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Iot Based Smart Healthcare Kit

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Abstract— Internet-of - Things (IoT) creation has improved healthcare. From treatment to health management, the course of healthcare has been shifted.
The paper presents the design and implementation of an IOT-based emergency medical health monitoring system that can flexibly demonstrate the collection, integration, and interoperability of IoT data that can support emergency medical services.
The proposed result of the paper is to establish a framework to provide patients with world-class medical assistance, even in the most remote areas with no hospitals in their areas, by communicating through the internet and collecting information about their health through
The concept of this project was to reduce the patient's headache while visiting the doctor if he has to monitor his blood pressure, heart beat rate, temperature, etc. The time of both patients and doctors is saved with the aid of this proposal, and doctors will also aid as much as possible in emergency situations.
Keywords— IOT, sensors, health parameter, monitoring system, smart healthcare

I. INTRODUCTION

Health is characterised as a full state of physical, mental, and social well-being and not merely a lack of illness. Health is a fundamental element of people's need for a better life. Unfortunately, health care is becoming even more difficult to manage because of insufficient and less effective healthcare services to meet increasing demands of rising population with chronic diseases. With the advancement in technology, lots of smart medical sensors came into existence that continuously analyses an individuals patient activity and automatically predicts a problem accurately.[1]

The interconnected devices collect data at regular intervals which can be used to initiate immediate actions, decision making. The IOT is generally considered as connecting objects to the Internet and the data produced by ECG sensor, BP sensor and temperature sensor can be used for different purposes and also by different doctors, patients and healthcare centres. With the help of analytics, a data report is made that describes the health condition of that particular patient and then, doctors readily assimilate the information obtained from sensors in order to monitor, process and think and send notification about the same via internet.[providing intelligent network for analysing, planning and 3]

According to a study, it has been found out that approximately 2000 people die monthly only due to carelessness of their health; this is because people don't have time to visit the doctors for monthly health check-ups owing to heavy workload. As a result, the primary purpose of such a project is to create a dependable patient monitoring system that allows health care providers to keep track of patients who are either hospitalised or going about their regular lives.

PROBLEM DEFINITON

Internet of Things (IoT) devices can be used in a variety of applications like smart city, smart energy, and healthcare etc. With the ever increasing world population, the conventional patient-doctor appointment has lost its effectiveness. Smart healthcare can be implemented at all levels, starting from temperature monitoring to vital signs in the elderly. Doctor-patient ratio in India is well below the global average. So, IoT can have profound effect on healthcare in India.

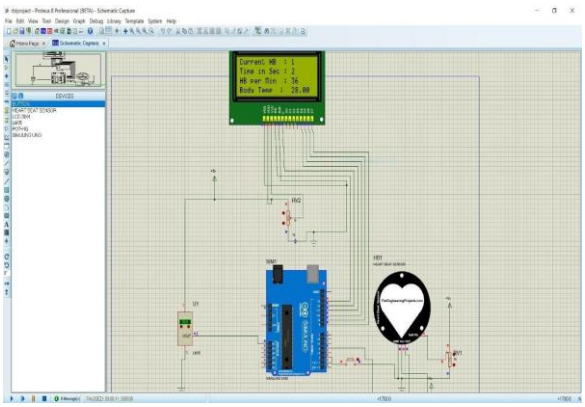
II. IMPLEMENTATION

A. Sensors

1. ECG SENSOR:

Heart disease has been a major population's illness for many years. The World Health Organization (WHO) study also shows that most people die from heart diseases. Therefore, this disease cannot be taken lightly, for this reason, healthcare devices and monitoring systems are designed to track disease professionally. We know these diseases can be prevented by analysing and monitoring the ECG signal at the initial stage. So, this project uses AD8232 ECG Sensor**.** The AD8232 ECG-sensor is a very cost-effective board utilized to measure the electrical activity of the heart. It was intended to extract, amplify, and filter tiny biopotential signals in the midst of noisy situations, such as those caused by mobility or the installation of remote electrodes. The AD8232 Single Lead Cardiac Rate Monitor works as an operating amplifier to help you get a clean heart signal quickly.

2. BP SENSOR:



Honeywell's 26 PC SMT pressure sensor is one of the best pressure sensors used in this system. This sensor is compact, inexpensive, and capable of measuring higher pressure levels. This sensor can measure pressure more quickly and precisely. The sensor's genuine installation cost is very inexpensive because it has true surface mount capability. The systolic, diastolic, and mean arterial pressures can all be measured using this sensor.. A four-element piezoresistive bridge is included in the 26PC SMT (Surface Mount Technology) pressure sensor. The bridge resistance varies as pressure is applied, and the sensor produces an output signal proportional to the input pressure. This Sensor is safe to use because it is non-invasive. It is more user-friendly and may be monitored by anyone. This sensor simplifies the work of monitoring mercury levels and calculating pressure. This system is lightweight and portable. It's simple to transport and use, and it's especially beneficial in distant locations where medical services are few because it generates results automatically. [4]

3. TEMPERATURE SENSOR:

LM35 Body Temperature Sensor:

The LM35 is a temperature sensor with an analogue output voltage that varies with temperature. It shows the output voltage in degrees Celsius. It does not necessitate the use of any additional calibrating electronics. At 25 degrees Celsius, it demonstrates guaranteed precision. It has a temperature range of -55 to 150 degrees Celsius. Because of its compact size, it is ideal for remote applications. Because of its small size, it is also a low-cost component. It operates at a low voltage of 4 to 30 volts. In motionless air, the self-heating temperature is 0.08 degrees Celsius.

B. Microcontroller(8051):

The microcontroller is the main operating element that contains the mechanisms of each element and a few interlinks between them.

C. LCD:

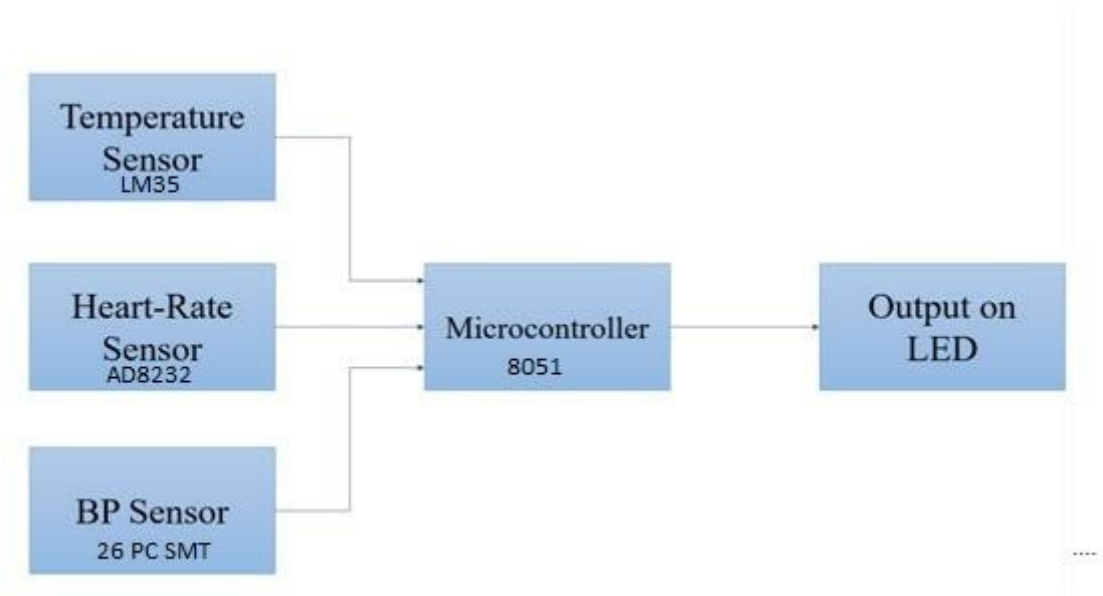
LCD (Liquid Crystal Display) is a type of flat panel display that operates primarily with liquid crystals. On the LCD panel, the output for the next project is displayed.

III. WORKING

This project describes the design of a simple, low-cost microcontroller based patient healthcare system. The research is ongoing in the field of IOT-healthcare, which provides clinical evidence that they received data through wireless networks that are connected to devices, which has aided in the management and prevention of diseases, as well as patient monitoring. Therefore, the various health monitoring systems are getting better today's like, ECG monitors, pulse rate, heart beat rate and blood pressure monitor. Now the research is being carried out in the field of IOT and many products and services are utilized based on them.

People's heart rates are a measure of their emotional state, exercise intensity, and an objective indicator of cardiac function. However, most people find it extremely difficult to precisely estimate the time and his heart rate readings. With the help of heart-rate sensor and monitor, heart ECG electrodes will be detected by monitoring the signal processing device, the user can at any time check the heart rate changes, changes in heart rate and self-monitoring status.

A healthcare kit can be constructed with the use of several parameters such as heart rate sensors, blood pressure sensors, and temperature sensors, and the inputs will be taken by the patients using a microcontroller. The patient would be able to monitor the inputs collected on the LCD panel. [2]



IV. EXPECTED OUTCOME

The project's proposed outcome is to provide proper and efficient medical services to patients by connecting and collecting data from health status monitors, which would include the patient's heart rate, blood pressure, and ECG, and sending an emergency alert to the patient's doctor with his current status and complete medical information. This smart healthcare system will display the health parameters of the patient. The patient can have a record of exceeding or preceeding health parameters. So the patient can consult the doctor accordingly.

This system will provide better and efficient health services for the patients by constant monitoring. The final model will be well equipped with the features where the doctor can examine his patient from anywhere and anytime. The proposed model will be be deployed as a smart health kit which becomes more mobile and easy to access anywhere and at anytime.

V. RESULT AND DISCUSSION

As the title says, the result of Smart Health Monitoring system is of extreme use to patients and doctors as well. The patient can check their health status anytime from the comfort of their homes and visit hospitals only when they really need to. This can be accomplished by utilising our technology, the results of which are made available online and can be viewed from anywhere in the world.

The doctors can also use the log of the patient body condition to study and determine the effect of medicine or other such things.

VI. CONCLUSION

The key concept of this method is to provide patients with better and reliable health services so that experts and physicians can make use of this information and offer a quick and effective solution. The final model is well equipped with features that allow the doctor to test his patient from anywhere and at any time. It is also possible to collaborate on emergency scenarios to send an emergency mail or message to the doctor with the current state of the patient and full medical records. Anywhere around the globe, the proposed model would be easy to use. The system would build a new wave of technology in many ways, such as minimally expensive patient surveillance, reducing the number of occupied hospital beds and improving the efficiency of medical staff.

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