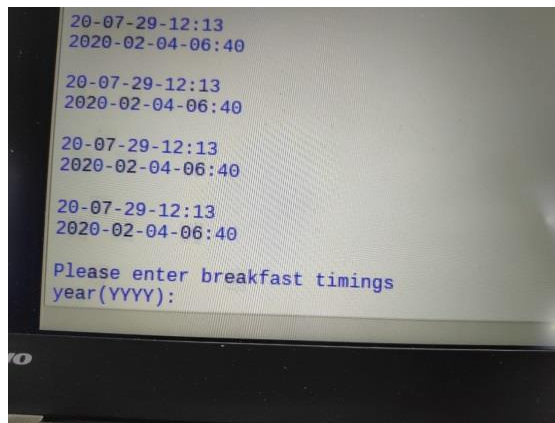


Figure7: displaying some instructions for medication.



Figure8: LCD for diagnosis by displaying medicine name.



## 8. Conclusion & Future Work

In this paper we have discussed about the existing systems and using them how we had implement system to detect the disease. In this proposed system. And we had added more features to this existing system those are GPS & GSM for sending the information of the person to the respective one, when they are in risk.

Using spo2 sensor, Pressure sensor, and adxl345 MEMS are used to any inactivity of the patients like high/low blood pressure, anemia, falling of patient. When any of the sensors crossed the set points, then immediately it will send message to hospital, ambulance & is it diagnosis by displaying medicine names so it is less time taking process and efficient.

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