

# IOT Based Smart Health Band

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**Abstract - Healthcare monitoring is increasingly important due to busy lifestyles, chronic diseases, and delayed diagnosis in traditional systems. This paper presents an IoT-based health monitoring system that measures vital signs, including heart rate and body temperature, while also tracking the user's live location. The system uses MAX30102 and DHT22 sensors connected to an ESP32 microcontroller, which processes the data and transmits it to a mobile application and cloud platform via Wi-Fi. A GPS module (NEO-6M) provides real-time location tracking. Alerts are generated when any parameter exceeds safe limits. The results show that the system is reliable, cost-effective, and suitable for home-based monitoring, elderly care, and emergency response.**

**Keywords: IoT, Health Monitoring, ESP32, MAX30102, DHT22, GPS, Real-Time Monitoring.**

## I.INTRODUCTION

The rapid increase in health issues due to stress, sedentary lifestyles, and chronic diseases demands continuous monitoring of vital signs. Traditional healthcare systems rely on hospital visits, which may delay detection and intervention. IoT technology enables real-time health monitoring using sensors and microcontrollers, allowing healthcare providers and family members to track patient status remotely.

This project focuses on developing a low-cost, non-wearable system that measures heart rate and temperature, tracks live location, and provides alerts for abnormal readings. Such systems improve preventive healthcare, enhance safety for elderly users, and provide valuable data for chronic disease management.

### Problem Statement

With increasing health issues due to busy lifestyles and chronic diseases, traditional healthcare systems

often fail to provide continuous monitoring, leading to delayed detection of critical conditions. Existing solutions are costly, wearable, or hospital-based, and may not offer real-time alerts or location tracking. This project aims to develop a low-cost IoT-based system that monitors vital signs, tracks live location, and generates timely alerts, ensuring reliable and accessible healthcare monitoring for home, elderly, and remote patients.

### Background & Motivation

Health issues are increasing due to busy lifestyles, stress, and lack of regular monitoring. Traditional healthcare systems depend on hospital visits and do not provide continuous observation of a patient's health, which can delay diagnosis.

With the advancement of IoT technology, it has become possible to monitor health parameters remotely using smart systems. Sensors and microcontrollers can collect and transmit real-time data, making healthcare more efficient and accessible.

The motivation of this project is to develop a low-cost health monitoring system that can track vital signs and provide real-time updates. It helps in early detection of health problems and supports better patient care and preventive healthcare.

## LITERATURE SURVEY

- Dozee (Mudit Dandwate & Gaurav Parchani)
  - Technology: Ballistocardiography (BCG), contactless sensor mat under mattress
  - Findings: Accurate health monitoring in homes and hospitals
  - Limitations: High cost, non-portable, limited to bed use, privacy concerns
- Saathi (Students, Aditya Birla World Academy)

- Technology: MPU6050 accelerometer, HC-05 Bluetooth, wrist-worn device with mobile app
- Findings: Supports elderly activity, social engagement
- Limitations: Prototype, limited medical accuracy, app-dependent, difficult for some elderly users  
SSSSSS
- Shubhachintak Research Protocol
  - Technology: Biosensors, microcontrollers, AI & ML algorithms
  - Findings: Useful in hospitals, home care, and remote monitoring
  - Limitations: High cost, privacy & security risks, limited battery life, complex for senior user.

Scope of the Project

The IoT-based health monitoring system provides continuous monitoring of vital signs such as heart rate and body temperature, along with real-time tracking of the patient’s location using GPS. It enables early detection of abnormal health conditions by sending alerts to caregivers or family members. The system is especially useful for elderly care, home-based healthcare, and remote patient monitoring. Being low-cost, portable, and user-friendly, it has the potential to improve preventive healthcare and ensure timely medical intervention.

METHODOLOGY

The system uses MAX30102 to measure heart rate and DHT22 for body temperature, connected to an ESP32 microcontroller. A GPS module (NEO-6M) tracks the user’s live location. The ESP32 processes the sensor data and transmits it via Wi-Fi or Bluetooth to a mobile app and cloud platform. Alerts are generated if any parameter exceeds safe limits, providing real-time monitoring and notifications to caregivers or family members.

SYSTEM DESIGN OVERVIEW

The proposed system is an IoT-based health monitoring system designed to measure vital parameters such as heart rate and temperature in real time. It uses sensors like MAX30102 and DHT22 connected to a microcontroller (ESP32) to collect health-related data efficiently. The sensors capture the data and send it to the ESP32, which processes and converts it into meaningful values such as beats per minute (BPM) and temperature in degrees

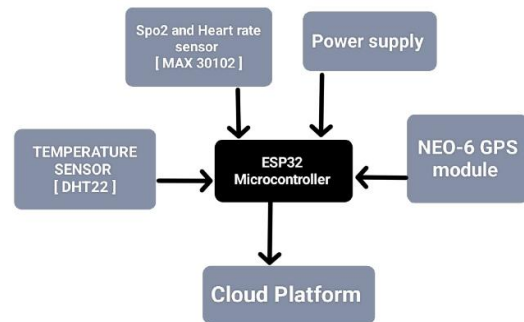
Celsius. The processed data is then transmitted wirelessly using Wi-Fi or Bluetooth.

The system allows users to monitor their health data remotely through a mobile application or cloud platform. It make the system reliable, cost effective, and suitable for continuous health monitoring.

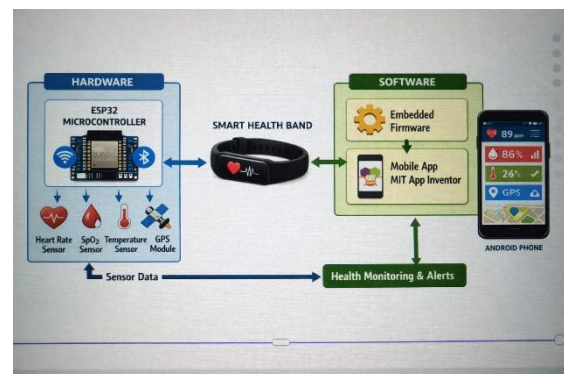
Components used

- MAX30102: Heart rate sensor
- DHT22: Temperature sensor
- ESP32: Microcontroller for data processing
- NEO-6M GPS Module: Real-time location tracking
- MIT App Inventor: Mobile app for user interface and alerts.

BLOCK DIAGRAM



Working

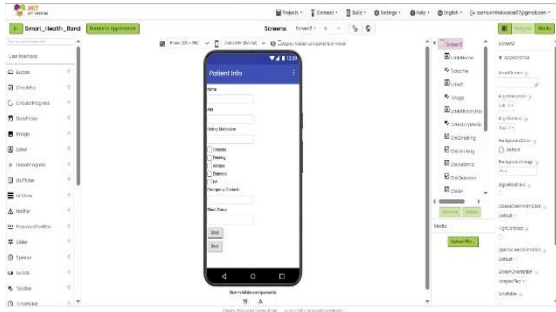


Sensors (MAX30102, DHT22) collect heart rate and temperature data. Data is sent to the ESP32 microcontroller. ESP32 processes and converts data into meaningful values (BPM, °C).

GPS module (NEO-6M) provides live location (latitude & longitude). Processed data is transmitted via Wi-Fi/Bluetooth to mobile app or cloud.

Alerts are generated if any parameter crosses safe limits. User and caregivers can monitor health data and location in real time.

MIT App Inventor App Flow



1. User logs in with credentials.
2. Fills patient information: Name, Age, Medical History, Emergency Contact.
3. Real-time health data and location are displayed on the app.
4. Alerts are received in case of abnormal readings.

RESULT

Sr.No	Date	Time	Body Temp (°C)	HR (BPM)	SpO2 (%)	Latitude	Longitude
1	2026-01-30	18:14:41	28.8	72	96	1838.94076,N	07345.45660,E
1	2026-01-30	18:14:46	28.8	72	96	1838.94076,N	07345.45660,E
2	2026-01-30	18:15:55	29.0	72	96	1838.94076,N	07345.45660,E
3	2026-01-30	18:16:00	29.1	136	96	1838.94076,N	07345.45660,E
4	2026-01-30	18:16:05	29.1	136	96	1838.94076,N	07345.45660,E
5	2026-01-30	18:16:10	29.3	136	96	1838.94076,N	07345.45660,E
6	2026-01-30	18:16:15	29.3	72	96	1838.94076,N	07345.45660,E
7	2026-01-30	18:16:20	29.3	72	96	1838.94076,N	07345.45660,E
8	2026-01-30	18:16:26	29.3	72	96	1838.94076,N	07345.45660,E
9	2026-01-30	18:16:30	29.2	72	96	1838.94076,N	07345.45660,E
10	2026-01-30	18:16:36	29.2	51	96	1838.94076,N	07345.45660,E
11	2026-01-30	18:16:41	29.2	51	96	1838.94076,N	07345.45660,E
12	2026-01-30	18:16:46	29.2	166	96	1838.94076,N	07345.45660,E
13	2026-01-30	18:16:51	29.2	166	96	1838.94076,N	07345.45660,E
14	2026-01-30	18:16:56	29.2	166	96	1838.94076,N	07345.45660,E
15	2026-01-30	18:18:30	29.2	72	96	1838.94076,N	07345.45660,E
16	2026-01-30	18:19:55	29.0	72	96	1838.94076,N	07345.45660,E
17	2026-02-16	13:28:27	29.9	72	96	1838.94076,N	07345.45660,E
18	2026-02-16	13:28:32	29.9	72	96	1838.94076,N	07345.45660,E
19	2026-02-16	13:28:37	29.9	72	96	1838.94076,N	07345.45660,E
20	2026-02-16	13:28:42	29.9	72	96	1838.94076,N	07345.45660,E
21	2026-02-16	13:28:47	29.9	72	96	1838.94076,N	07345.45660,E
22	2026-02-16	13:28:52	30.0	72	96	1838.94076,N	07345.45660,E
23	2026-02-16	13:28:57	30.0	72	96	1838.94076,N	07345.45660,E
24	2026-02-16	13:29:02	30.0	72	96	1838.94076,N	07345.45660,E
25	2026-02-16	13:29:07	30.0	214	96	1838.94076,N	07345.45660,E

Observations:

- Sensors provided accurate, real-time readings.
- GPS successfully tracked live location.
- Alerts triggered for abnormal heart rate or temperature.
- Cloud storage enabled long-term trend analysis.

Graphical Representation of the result  
Heart Rate Graph: Fluctuations over time, peaks indicate stress or abnormal conditions.

Temperature Graph: Tracks fever or body temperature changes.

Location Map: Shows real-time position of patient for emergency response.

Future Scope

- Add additional health parameters like SpO2, ECG, and blood pressure.
- Integrate AI/ML for predictive health analysis.
- Enhance portability with low-power devices and long-lasting batteries.
- Implement secure cloud storage with blockchain for data privacy.
- Integrate with telemedicine services for remote healthcare access.

CONCLUSION

The IoT-based health monitoring system is cost-effective, portable, and efficient, enabling real-time monitoring of vital signs and live location tracking. It is suitable for home care, elderly monitoring, chronic patients, and emergency response. The system ensures timely alerts for abnormal conditions, supports preventive healthcare, and demonstrates the practical benefits of IoT in modern healthcare.

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