A. PROPOSED SYSTEM

The proposed system monitors the health parameters of the user in real-time using cheap and efficient components. The components of the proposed systems are split into two layers. In the first layer the microcontroller gets the data gathered from the sensors in real time and send it to the cloud database via Wi-Fi. In the second layer, a real-time plot of the data is produced via a developed app. The app also pushes a notification and sends a SMS if any abnormal values are recorded.

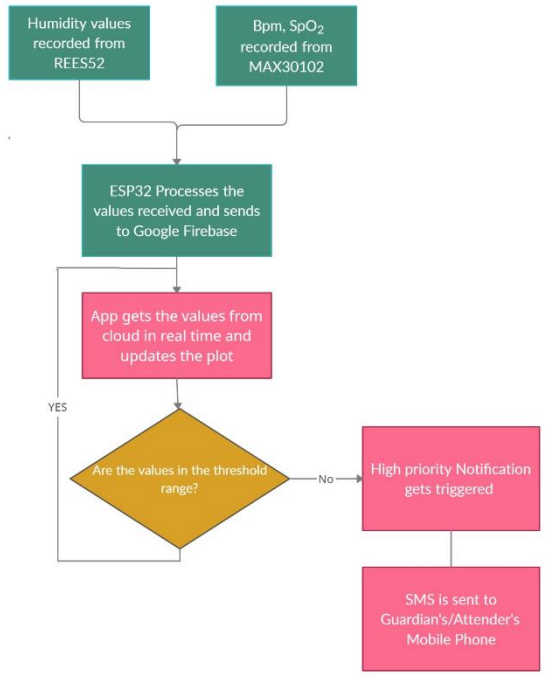


Figure 2.2.1 Schematic Flow Chart of the Proposed System

B. HARDWARE COMPONENTS

This section specifies the hardware details of the proposed system which consists of a Microcontroller which has inbuilt Wi-Fi module, sensors for measuring Bpm, SpO_2 and humidity.

ESP32 MICROCONTROLLER

ESP32 is a Microcontroller Unit (MCU) made by Espressif Systems LTD for IoT. It is a System on a Chip (SoC) series with Wireless Fidelity (Wi-Fi), dual-mode Bluetooth. It has a clock rate of up to 240 MHz. It has an inbuilt power amplifier, low-noise receive amplifier, filters, and power management modules. It has Pulse Width Modulation (PWM) signal generation through 16 channels and supports SPI, UART modes of communication. It is low cost and consumes less power and requires a supply voltage ranging from 2.2 V to 3.6 V.

ESP32 Microcontroller

REES52 Humidity sensor

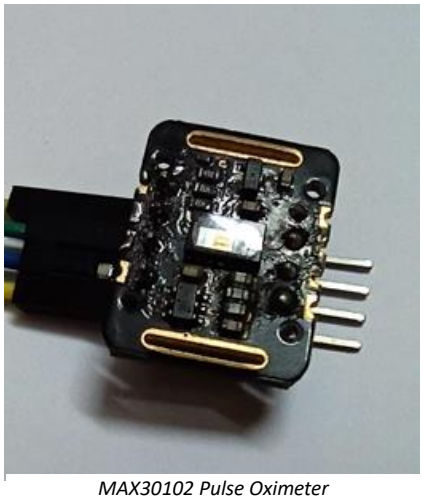
REES52 is a low-cost humidity and temperature sensor, which gives digital output and provides high reliability and long-term stability. It has 3 pins Vcc, GND, and Output. It requires a 3.3 V to 5 V supply and the measurement range of humidity is 20-95% RH and temperature is 0~50℃. It uses a capacitive humidity sensor to detect the ambient humidity and a thermistor to read temperatures to a resolution of 1℃.

REES52 Humidity Sensor

MAX30102 Pulse Oximeter

REES52 is an ultra-low-power operation biosensor module, integrated with LEDs, low noise electronics with ambient light rejection, photodetectors, and optical elements. It requires a 3.3 V to 5 V supply and uses I2C protocol for communication.

The sensor consists of 2 LEDs, one emits red light and the other emits Infra-Red (IR) light and a photodetector. The red LED wavelength is 650 nm and an IR LED are approximately in 950 nm wavelength. A photodetector measures the light intensity and the difference between the light intensity of RED and IR LED is used to calculate a close to accurate value of the heartbeat and oxygen level in the blood.



MAX30102 Pulse Oximeter

LITHIUM-POLYMER RECHARGEABLE BATTERY

To power the system a Lithium polymer battery, also called as Li-Po battery, has been used. It gives an output voltage of 3.7 V and has a capacity of 300 mAh. It is thin, lightweight and efficient which makes it easier to used even in mobile systems. The approximate size will be 25 × 20 × 4 mm. It could also be recharged by supplying a voltage after reversing the polarity.

Li-Po Battery