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IoTA-based Covid Patient Health Monitor System in Quarantine

M.Mahesh[1], Dr. S.N.Chandrasekhar[2], M.Geohnavi[3] and P.Srihitha[4]
[1,2]Asst Professor[3,4]Student,
ECE Department,Sreenidhi Institute of
Science and Technology, Hyderabad,
India

Abstract:-The word "COVID" breaks the hearts of all humankind. Coronavirus is highly contagious and can be preventable. Isolation of patients is important, but specialists should test Coronavirus patients. With the number of growing Corona patients, it becomes more difficult for physicians to track the health of quarantined or isolated patients. To cope with this issue, we have designed a remote Iota-based screen prototype design that takes into account multiple Coronavirus patients across the web 2.0. This system uses Temperature sensors, respiratory sensors, heart rate sensors, and fluid level indicators to evaluate a patient's health limits. If any abnormalities are detected in the patient's life, the notice is sent via Iota remotely using an Iota terminal called TCP Telnet via the web. This will notify the doctor and caregiver about Iota remotely. Our program, therefore, provides a secure health monitoring plan, prevention of the spread of Coronavirus, and monitoring of individual patient health.

***Keywords*:-** *Covid patient, Quarantine, IoT-TCP Telnet Terminal, Arduino UNO, Sensors.*

I. INTRODUCTION

Recently, coronavirus (COVID-19) became an epidemic in more than 1,856.798 patients worldwide. The prevalence of infection and death rates are rising daily. Most people who were contacted by patients are members of health care whether they are doctors or nurses. Therefore, there is a great need for advances in remote smart health care, especially for highly infectious viruses like COVID-19 to save lives. Remote monitoring requires multiple sensors that record each condition's parameters in real-time to improve high-speed health care services and remote governing and managing. An intelligent health care system relies on the union of artificial intelligence and Internet of Things (Iota) Technology. The previous study aimed to monitor the patient for various ailments such as debates, diet, and post-surgery. They enable doctors to see many patients at once. That makes the system more flexible, and more precise. The sensors are of various types, which are portable or integrated sensors, or ambulant sensors. These programs need to interpret the data extracted from these sensors to achieve the main goal. This paper introduces the quarantine program which is a proposed Health Plan to monitor coronavirus patients for isolation in remote areas. It is based on a wide range of integrated data from a variety of sensors to determine the severity of the disease and the severity of the condition. It is based on monitoring the reading of heart rate, respiratory pressure, fluid level, and temperature in real-time. It suggests a series of data that combines successive data points in a timeline. The Remote Patient Monitoring Program empowers patient care outside of conventional medical facilities, which increases access to human services offices by reducing expenses. Iota is a network of devices and services that minimize human intervention to lead a better life. This project marks an improvement in the health care system, will save patients from future health problems that may arise, and will also help physicians to take appropriate action or timely ac the patient's health.

II. LITERATURE SURVEY

There are a few motivations for research and investment in intelligent health systems, which mimic real-time monitoring or monitoring programs where needed. This study aims to save time and health costs. A major goal of wise health management is to remotely control many patients by monitoring their illnesses, as well as health conditions in real-time. This is done by interpreting, compiling, and visualizing the required data extracted from many machines and intelligent sensors. The information collected from the sensors will monitor patients away from their hospitals and homes.

A. Smart Health:

It is a powerful research and industrial centre that integrates the interactions between patients' sensory interactions. This provides patient monitoring with video, audio or text. The biggest problem in this area is how to manage data, and analyze and visualize reports. This section presents a comparative study of several previous types of research on mental health. It incorporates a combination of artificial intelligence and machine learning algorithms that will support high-quality patient guessing and diagnostic results.

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Paper No.	Domain	Target	Benefits	Limitations
1.	Smart Health	Monitoring patients remotely	Visualize patient cases graphically	Noisy data and redundant features
2.	Smart Health	It is based on creating a surgical prediction multi-model for patients	95% accuracy results	Lack of information (requires expert people)
3.	Smart Health	Support monitoring healthcare	Improve accuracy by 9%	Improving reliability and integrity
4.	Smart Medical	Improves the hospital's recommend actions	Enhance patient monitoring	Requires enhancing the accuracy
5.	Smart Health	Monitoring patients	Improves patient monitoring	Requires improving accuracy
6.	Smart Health	Monitoring patients	Recognize 4 parts: falls lying, standing, sitting and walking activities	The hardness of fusion with various data types

Table 1: A comparative study of smart health systems for monitoring patients

Previous studies, obtained to build any intelligent health system require knowing all the conditions, as well as specific expert knowledge to automatically diagnose and obtain important or insignificant studies for each patient. That requires supervised training to support any new cases and find problems. Display of extracted patient data is very important to save time and health at the same time. Data visibility refers to one of the keys to the data analysis fields that allow end users to analyze, understand and extract data.

III. COMPONENTS REQUIRED

A. Software Components:

- ARDUINO UNO
- IOT APP- TCP Telnet Terminal

B. Hardware Components:

- Power supply
- ARDUINO
- LM35 Temperature Sensor
- HEARTBEAT SENSOR
- Atmega Microcontroller
- Respiratory Pressure Sensor
- Selian/fluid level Indicator
- LCD Display
- Wi-Fi Module
- Switches
- Resistors
- Capacitors
- Diodes
- Transistors
- PCB
- LED's

IV. PROJECT DESCRIPTION

Our proposed system allows remote monitoring of patient health limits using Iota and an urgent warning is sent to doctors. Preventing the spread of the disease by providing viewing screens to all patients will keep specialists away from the patient. In our proposed system, in the unlikely event of a discovery, it is helpful to send a notification remotely to an application called the TCP Telnet Terminal.

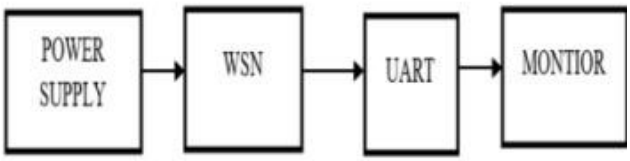

Fig. 1: Block diagram for the Software

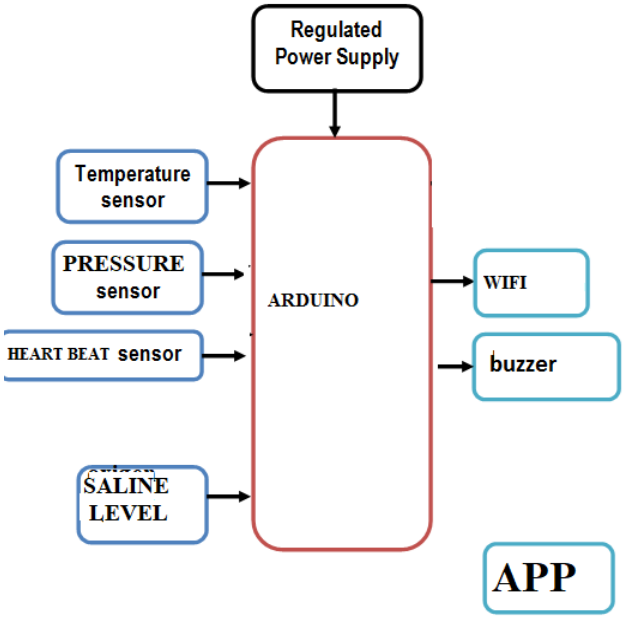

Fig. 2: Block diagram for hardware

V. WORKING

Sensors measure biological data in the human body and transmit analog values to Arduino UNO, which converts them to digital data. The server sends limited data to the mobile application and displays data via LCD simultaneously.

The system is connected to a temperature sensor and a pressure sensor and a heartbeat. We need to attach a heart rate monitor to the patient's wrist rather than to the patient, showing the patient's heartbeat by displaying it on the Iota app screen. To check the temperature we will use a temperature sensor connected to the system. To indicate the temperature rise we will turn on the light in front of the temperature sensor, as soon as the flame approaches the temperature sensor and the display shows the temperature rise and is loaded into the Iota web application. The respiratory sensor is attached to an oxygen mask, which helps in analyzing breathing, in case something unusual is

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detected as a rise or decrease in respiratory pressure a notification is sent to the app.

With this program, we can track the physical condition of patients and if they need any medical attention, we can inform the relevant authorities about the TCP Telnet app. This is a life-saving activity for Covid-19 patients who are confined to solitary confinement.

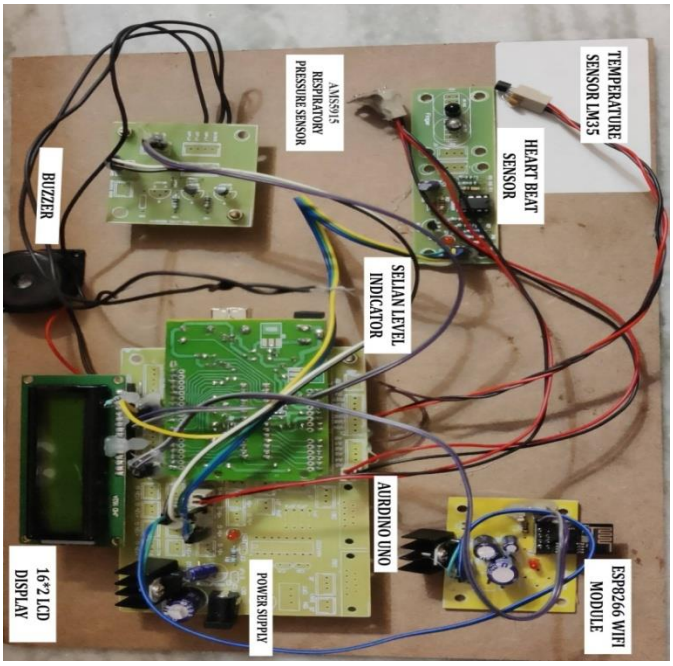

Fig. 3: Circuit

VI. FLOWCHART

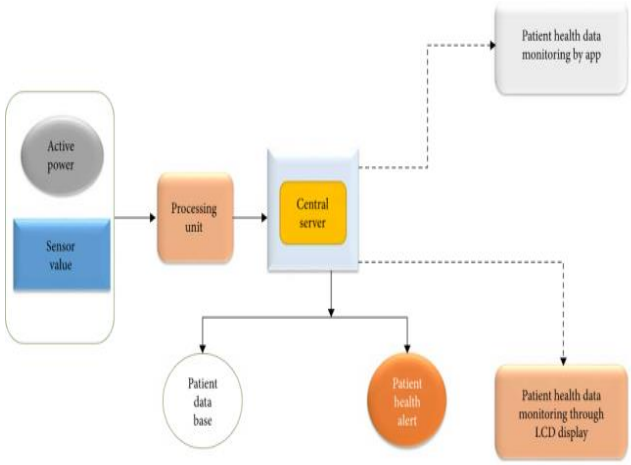

Fig. 4: Flowchart

VII. ADVANTAGES & DISADVANTAGES

A. Advantages:

- Remote monitoring in real-time
- Prevention of many diseases and serious conditions
- Reduction of health care expenses
- Medical data accessibility (electronic records)
- Better healthcare management
- Improvement in research

B. Disadvantages:

- Security and privacy remain major concern that prevents users from using Iota technology for medical purposes, as health care monitoring solutions have the potential to be breached or hacked.
- Failures or interruptions in hardware or even power failures can affect the functioning of connected nerves and devices that put health care activities at risk.
- There is no consensus regarding Iota protocols and standards, so devices manufactured by different manufacturers may not work well together.
- Although Iota promises to reduce the cost of long-term health care, the cost of its hospital implementation and staff training is very high.

VIII. RESULT

We have developed a smart health monitoring system that is smart enough to automatically monitor the patient using Iota that collects status information through these systems which can include patient heart rate, temperature, and respiratory rate, Salina level/fluid that sends an urgent warning to a patient with his or her current medical condition. This will help the doctor to monitor his patient from anywhere and even send the patient his condition directly without going to the hospital. Our model can be distributed to various hospitals and medical centers. The system uses intelligent sensors that generate raw data collected from each sensor and send it to a stored server where the data can be updated and digitally stored for use by medical professionals. Keeping a backup server is necessary to keep track of a patient's previous medical records that provide better and more advanced testing.

Fig. 5: System Architecture

Fig. 6: COVID Patient under quarantine using the system

IX. FUTURE SCOPE

A. The Future of Iota in Healthcare:

According to Business Insider, the Iota healthcare technology market will grow to $400 billion by 2022. Such growth will be due to the growing demand, the development of 5G connectivity and Iota technology and the growing adoption of IT healthcare software. Technological bullying programs such as Apple, Google and Samsung invest in closing the gap between the authenticity of tracking apps and actual medical care to contribute to this process.

Despite the decline, continuous digital transformation in health care is inevitable and the concept of Iota will continue to capture and transform healthcare services. So, it seems like the right time to look beyond the challenges and embark on a journey to connected healthcare devices.

X. CONCLUSION

In this project, the main idea of the proposed program is to provide efficient health services to isolated patients using a cloud of network information so that experts and physicians can use this data and provide a quick and effective solution. The final model will be equipped with features where the doctor can diagnose his patient anywhere and anytime. An emergency to send an emergency email or message to a doctor with a patient's current status and full medical information can also be processed.

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