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Health Monitoring System for Multiple Patients

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Abstract:
Health monitoring is very important for the patients admitted in ICU. Meny patients get admitted in ICU of hospital for various health issues. But relatives are waiting outside of the ICU and they want to know the condition of patient. Meny times they are not permitted to enter inside ICU due to treatment. Our objective for this system is to develop such a system that facilitates live health parameters display that can be accessed from remote location with the help of IoT. This system also provide facility to doctors for live status monitoring remotely. In this project we are monitoring health parameters like Pulse rate, Oxygen level, ECG, Live streaming, ICU room temperature and humidity.

Keywords: -Pulse rate, ECG, DHT11, IoT, Health monitoring

1. INTRODUCTION

This system is proposed to display live health parameters on IOT cloud. Parameters like pulse rate, oxygen level, body temperature, ECG, patient video is displayed with the help of IoT. This system helps to view patient live condition through IoT. Sensors for measuring health parameters are interfaced to the microcontroller. This system uses NodeMCU as a Local server. And this server displays a data on HTML page. This can be accessed by using IP address.

2. Literature review

Rohan kalal has proposed IoT Based Patient Monitoring System. In his work he used nodeMCU, Max30100, DS18B20 temperature sensor and ECG sensor. Thing speak is iot platform which is used to display health parameter in numerical and graphical form. ECG graph is plotted on serial monitor of Arduino IDE.

Alvin Thomas has proposed IOT based Health Monitoring system. ATMEGA328P is microcontroller used in his work. The objective of the work is to provide online consultation of doctors thereby making efficient system. Various sensors that measure health parameters are interfaced to the microcontroller. these health parameters are measured and displayed on IOT platform.

Ruturaj Ambedkar has proposed smart health monitoring system using IOT. where he used NodeMCU, Max30100, ECG sensor, DS18B20 temperature sensor for monitoring health parameter. This data is measured and displayed on Thing speak IoT platform.

Khushboo Malvi has proposed IoT based system of Medicine reminder and health monitoring system. She worked with PIC microcontroller to develop the system. Sensors, GSM module and LCD display are interface to PIC microcontroller.

3. Existing system

Now a days in hospitals are using Local display system for monitoring ECG. They are taking manual reading of body temperature, pulse rate, oxygen level. Only doctors and medical staff are present in nursing station. This system is suitable for inside monitoring. Visitors and relatives are frequently not allowed in ICU to visit patient. Once consulting doctor visit is over he is not in touch with the latest health condition of patients.

4. Proposed System

The objective of this Proposed system is to develop GUI that support Multiple Patients health parameter monitoring.

Step 1:- Develop GUI that support user to access health parameter

Step 2:- NodeMCU is the microcontroller where Max30100 sensor, DHT11 sensor ECG sensor are interfaced on local server. ESP32 CAM IP address linked to NodeMCU. All these IoT devices are connected to the common network.

Step 3:- Communicate between GUI and NodeMCU data

5. Block Diagram

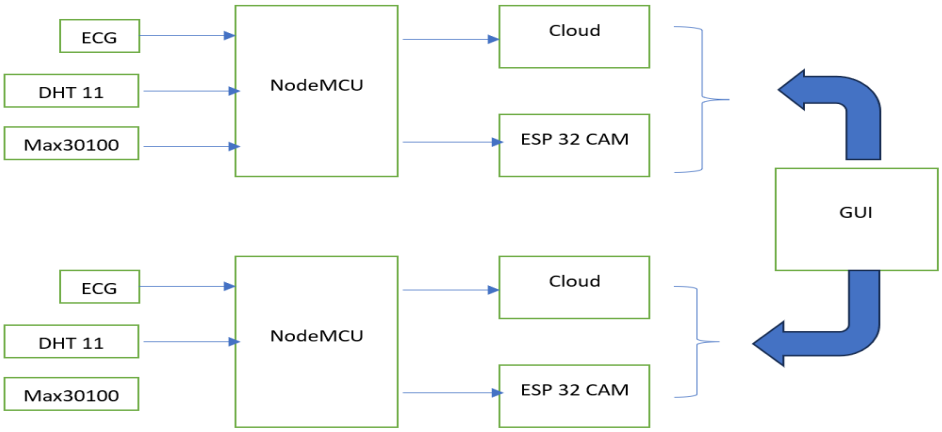

Fig.1 Block Diagram

6. Flow chart:-

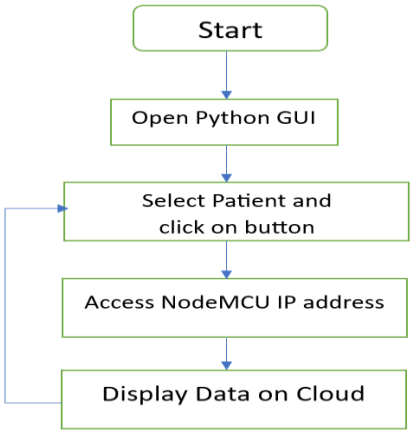

Fig.2 Flow chart

7. Working of Project:-

In this system Python is used to develop Graphical user interface. Buttons are provided to select the respective patient. By clicking button one can access the Patients health parameter. This GUI provide console for doctors, relatives that are outside of the ICU. In this GUI we can add multiple buttons to access multiple patients' data. In this proposed system we created GUI for Two patients.

NodeMCU is the master controller of the system. For each patient we have used separate NodeMCU, Max30100, DHT sensor, ECG sensor. NodeMCU reads the data from sensor and display on HTML page. NodeMCU has IP address. So, it acts as local server. When IP address of NodeMCU is entered in google search engine, it immediately displays the patients' health parameter.

Similarly, ESP32 cam has IP address. Its IP address is embedded in NodeMCU HTML page. So that when NodeMCU display its HTML page, it shows Live video streaming of patient.

This GUI is suitable at hospital.

An individual can access the Patients health parameter data by entering IP address in google search.

One can access data through mobile from anywhere.

8. Components:-

NodeMCU :- It is 32-bit microcontroller. It has inbuilt ESP8266 wifi module. It can easily connect to the internet by providing SSID and Password. It can be programmed through Arduino IDE. It an work on 3.3 V. D1 and D2 will act as SCL & SDA pins of NodeMCU and is connected to the SCL & SDA pins of max30100 sensor.

Fig.3 NodeMCU

Max30100:- This is small size three in one sensor.it measures Pulse rate, Oxygen level, Body Temperature. This is low powered device and it uses 3.3 V. SCL and SDA pins are connected to the NodeMCU. It uses I2C protocol. When finger is placed on photo detector then light from red led enters through skin in finger. some light gets aborted and remaining get reflected. This reflected light is used for measurement by using photo detector.

Fig. 4 Max30100

DHT11:-This is room temperature and Humidity sensor and is connected to the D5 pin of NodeMCU

Fig.5 DHT11

ECG Sensor:- AD8232 ECG module is used to measure ECG parameter. It is connected to the analog pin of NodeMCU

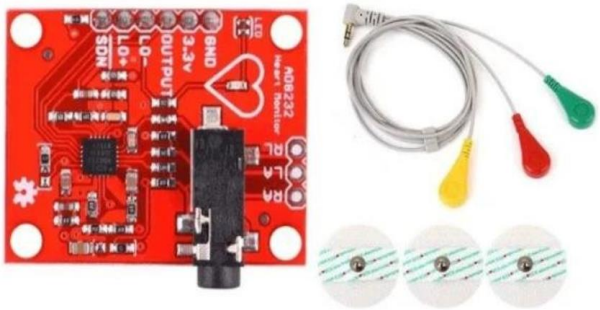

Fig. 6. ECG sensor

ESP32 CAM:- this camera module is used to display the Video at its IP address. Its IP address is embedded in NodeMCU. It is also low powered device. WIFI ssid and password is given to esp32 cam.so that when power on it automatically get connected wifi and can start the streaming video or still.

Fig.7 ESP32 CAM

9. Result

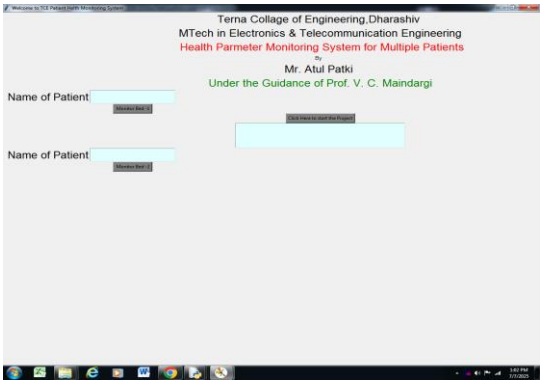

Fig.8 GUI

Fig.9 Patient-1 Live data streaming

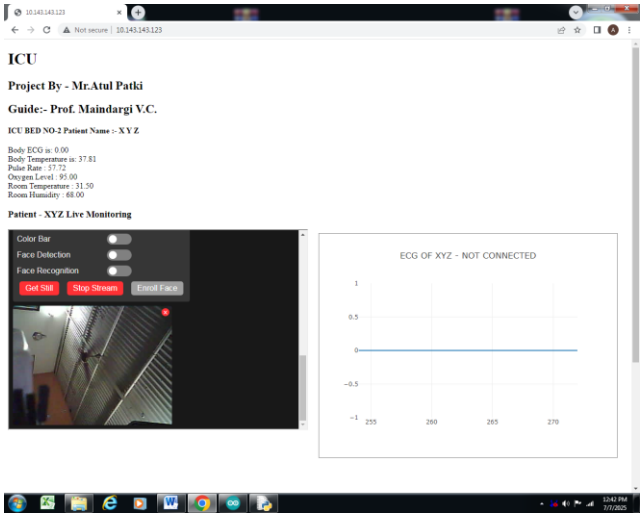

Fig.10 Patient-2 Live data streaming

10. Conclusion

The system is succesfuly implimented with GUI and IP address of NodeMCU & ESP 32 CAM.
Data transmission, data display, Graph Plotting, video streaming is very fast. This is user friendly system.
This system utilises low power & is highly accurate.

11. Project Photo:

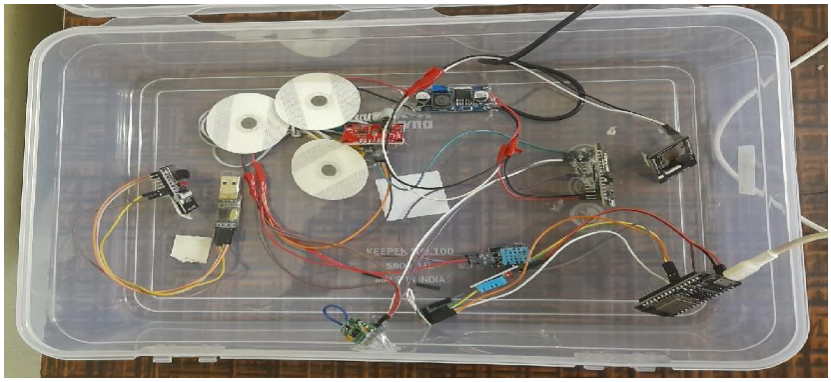

Fig.11 Project Photo

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