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Wearable Health Monitoring Device

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ABSTRACT

IoT Based Wearable Health Monitoring DeviceSong key fitness parameters which include heart fee, step count and frame temperature in actual-time. It keeps person data permanently in a database you can request via a cell app. The device capabilities treatment reminders and emergency indicators, alerts kin or caregivers when vital thresholds are crossed. It also assures automatic statistics syncing and faraway access with the aid of WiFi connectivity.

This device is speedy and most that prefer to alarm, for aged man or woman health fanatics and sufferers struggling from continual ailments, are avoids regular clinic visits. It enables health control and medical intervention on time with the integration of IoT generation into healthcare. This serves as an inexpensive, consumer-friendly solution to fill the gap between traditional health care and modern digital technology.

Introduction:

In ultra-modern virtual era, healthcare is evolving with era which lead to the upward push of clever fitness monitoring systems. The information that is caught in this IoT-Based Wearable Health Monitoring System is to music key health parameters like heartbeats, step number, and frame temperature in the genuine surroundings. The data gathered is stored securely in a database, allowing consumers to access their medical knowledge by using a cellular software. The tool additionally features medicinal drug reminders and creates alerts while important limits are exceeded, alerting circle of relatives people or caregivers to make sure timely scientific consideration. This wearable solution, unlike tracking gadgets, provides 24/7 monitoring without requiring regular hospital appointments.

This mission is especially useful for the elderly, the sick with persistent health problems and sports addicts want to display their health independently. The tool guarantees records transmission and far off get entry to through the use of IoT era and WiFi connectivity.

C++ (Microcontroller Programming)

The microcontroller (like ESP32) is programmed in C++ to manner sensor facts and manipulate tool operations It manages correspondence with heart charge, temperature, and step depend sensors, techniques the accrued records, and sends it to the mobile utility over WiFi. C++ is utilized to guarantee real-time monitorization the fitness results and to maximize muscle consumption for the wearable device.

Java (Android Development)

The Android utility which is an interface for accessing health records is built using Java. It allows for stable login, data retrieval, natural time fitness monitoring, and alert reminders. The strong structure offered by Java helps guarantee the app is running effectively and quickly, and it's also well-suited for being used on many Android devices.

Android Studio (App Development Environment)

Android Studio provides a powerful IDE for building the mobile application. It facilitates UI/UX design, integrates real-time database connections, and supports background services for continuous data synchronization. Features like user authentication, health history tracking, and emergency alerts are implemented within this environment to ensure seamless operation.

Firebase:

Firebase (Database and Cloud Storage)

Firebase is used as the cloud database for storing and managing user health data securely. It enables:

- This security is done with the help of Firebase Cloud database which is used to save and process user fitness data. It allows:
- Real-time facts synchronization between wearable devices and cell apps.

- User authentication, allowing permanent login and personalized access.
- Health history storage, to ensure users will always be able to check their past statistics anytime.

The further development of this IoT-Based Wearable Health Monitoring System is done in a structured approach to ensure smooth functioning, accessibility for users, as well as effective health observation

1. User Login

The device begins with a gradual login and registration module, where clients can sign up the use of their electronic mail and password. All this lends towards customized get right of entry to to the platform, which means that every consumer can securely view their fitness facts, indicators, and medicinal drug reminders. Then this login device hooked up to a database that is used to save person credentials and all scientific records..

2. Home Page

After a successful login, the users are redirected to the home page, which is the main dashboard displaying real-time fitness metrics, including:

- Heart Diagnosis: Analyzes heart rate trends and detects abnormalities.
- Heart Rate Monitoring: Displays the current heart rate and alerts the user if it crosses a predefined threshold.
- Step Count: Tracks daily movement and activity levels.
- Temperature Monitoring: Shows body temperature readings in real-time.
- Medicine Reminder: Notifies users of upcoming medication schedules.

The data displayed on the home page is continuously updated, ensuring real-time health monitoring.

3. Menu Section

The menu tab offers consumers extra features for comprehensive fitness tracking and analytics:

History: Historical stores of health records, enabling customers to monitor their heart charge, steps, and temperature over the years.

•Illness Detection: Detects patterns inside the amassed statistics and offers early warnings of potential illnesses.

Emergency Alerts: In case of unusual readings, alerts are sent to care givers or family members.

The time-honored technique of approaching that illustrates the dependency of the IoT-based wearable health monitoring machine makes it client-pleasant, green, and in a position to send real-time fitness associated statistics to the clients, whilst maintaining the facts protection and accessibility..

Technologies Used:

The development ensures that the frontend of the application is responsive and convenient for health metric display, utilizing Java and Android Studio. Firebase powers the backend, responsible for user authentication, health data storage, and real-time statistics synchronization.

The system adopts an eco-friendly approach to provide real-time health tracking with an IoT-based wearable device. After authenticating via a secure login system, users are brought to the entry to the dashboard, which presentations simple-appraisal of key fitness parameters which include heart price, step matter and temperature. Other features include medication reminders, tracking health records and illness detection.

The tech stack consists of Java (for the development of the Android app) and Android Studio (for UI/UX design) as frontend technologies, even as backend technologies such as Firebase are used to store and fetch user information. The microcontroller has been programmed using C++ to gather and send sensors records through WiFi, adhering to the smooth connection between the wearable tool and the cellular software.

Mobile Application:

Our IoT-Based Wearable Health Monitoring System user interface UI is designed using Java and Android Studio, providing customers with a responsive, intuitive, and visually appealing experience. This is the mobile software that makes it possible for reach on smartphones and pills, allowing customers to reveal their fitness anytime, everywhere. It displays updates on heart fee, step depend, frame temperature, and remedy reminders, making sure seamless person interaction and health tracking.

Wearable Device:

The heart and soul of the wearable fitness tracking device is an ESP32 microcontroller running C++ code. It aggregates real-time data from sensors, such as:

- Heart Rate Sensor – Measures heart charge and senses abnormalities.
- Ambulatory Monitoring System: Wearable sensors for real-time health parameters monitoring.
- Accelerometer/Pedometer – Monitors steps and physical activity.

Here, the statistics gathered is relayed over WiFi to the mobile utility to enable verbal exchange and monitoring of well being as it occurs.

Firebase Integration:

Firebase is a cloud-based totally platform by means of Google integrated into the machine for consumer authentication and fitness facts garage.

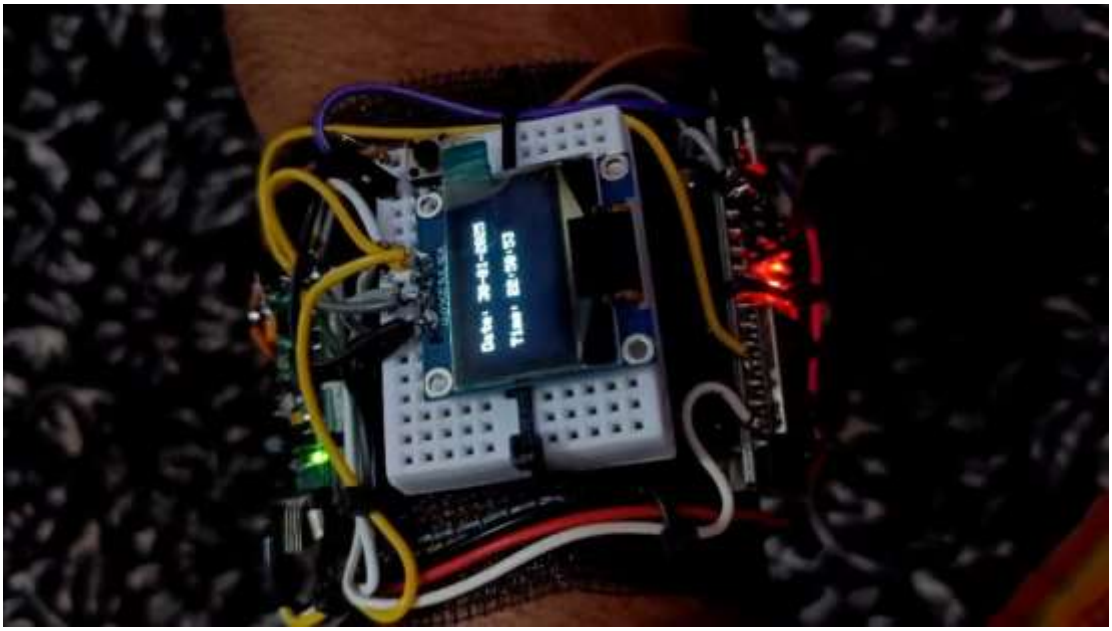
- Firebase Authentication provides secure login and registration system, allowing consumers to create debts and get entry to their health data.
- Firebase Realtime Database or Cloud Firestore for green information storage and retrieval, allowing customers to observe their fitness history, step remembers, and medicinal drug reminders at any time.
- This is important to ensure that the app is always updated with the latest physical health indicators from the device.

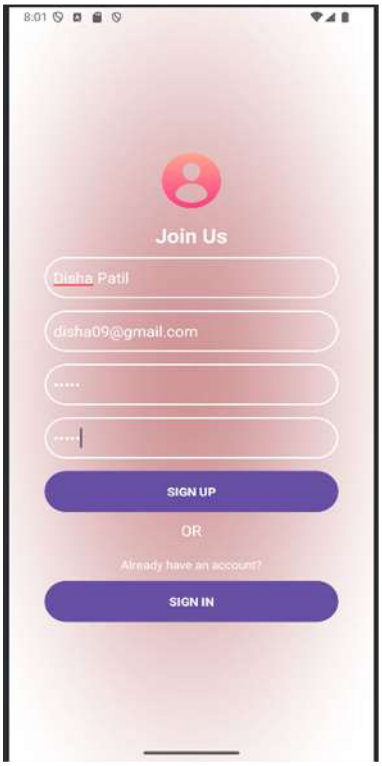
Prospects & Future WorkAt this stage, we have mobile software, wearable tool, and integration with Firebase for real-time workout updates, providing for a coherent fitness keeping up-to-date experience.

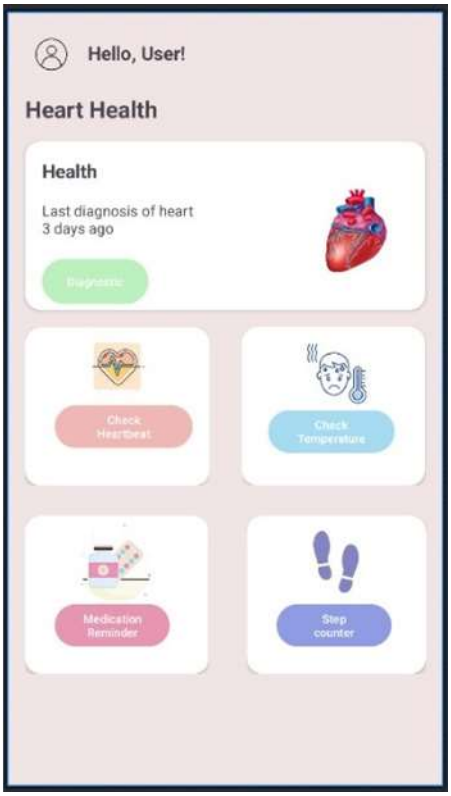
RESULT:

This project provides a real-time health monitoring device using wearable IoT device and a mobile application. It serves quantum steady client verification, a dashboard that showcases basic medicinal drug metrics such as coronary heart rate, step matter and temperature, as nicely as medicinal drug hints and health data monitoring. The device offers steady health tracking and gives an smooth-to-use interface for users to get admission to their scientific facts any time.

This was an ultimate fitness management solution to help people, older customers, and individuals with chronic diseases. It assures a simple, successful, and dependable option for non-public healthcare by means of incorporating the IoT technology, actual-time records processing, and Firebase for cloud garage. This is to augment accessibility, comfort, and moving well being through the exploit of the device, enabling customers to improved manipulate their nicely-being.







CONCLUSION:

This project aims to make health monitoring more accessible and efficient through an IoT-based wearable device and mobile application. By combining real-time health tracking, user authentication, and cloud-based data storage, it provides a comprehensive and user-friendly solution for individuals to monitor their well-being. The system ensures continuous tracking of heart rate, step count, and temperature, along with medicine reminders to promote better health management. With its seamless integration of IoT and mobile technology, this project offers a reliable, real-time, and convenient approach to personal healthcare, enabling users to take proactive control of their health anytime, anywhere.