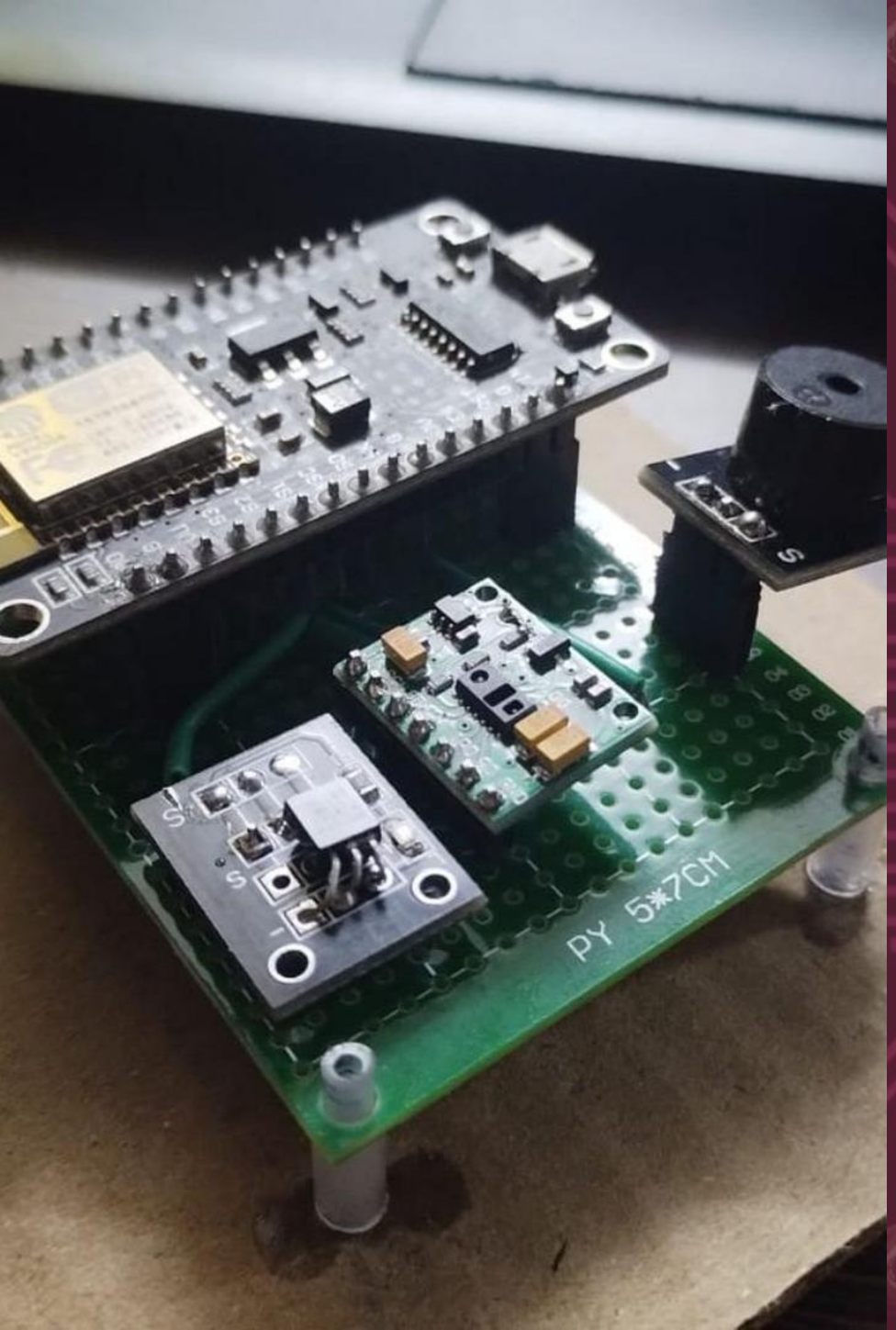


A Realtime health monitoring system

Introduction

In today's healthcare landscape, the ability to continuously and efficiently monitor patient health is crucial, especially within resource-constrained environments like government hospitals. Our project addresses this critical need by proposing a cost-effective, real-time health monitoring device.

This device is capable of measuring vital physiological parameters such as heart rate, blood oxygen saturation (SpO2), and body temperature. The collected data will be seamlessly transmitted to an online website, enabling healthcare professionals to monitor the patient's health. This approach promises to enhance patient care, facilitate early detection of critical changes, and optimize resource allocation within the healthcare system, ultimately contributing to improved public health outcomes.

Contents

Project Scope and Objectives

Primary Goals

Develop a system capable of continuously tracking key health parameters such as heart rate, SpO2 levels, and body temperature.

Technical Challenges

Ensuring reliable and consistent data from heart rate, SpO2, and temperature sensors and Seamless integration of microcontroller, sensors, and communication modules within hardware constraints.

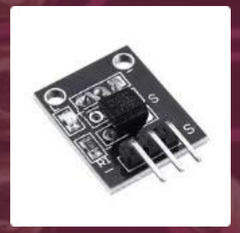
Components and cost:

ESP8266 NODE MCU

Cost: Rs. 166

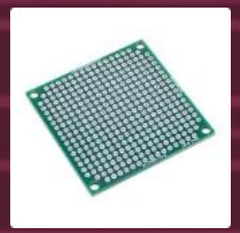
MAX30100 HEART RATE SPO2 SENSOR

Cost: Rs. 106



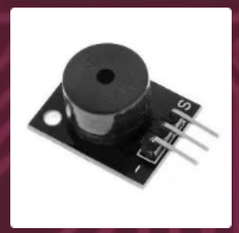
DS18B20 TEMPERATURE SENSOR SENSOR

Cost: Rs. 69



PERF BOARD

Cost: Rs. 30



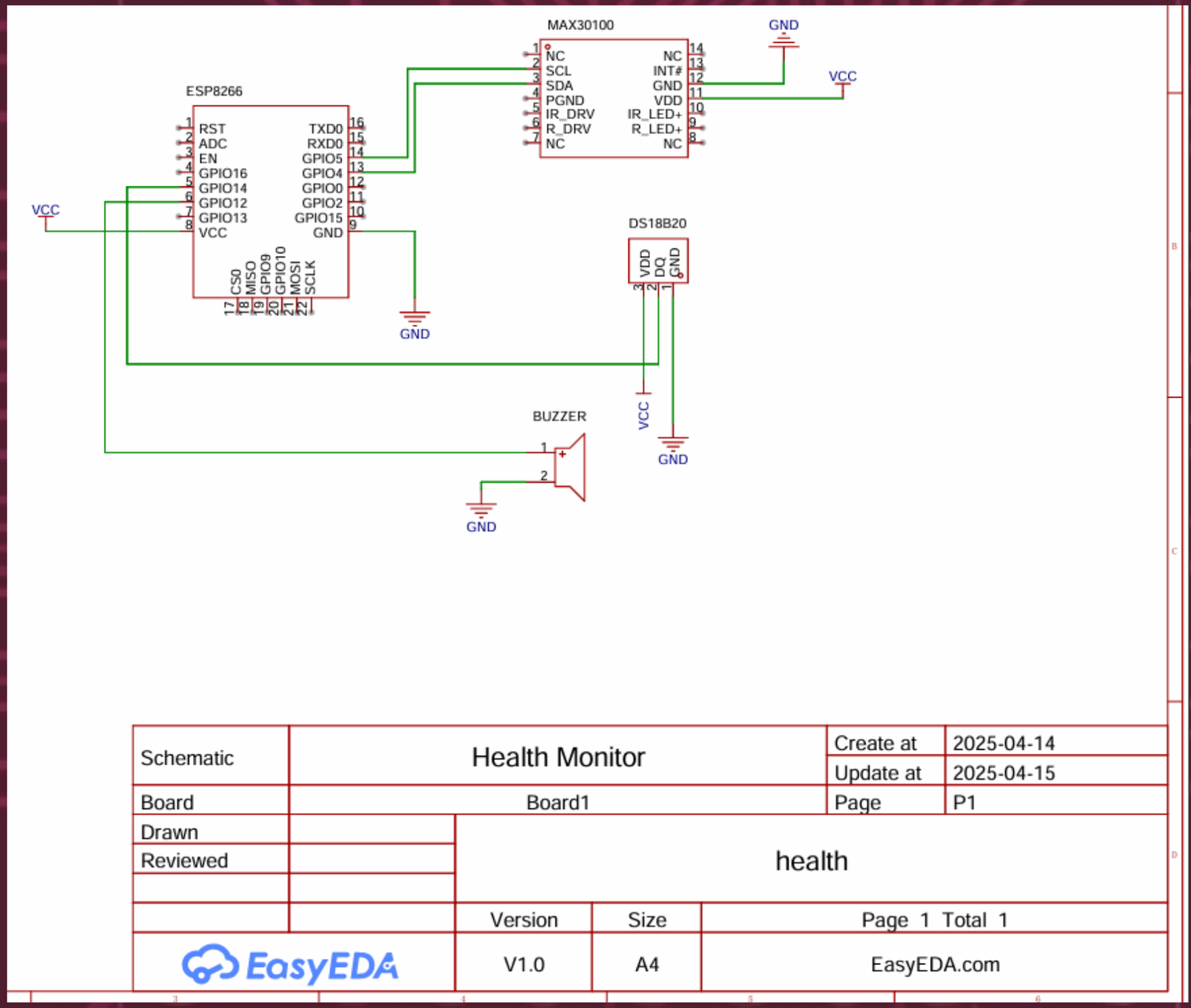
BUZZER

Cost: Rs 32

TOTAL COST

cost: Rs. 403

Circuit Diagram:



Project Results:

ANALYSIS ON THE VITAL READINGS

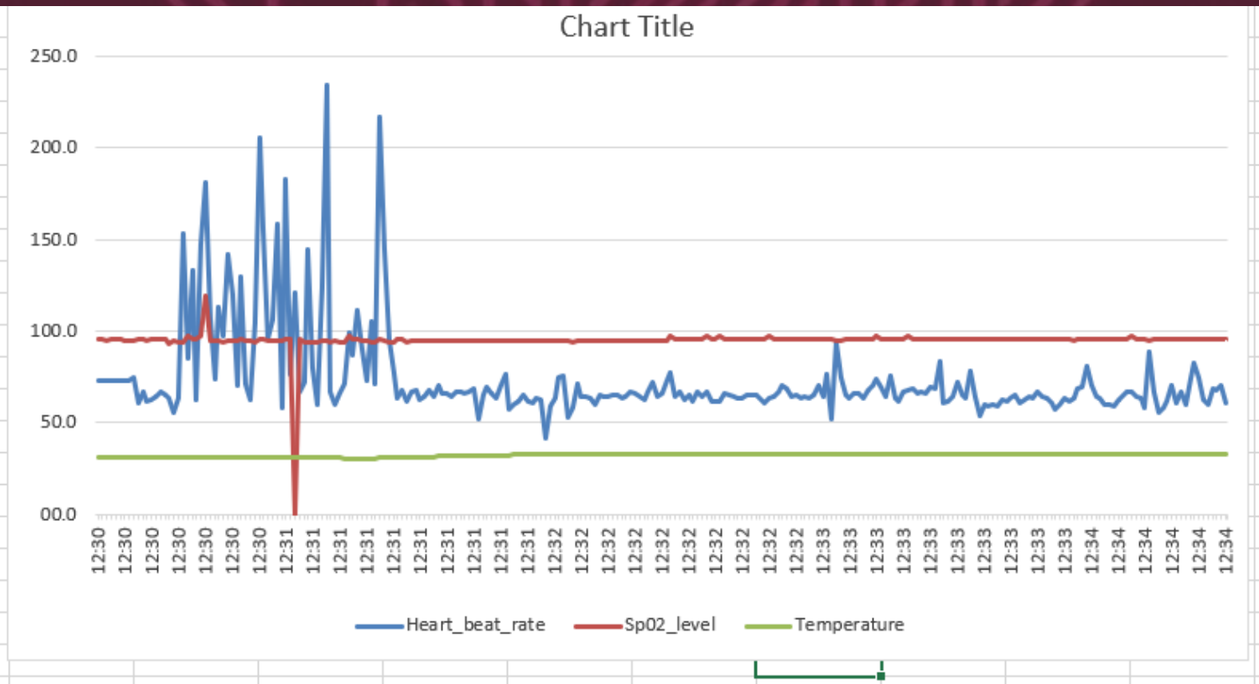
averages	value
hear rate	73.8
sp02	95.3
temp	32.3

medain	values
heart rate	65.6
sp02	96.0
temp	32.8

mode	value
heart rate	72.9
sp02	96.0
temp	32.9

variance	value
heart rate	684.9
sp02	38.8
temp	0.7

SD	value
heart rate	26.17
sp02	6.23
temp	0.837



we can conclude that it requires some time for the hear rate sensor to get accurate values ,
at the initial time, noise is high and after around 1 min the sensor gives stable vales with accurate result >90%

- The **average, median, and mode** are all within a normal resting heart rate range for adults (60–100 bpm).
- The **high variance and standard deviation** indicate significant fluctuations, which is visible in the graph (especially at the start, with many spikes and outliers).

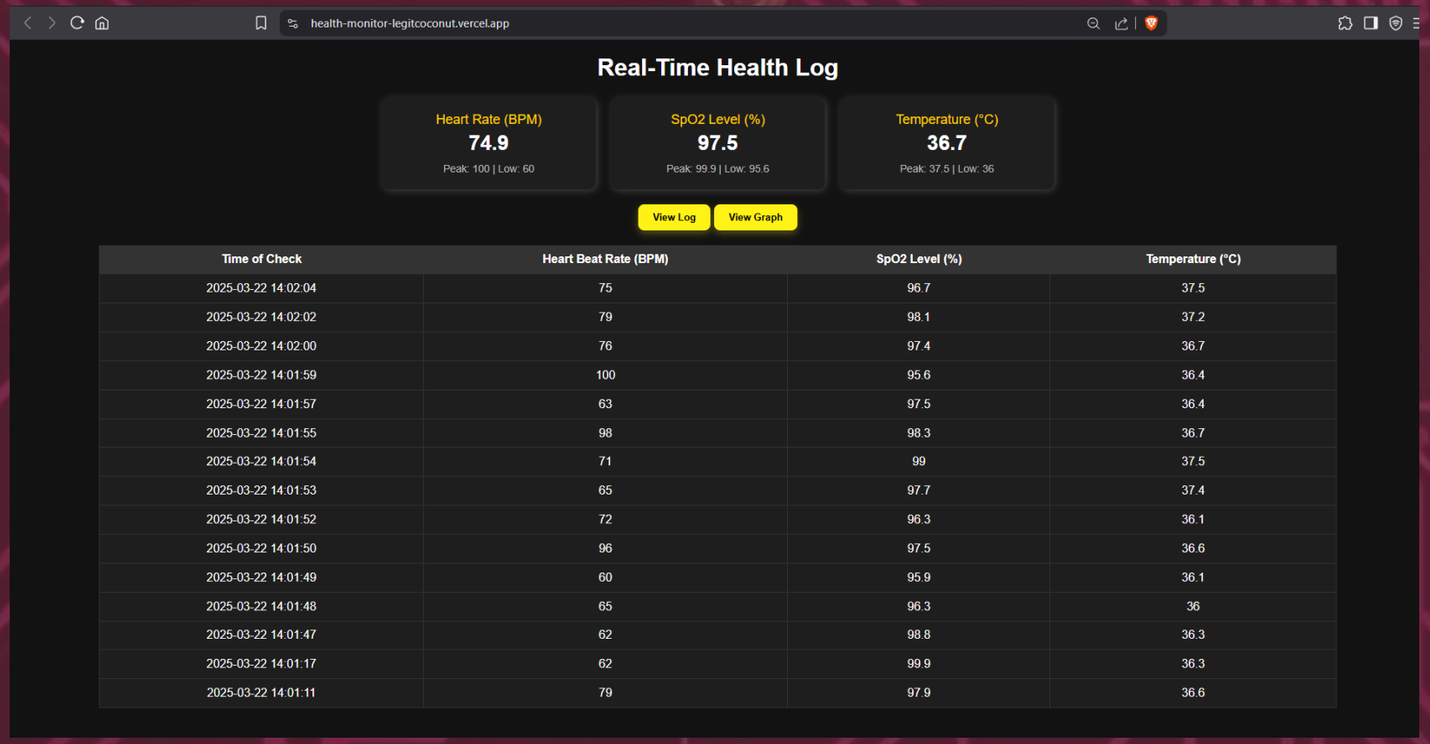
- The **average, median, and mode** are all within the normal range (95–100%).
- Excluding the outlier, SpO2 is stable and healthy.

- The **average, median, and mode** are all very close, indicating stable readings.
- The **variance and standard deviation** are very low, confirming the stability seen in the graph

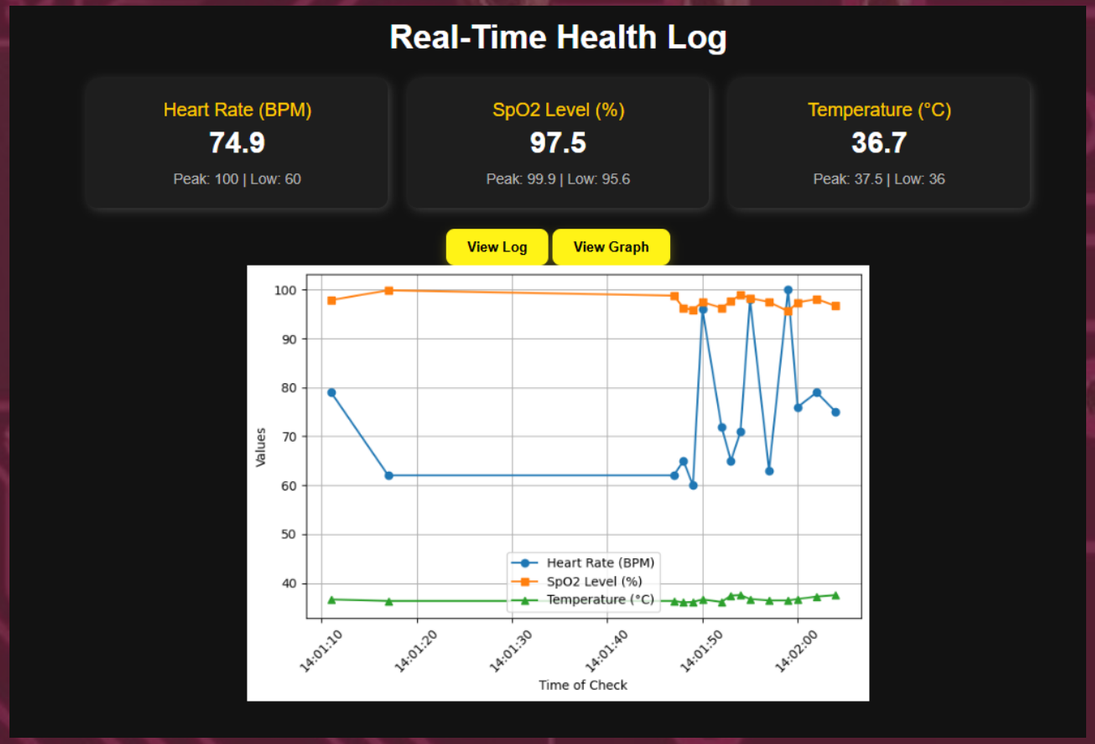
Project Results:

The following screenshots illustrates the user interface of our project's website. Through this platform, this platform, authorized users can access patient data and monitor them.

Link : https://health-monitor-legitcoconut.vercel.app/



Time of Check	Heart Beat Rate (BPM)	SpO2 Level (%)	Temperature (°C)
2025-03-22 14:02:04	75	96.7	37.5
2025-03-22 14:02:02	79	98.1	37.2
2025-03-22 14:02:00	76	97.4	36.7
2025-03-22 14:01:59	100	95.6	36.4
2025-03-22 14:01:57	63	97.5	36.4
2025-03-22 14:01:55	98	98.3	36.7
2025-03-22 14:01:54	71	99	37.5
2025-03-22 14:01:53	65	97.7	37.4
2025-03-22 14:01:52	72	96.3	36.1
2025-03-22 14:01:50	96	97.5	36.6
2025-03-22 14:01:49	60	95.9	36.1
2025-03-22 14:01:48	65	96.3	36
2025-03-22 14:01:47	62	98.8	36.3
2025-03-22 14:01:17	62	99.9	36.3
2025-03-22 14:01:11	79	97.9	36.6



Conclusion

- The Realtime Health Monitoring System demonstrates the potential of low-cost, hardware-based based solutions in transforming public healthcare infrastructure. By integrating vital sensors with sensors with microcontrollers and enabling remote access via an online platform.

- The project offers an affordable and scalable method to continuously monitor patient health in real time. Despite technical challenges, the system lays the foundation for smarter, faster, and more accessible healthcare — especially in government hospitals and resource-limited settings.

- With further improvements and cloud integration, this solution can significantly reduce response times, improve patient outcomes, and modernize healthcare delivery across large populations.

References:

1

Last Minute Engineers

Interfacing MAX30100 Pulse Oximeter and Heart Rate Sensor with Ardui...

Learn to interface MAX30100 Module with Arduino along with working, Pinout, MAX30100 not working problem & solution, code for measuring heart-rate, oxygen saturation, temperature

2

GitHub

Arduino-libraries/DallasTemperature at master · vlast3k/Arduino-libra...

Contribute to vlast3k/Arduino-libraries development by creating an account on GitHub.

3

GitHub

GitHub - esp8266/Arduino: ESP8266 core for Arduino

ESP8266 core for Arduino. Contribute to esp8266/Arduino development by creating an account on GitHub.