

## A Project Synopsis

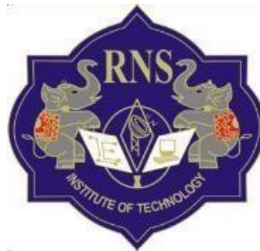
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# “CAREBOT: SMART IOT BASED DEVICE FOR HEALTH MONITORING AND HOME AUTOMATION”

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## RNS Institute of Technology

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**Keywords:** *healthcare, heart-rate monitoring, SpO2, body temperature, calories burnt, soil moisture, humidity, temperature, IoT, wearable, mobile app, WhatsApp, home automation.*

## **I. Introduction:**

The CareBot is an innovative and advanced solution for health monitoring and home automation. With its smart IoT devices, patients' health can be effectively tracked and monitored, providing immense support for individuals whose caretakers may be unavailable. The device keeps a close eye on vital parameters such as oxygen levels, heart rate, body temperature, calories burnt, distance covered, and steps taken. This real-time data can be remotely accessed by doctors, children, and parents, ensuring constant vigilance over the patient's well-being, whether they are at home or elsewhere. [2-5]

This feature is invaluable in critical situations, alerting caretakers promptly and potentially saving lives when the patient is collapsed or unable to get help. Given that cardiovascular diseases alone contribute to a staggering number of global deaths [7], the CareBot's constant monitoring and emergency notifications hold great potential in reducing mortality rates. It also provides access to various applications such as calculators, dictionaries, alarms, timers, and even weather reporting.

In addition to its health monitoring features, the CareBot also incorporates home automation capabilities, enabling patients to lead independent lives [1]. The device includes voltage and current sensors, ensuring the safe operation of medical devices by preventing any potential damage. Moreover, it provides information on power consumption by home appliances through a display, allowing users to monitor and manage their energy usage effectively. It uses a dht11 sensor to monitor the surrounding temperature and humidity to prevent the patient from feeling discomfort. Implementing soil moisture monitoring technology into the diaper of elderly people can have several potential benefits. By incorporating a moisture sensor into the diaper, it would be possible to monitor and manage the moisture levels in the diaper in real time. This can be particularly useful for elderly individuals who may have difficulty sensing or communicating their need for a diaper change.

In conclusion, the CareBot is an innovative and advanced solution that combines health monitoring, home automation, and emergency notifications into a single device

## **II. Objectives:**

Below is the objective of the CareBot device

- Provide comprehensive health monitoring and tracking of vital parameters.
- Enable remote access to real-time health data for healthcare professionals and caretakers.

- Enhance independent living through home automation capabilities.
- Offer access to various applications for convenience and utility.
- Integrate moisture monitoring technology into the diaper for improved comfort and care of elderly individuals.
- Promote proactive healthcare, safety, convenience, and autonomy for patients and caregivers.

Overall, the objective of the CareBot is to provide a comprehensive solution to the patient who needs health monitoring and automate the surrounding according to the needs of the patient.

### **III. Methodology:**

Fig 1 represents the block diagram of the CareBot Architecture. There are 4 blocks in CareBot architecture.

#### **CareBot Band**

The CareBot band is a wrist-fit band that collects information such as heart rate, SpO2 value, number of steps, distance, and calories burnt. The band is equipped with several sensors, including MPU6050 acceleration and gyro sensors, which help to detect motion, and Max30102 sensors, which calculate the heart rate and SpO2 value of the user. The band also features an ILI9341 TFT display that provides a visual interface for the user to interact with the system. The band is powered by an ESP32 microcontroller that interacts with the sensors through SPI or I2C communication.

#### **Firestore Block**

The Firestore block is the central hub of the CareBot system. It collects data from the CareBot band, the mobile application, and the home automation module, and stores it securely. The data collected from the CareBot band is reflected in the mobile application, which serves as the user interface for the system. The Firestore block also authenticates the user when they sign up or log in to the CareBot mobile application.

#### **Mobile Block**

CareBot application provides a dashboard that displays the user's health data in real-time. The application also features a WhatsApp integration, which allows the caretaker to access the patient's health parameters. through the Whatsapp.

#### **Home Automation Block**

The home automation block is responsible for monitoring the patient’s home environment. It consists of several sensors, including voltage, current, moisture, and temperature sensors. The sensors are connected to an ESP32 microcontroller through I2C communication. The information collected by the sensors is uploaded to the Firebase block and can be displayed on the CareBot mobile application.

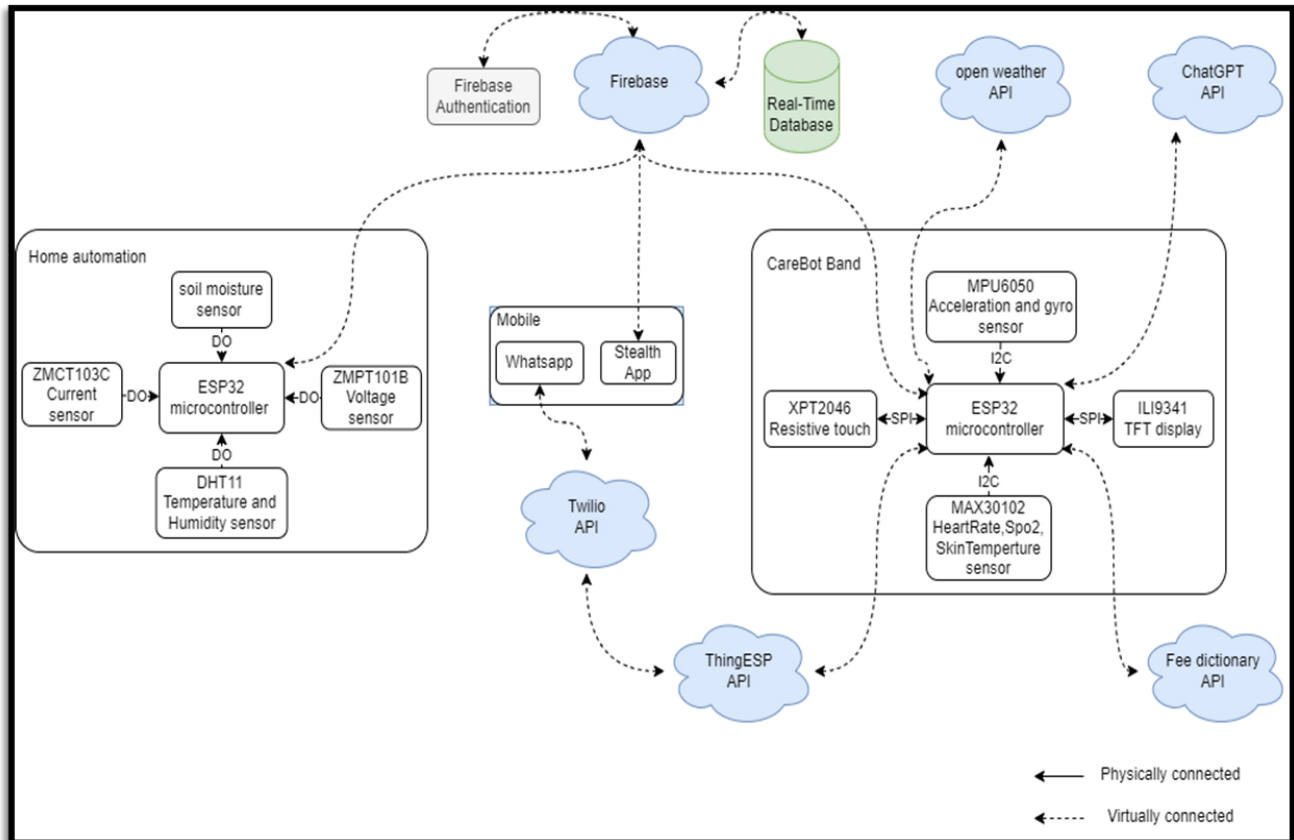


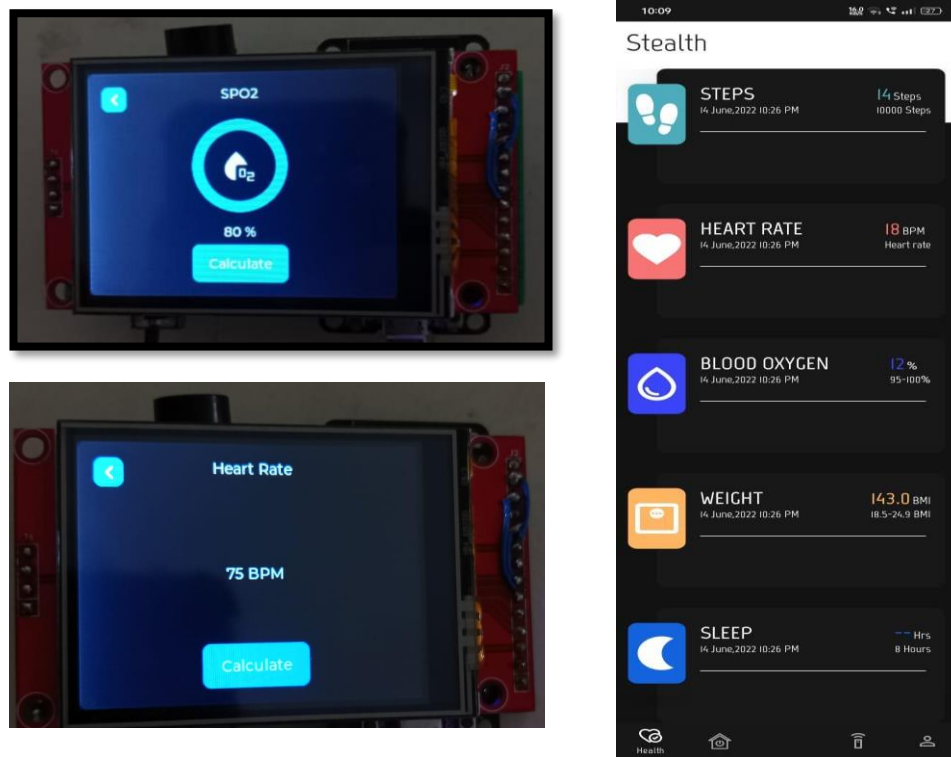
Fig 1 CareBot Architecture

#### IV. Results and Conclusion

CareBot smart band can be used for a variety of purposes. Each application performs a specific function, such as the heart-rate application, which calculates a person's heart rate. The Spo2 application calculates the patient's oxygen level. These details are efficiently and effectively conveyed to the caretaker using WhatsApp and the Carebot application. It also automates the patient's surroundings.

In conclusion, the Carebot device proves to be an essential tool in constantly monitoring the health of elderly individuals and patients. Its ability to detect abnormalities and promptly report

them to trusted contacts allows for faster action to be taken, ensuring timely intervention and potentially saving lives. With its advanced monitoring capabilities, the Carebot device serves as a valuable companion in maintaining the well-being and safety of those in need, providing peace of mind for both individuals and their caregivers.



**Fig 2 CareBot Smart Band and Mobile Screen**

## **V. Future scope:**

In order to enhance the capabilities of the carebot and improve the user experience, several future scope areas can be considered. Integrating mental health evaluation alongside physical health monitoring can provide valuable insights and support. This can involve incorporating mental health assessment tools, such as questionnaires or mood trackers, into the carebot app to monitor indicators and detect potential issues, enabling early intervention or professional assistance.

Apart from this the moisture level sensor can be integrated to diaper to monitor the moisture levels and provide timely care. By integrating a moisture level sensor into diapers for elderly patients, caregivers can monitor the wetness of the diaper remotely or receive alerts when it needs to be changed. This technology can help prevent skin irritation, discomfort, and infections that can occur due to prolonged exposure to wetness. Additionally, it can improve the efficiency of caregiving by reducing the need for frequent manual checks and providing real-time information on the patient's diaper status.

Considering these future scope areas, the carebot project can advance its capabilities, enhance the user

experience, and provide comprehensive health monitoring and support to individuals.

## **VI. What is the innovation in the project?**

The innovation in this project lies in the integration of multiple features and technologies to create a versatile and cost-effective device. The use of Wi-Fi instead of Bluetooth enables seamless data access from any part of the world, providing convenience and flexibility for users. By leveraging Twilio and WhatsApp, the device can reflect real time reports of the body vitals, ensuring quick and effective communication during critical situations.

Furthermore, the inclusion of home automation capabilities, specifically monitoring the moisture level in potted plants, adds an additional layer of functionality and convenience to the device. Users can remotely monitor and maintain their plants' health, ensuring optimal conditions for growth and minimizing the risk of under or overwatering.

The integration of a moisture level sensor into diapers for elderly patients enables remote monitoring and timely care. It helps prevent skin irritation, discomfort, and infections by providing real-time information on the diaper's wetness. This technology improves caregiving efficiency by reducing manual checks and alerting caregivers when a diaper change is needed.

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