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HEALTH CARE SYSTEM FOR HOME QUARTINE PEOPLE

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Abstract - In recent days healthcare monitoring systems with new technologies have become of great concern to countries everywhere the planet. Nowadays IoT (internet of things) is such an emerging technology. It consists of varied sensors and communication devices which are necessary tools for IOT-based health monitoring systems. Among the varied applications that the net of Things (IoT) facilitated for the planet, Health care and Health monitoring applications are the foremost important. It also responded if any medical emergency was needed. IoT (Internet of Things) has brought a noteworthy approach to healthcare during the worldwide pandemic. The remote health surveillance monitors certain parameters of a patient using digital technology and allows an accurate evaluation of health right reception. This brilliant internet revolution has not only minimized patient movement during COVID but also ensured smart healthcare for all ages. IoT heads to line up a strategic connection between the patient & the doctors. The goal is to trace the important health parameters like - heartbeat sensor, vital sign, sweat, SPo2, etc., and evaluate the info to work out any variety of medical emergency. Using certain medical sensor devices & web-based apps, the health data is passed to the portal from where concerned doctors can provide medical assistance. the info collection, transmission & visualization can use a smartphone as a hub, thus making the operation smooth & flexible. The wearable real-time health tracking devices privilege the elder citizen through continuous monitoring while ensuring immediate measures just in case of emergency. during this paper, a review of IoT-based smart health monitoring systems is presented. This review's goal is to effectively and continuously monitor the multiple patients in a very block and also as remotely located patients so it'll ultimately reduce hospital operating costs, and every one other communication costs and improve the standard of health service.

***Key Words*:** ESP32, temperature sensor, SPO2 sensor, heart beat sensor, sweats sensor.

1. INTRODUCTION

Health is characterized as a full state of physical, mental, and social well-being and not merely a scarcity of illness. Health may be a fundamental element of people's need for a far better life. Unfortunately, the world unhealthiness has created a dilemma due to certain factors, like poor health services, the presence of huge gaps between rural and concrete areas, physicians, and nurse's unavailability during the toughest time. IoT is making any objects internally connected within the recent decade and it's been considered the subsequent industrial revolution. the foremost tremendous use of IoT is in healthcare management which provides health and environment condition tracking facilities. IoT is nothing but linking computers to the net utilizing sensors and networks. These connected components will be used on devices for health monitoring. The used sensors then forward the knowledge to distant locations like M2M, which are machinery for computers, machines for people, handheld devices, or smartphones. It's an easy, energy-efficient, much smarter, scalable, and interoperable way of tracking and optimizing look after any ill health.

Nowadays, modern systems are providing a versatile interface, assistant devices, and mental state management to steer a wise life for personalities. Heart rate and temperature are the 2 most important indicators of human health. Pulse rate is that the per-minute amount of heartbeats, commonly called the heartbeat rate. to live the heart beat rate, a rise within the blood flow volume are often utilized by calculating the pulses. Normal vital sign ranges between 60 and 100 beats per minute for healthy people. The standard restful heart for adult males is roughly 70 bpm and for adult females 75 bpm. Females 12 years old and above, typically have higher rates of heart in contrast with males. The temperature of the frame is just the warmth of the body and also the sum of warmth radiated by the body is scientifically determined. the common person's vital sign relies on various factors like ambient temperature, the person's gender, and his eating habits. In healthy adults, it's likely to range between 97.8 °F (36.5 °C) and 99 °F (37.2 °C). Various factors like flu, low-temperature hypothermia, or the other illness may result in a change in vital sign. In most illnesses, fever could be a typical indicator. Various methods exist to invasively and noninvasively assess the center rate and temperature. For the buyer, noninvasive approaches over ages have proven accurate and convenient. it's suggested that healthcare should provide good room conditions to facilitate the patients.

The developed system also provides an answer for the matter of maintaining one database of patients in hospitals employing a web server, except for the personalization of critical health-related criteria. During this system, the gas sensor is employed to spot an unexpected occurrence that contrasts the performance with the brink and produces a PPM signal if the output value crosses the brink. Here the most objective is to style an overseas Patient Health Monitoring System to diagnose the health condition of the patients. Giving care and health assistance to bedridden patients at critical stages with advanced medical facilities has become one amongst the most important problems within the modern hectic world.

In hospitals where many patients whose physical conditions must be monitored frequently as an element of a procedure, the requirement for an economical and fast-responding alert mechanism is inevitable. Proper implementation of such systems can provide timely warnings to the medical staff and doctors and their service will be activated just in case of medical emergencies. the net of Things (IoT) platform offers a promising technology to attain healthcare services, and may further improve the medical service systems. IoT wearable platforms will be accustomed

collect the needed information of the user and its ambient environment and communicate such information wirelessly, where it's processed or stored for tracking the history of the user.

2. LITERATURE SURVEY

In this work maker, Amna Abdullah et al. demonstrate a Lab VIEW-based patient checking framework. The framework undertaking is completed in five key advances. we expect about two frameworks to execute the structure. within the rule system, we interface the sensors joined with the patient's body to a transmitter unit associated with a Zig Bee or GSM orchestrate. The transmitter transmits the knowledge remotely to a recipient that's additionally connected with a Zig Bee or GSM engineer. The beneficiary is connected on to the USB port of a just about watching unit (which may be a Laptop with Lab VIEW programming in it). The region watching unit shows the last information[1].

This paper exhibits the upgrade of a microcontroller-based structure for remote heartbeat and temperature watching utilizing Zig Bee. In India, different patients are passing on because of heart assaults and illumination that they're not getting profitable and reasonable help. [2]

To give them worthwhile and bona fide enable first we to want to unending seeing of patient flourishing. The settled watching structure are often utilized precisely when the patient is on intriguing little lodging framework are enormous and just open within the retouching workplaces in ICU. [3]

The framework is created for home use by patients that don't seem to be in a very central condition but rather should be persistent or sporadically observed by the clinician or family. In any major condition, the SMS is shipped to the expert or any relative. [4] With the target that we will without a substantial amount of stretch additional different lives, Tao et al. designed a wearable health monitoring system that successfully screens the patient from time to time. If a patient falls automatically, some buzz or alarm is distributed to the doctor immediately [5].

The error rate may be a minimum of fifty only; therefore the recognition accuracy is 95% which could be a good design for the patients. Stefano et al. are hardware engineers who proved a design of a detection system that again detects the patients' movements as within the previous paper. However, their research uses different hardware with minimum cost, and operation of speed is high. They also proved the accuracy with 97.3%, which could be a good result [6].

Even nowadays, many researchers are using this technology as a reference and designed many systems. However, now this technology isn't employed in the market sing many new technologies include additional applications. Gennaro et al. designed a PHMS, but this works with the symptoms of the patients. there's a database where the patient values are differentiated and compared with the available ones, and also the disease is identified and diagnosed [7].

The data is analyzed by advanced technology, but it takes time for the method, and it's limited to particular diseases, which is that the major drawback of this technique.

BLOCK DIAGRAM

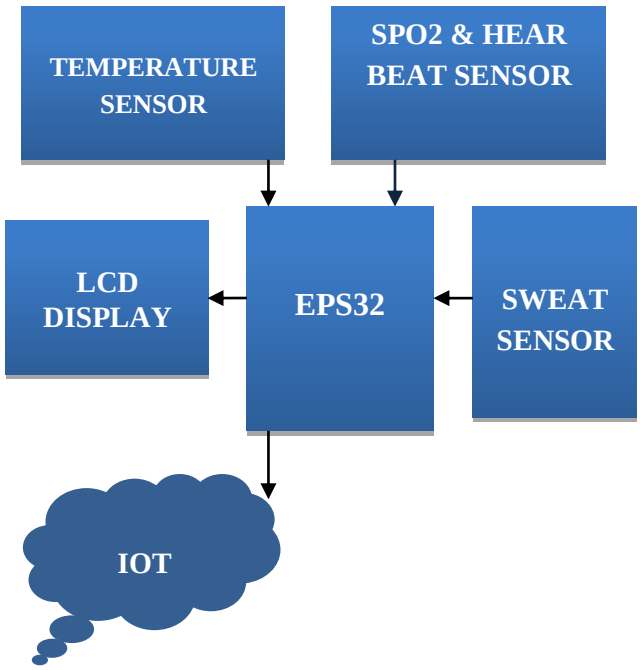

Fig.1: Block Diagram

3. TECHNICAL SPECIFICATION

I. ESP32

Fig.2: ESP32

ESP32 is one amongst the most IoT learning tools. This offers a full Linux system on alittle platform at a really low price. ESP32 connects device sensors and actuators through GPIO pins. ESP32 and IoT merge to be a brand new technology for creativity within the healthcare system. ESP32 is meant extremely with integrated antenna switches, RF-balun, control amplification, low-noise amplifier, and filters yet as power management modules. It can function as a whole stand-alone scheme or as a slave to a number MCU, decreasing overhead interaction within the most application processor. EPS32 can communicate with other Wi-Fi and Bluetooth devices via its SPI/SDIO, or I2C/UART interfaces.

II. Heart Beat Sensor

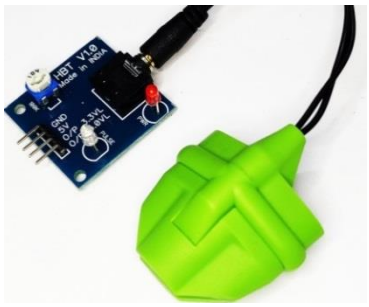

Fig.3: Heart beat sensor

The heartbeat sensor is developed supported the plethysmography theory. It measures the change in blood volume through anybody's organ that causes the sunshine intensity to maneuver through that organ. The timing of the pulses is more critical in systems where the guts pulse is to be tracked. the speed of heartbeats determines the distribution of blood volume, and therefore the signal pulses are adequate to the pulses of heartbeat when light is consumed by the blood.

III. Temperature Sensor (LM35)

Fig.4: Temperature sensor

The LM35 series are accurate optimized temperature circuits with output voltage, which is linearly relative to the temperature in centigrade. The LM35 has a vantage point over Kelvin's linear temperature sensors, as a realistic centigrade scaling does not allow the consumer to delete the huge constant voltage from the display.

IV. Sweat Sensor

Fig.5: Sweat Sensor

Wearable sweat sensors have been developed to track users' health condition and monitor the levels of these substances (known as analytes) in sweat. Lactate is considered an important biomarker thanks to its involvement in anaerobic metabolism. Inside the sensors are spiraling microfluidic tubes that can derive information on the rate at which the wearer is sweating. The tubes also have tiny chemical sensors that can measure the concentrations of potassium, sodium and metabolites, a class of molecules that interact with enzymes

4. SYSTEM DEVELOPMENT

Continuous online patient and patient room condition monitoring is that the main idea of the proposed system. Therefore, the healthcare monitoring system utilizes three-stage architectural features, namely (1) Sensor Module (2) processing Module (3) Web computer program.

The sensors are wired and are wont to collect data from the patient's body and therefore the environment by gathering physiological signs. The collected data are then processed via an ESP32 module and sent to the gateway server. For the online computer programme, ThingSpeak is employed for the graphical interpretation, and display of collected results. ThingSpeak shows this status and process of transactions. The HTTP protocol provides easy connectivity for the correspondence between a Wi-Fi module and therefore the web server. The HTML programme is updated every 15 s, allowing patients to be tracked in real-time.

In the overall system architecture of the developed system, it will be seen that each one of the sensors is wont to collect data from the hospital environment. The sensors all are connected to a processing unit called ESP32. Upon attaching these (temperature, heartbeat, gas) sensors, ESP32 works because of the heart of the system. ESP32 collects sensor data and wirelessly transfers them to IoT websites. The board uses its Wi-Fi and its own processing unit, which is Xtensa dual-core 32-bit LX6 microprocessor. The sensor output is then linked to the website of IoT.

5. SYSTEM IMPLEMENTED

The system is implemented using the mixture of hardware components. All the hardware components are assembled within the implementation phase. All the sensors are connected with ESP32 using physical pins. ESP32 is used as a processing device because it features a built-in Wi-Fi module. For all sensors, the Vcc and GND are connected with the Vcc and GND pin of ESP32. within the case of heart beat sensor, the signal pin is connected with D26 pin of ESP32. the knowledge pin of LM35 is mapped with D35 pin of microcontroller (ESP32). These are the case with a particular patient. The hand of 1 user is attached with sign sensor (LM35) and then the data are displayed within the net server.

Applications of IoT in Healthcare

- Hearables
- Computer vision technology
- Moodables
- Healthcare charting

The main advantages of IoT implementation in healthcare:

- Remote monitoring
- Prevention
- Reduction of healthcare costs

- Medical data accessibility
- Improved treatment management
- Improved healthcare management

6. RESULT

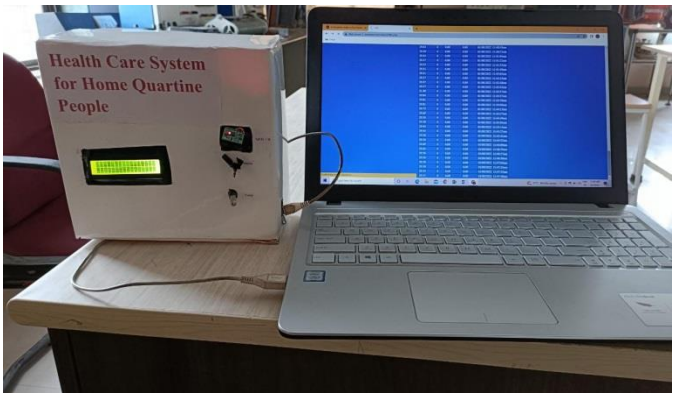

Fig.6: Proto type of Model

3. CONCLUSIONS

The proposed IOT-based health monitoring communication system has the ability to examine and monitor real-time health parameters or important Symptoms of COVID-19 as recognized by WHO (World Health Organization) of people who have been told for Home quarantine. This system will reduce the workload of medical Health Centres or COVID Hospitals and other concerned authorities. However, as this proposed system has advanced sensors and the latest raspberry pi model it can be slightly expensive. The proposed work can be further researched by modifying and analyzing using ANN (Artificial neural networks or other soft computing methods.

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