HMS - Smart Health Management

Prof. Jagruti Wagh, Ms. Priyanka More, Mr. Adesh Gadekar, Mr. Devashish Kukade, Mr. Aaditya Komerwar

Computer Department, Savitribai Phule Pune University

Abstract— **Maintaining good health and having an efficient healthcare system are crucial for individuals. The recent outbreaks of diseases like the coronavirus have highlighted the significance of healthcare even more. In such pandemics, a remote monitoring system based on the Internet of Things (IoT) has emerged as a promising solution. The healthcare industry has been actively exploring the potential of IoT, which is a rapidly growing field. The primary goal of this system is to enable remote healthcare monitoring, allowing individuals to monitor their health from any location they desire. By leveraging the power of IoT, this technology aims to revolutionize healthcare delivery and improve patient outcomes.**

Keywords— *IOT, GSM Module, ESP8266 , Pulse Sensor , Temperature Sensor*

INTRODUCTION

Ensuring good health and establishing an effective healthcare system are of utmost importance for individuals. Recent events such as the COVID-19 pandemic have further underscored the significance of healthcare. In addition, individuals with physical disabilities and the elderly often require reliable healthcare systems. One potential solution to address these challenges is the implementation of remote health monitoring systems. Leveraging the Internet of Things (IoT) technology is particularly advantageous due to its rapid advancements. By utilizing IoT-based health monitoring services, prompt diagnoses can be made even in the absence of physicians, while also mitigating the rapid spread of diseases like COVID-19. Remote doctors can utilize IoT to monitor patients' health conditions and diagnose their well-being from a distance. A portable physiological monitoring framework continuously tracks vital parameters such as heartbeat and temperature, transmitting the data for monitoring and storage on a server. This continuous monitoring and control system aims to provide remote health monitoring, enabling authorized individuals and doctors to access the stored data for disease diagnosis. The main objective of our project is to design and implement a smart health monitoring system. The system utilizes sensors to track patients' health conditions, transmitting the information to doctors through the internet. Furthermore, the development of this health monitoring system seeks to reduce healthcare costs by minimizing the need for frequent in-person doctor visits. Individuals requiring continuous monitoring outside of hospitals will benefit from this smart healthcare solution. Additionally, effective communication between nearby clinics and city hospitals regarding patients' health status is crucial. Our work presents a smart health monitoring system that utilizes biomedical sensors to monitor patients' conditions, with the internet serving as a means to disseminate relevant updates to concerned parties. To facilitate data visualization and storage on smartphones, a website and Android application have been developed. The Android application allows easy access to patient information for both the patient and their family members. This project aims to implement a smart patient health tracking system, utilizing sensors to monitor patients' well-being and utilizing internet connectivity to promptly inform loved ones in case of any anomalies. By reducing physician visits and hospitalizations, the development of remote monitoring systems can contribute to lowering healthcare costs.

PROBLEM STATEMENT

The well-being of individuals plays a pivotal role in leading a fulfilling and healthy life, emphasizing the need for a robust healthcare system. Recent events, particularly the COVID-19 pandemic, have underscored the criticality of healthcare systems. Tragically, many lives were lost during the pandemic due to insufficient treatment and a shortage of hospital beds. Physically challenged individuals and the elderly, who require specialized care, also necessitate a flexible and reliable healthcare system. Bedridden patients, experiencing partial or complete paralysis following a stroke, require continuous health monitoring. Accessing hospitals poses significant challenges for financially disadvantaged individuals and those residing in rural areas. Existing healthcare systems often face limitations in maintaining continuous health monitoring. Additionally, it is essential for doctors to have convenient access to patients' health data, even when physical proximity is challenging. To address these concerns, the implementation of a Remote Health Monitoring system can be instrumental.

EXISTING SYSTEM

Several research studies have put forth proposals for IoT-based health monitoring systems and disease prediction utilizing different techniques. In contrast to the existing systems, the proposed system exhibits notable differences. In existing IoT-based health monitoring systems, data is typically viewed only at the patient's location, employing pulse sensors, temperature sensors, and Bluetooth modules. Some of these systems incorporate a Wi-Fi module alongside sensors and access a cloud platform to visualize the collected data. Moreover, existing IoT-based health monitoring systems typically rely on AC power for operation.

PROPOSED SYSTEM

Due to the rapid advancement of technologies, IoT has emerged as a leading platform for remote-based smart health monitoring systems. The ESP2866 mini module offers microcontrollers the capability to establish WiFi connections and create TCP/IP connections. Our proposed system encompasses a continuous health monitoring system that monitors essential parameters such as the patient's condition and the room environment. Key parameters for determining an individual's health condition include pulse rate and body temperature. We propose utilizing Pulse sensors for pulse rate measurement, TMP37FT9Z sensors for body temperature measurement, and DHT11 sensors for measuring humidity and room temperature. In addition to monitoring the patient's health, we also recognize the importance of monitoring the surrounding environment.

Data captured by the system is transmitted to a cloud platform through a GSM module, enabling doctors to remotely access the patient's health status. The health monitoring system is powered by a battery, which in turn is powered by AC power. This approach enables the implementation of a continuous health monitoring system. An LCD display can be utilized to monitor the patient's health in real-time. Our proposal aims to ensure that the health monitoring system operates effectively in remote areas without requiring additional technologies. An Android application will be developed to provide direct access to IoT readings, and a web application will be available for hospitals to access the patient's data, facilitating efficient healthcare management.
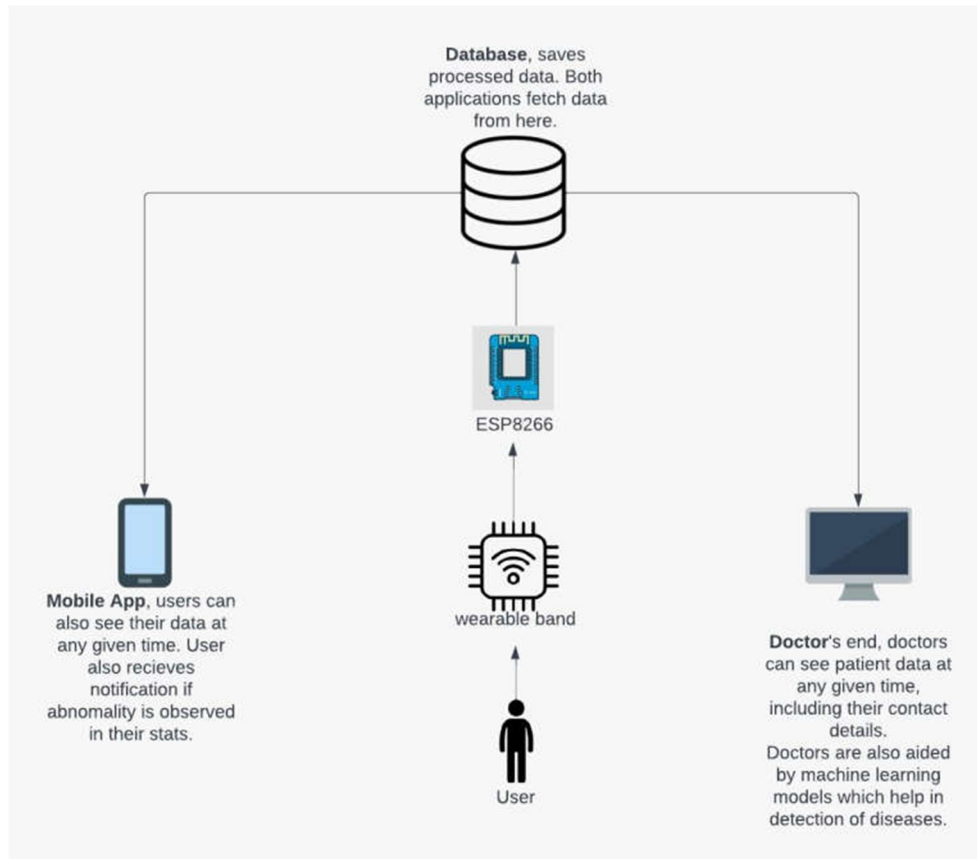
fig.1.1 System Architecture

IMPLEMENTATION

Our primary goal is to develop a Smart Health Monitoring System that enables continuous and uninterrupted monitoring of the patient's health status. Recognizing the limitations and drawbacks of existing systems, we aim to provide a comprehensive solution for the healthcare field. With the implementation of a Smart Health Monitoring System, the patient's health condition is continuously monitored, and the collected data is automatically transmitted to a server for viewing on a dedicated website. This allows caretakers to stay informed about the patient's health status, while also enabling doctors to access the patient's data in real-time.

Our proposed system incorporates nonstop health monitoring and control instruments that securely store patient information in a database, ensuring continuous monitoring of their health. IoT technology is leveraged to enable remote healthcare monitoring systems. Authorized individuals can access the stored data through an IoT platform, facilitating virtual disease diagnosis based on the collected patient information.

For fitness enthusiasts utilizing our system for their personal fitness goals, the sensor results are directly transmitted to the user's application. To ensure personalized health monitoring, users are required to provide their basic information, allowing the device to assess their current health status accurately. In cases where a doctor recommends continuous health monitoring for a patient, the doctor will provide the patient with an ID to register on the application. The patient's ongoing health details will then be accessible on the web application, enabling hospitals to continuously diagnose the patient's condition and take immediate action if any sudden deterioration in health occurs.

Screenshots
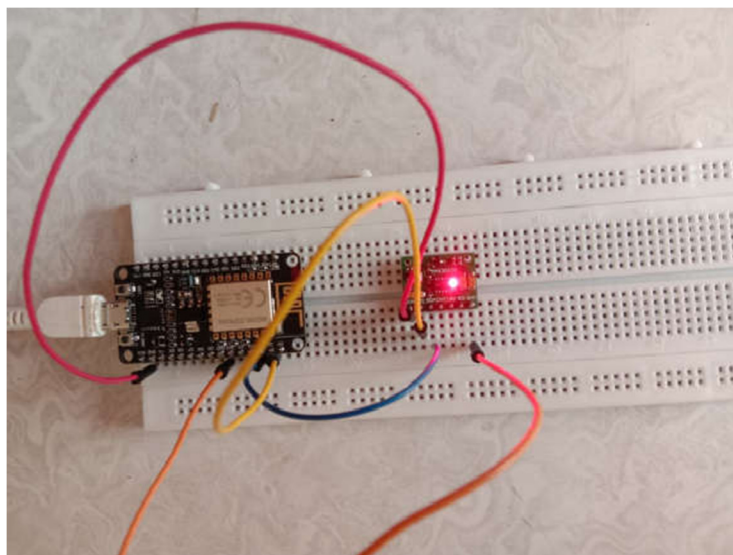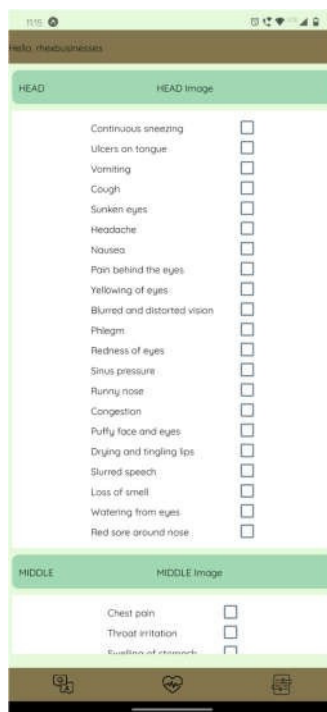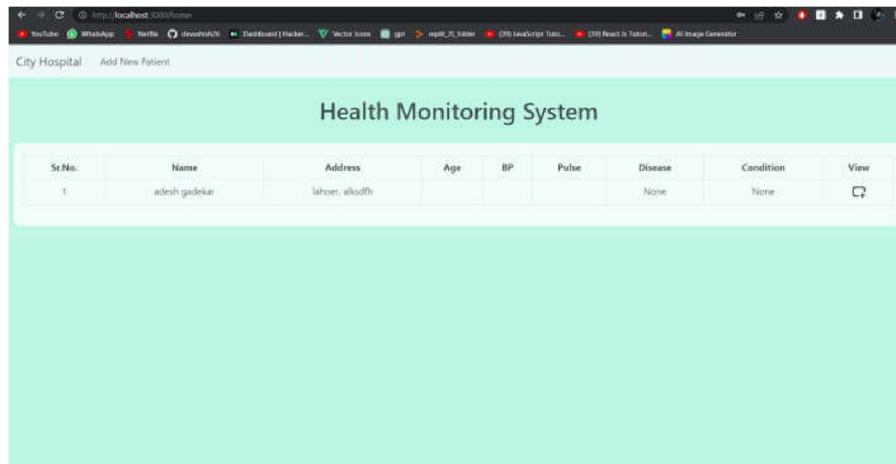
CONCLUSION

● An effective SHMS has been developed to continuously monitor the patient's condition, even in the absence of a doctor.

● The system collects vital information including temperature, blood pressure, and pulse rate, which is then transmitted to the physician.

REFERENCES

[1]   Priyanka More et al., "IOT Based Health Monitoring System," Volume 10, Issue XI, November 2022.

[2]   Lei Ru et al., "A Detailed Research on Human Health Monitoring System Based on Internet of Things," Hindawi Wireless Communications and Mobile Computing Volume 2021.

[3]   Prajjwal Soam et al., "Health Monitoring System using IoT: A Review," International Conference of Advance Research and Innovation (ICARI-2020).

[4]   Bertrand Massot et al., "A wearable, low-power, health-monitoring instrumentation based on a programmable system-on-chip," 2009 Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Sep 2009, Minneapolis, United States, November 13th 2019.

[5]   Shubham Banka et al., "Smart Healthcare Monitoring using IoT," Volume 13 International Journal of Applied Engineering Research, 2018.

[6]   Anurag Anil Saikar et al., "Medco: An Emergency Tele-Medicine System for Ambulance," International Journal of Rough Sets and Data Analysis Volume 4, Issue 2, April-June 2017.

[7]   Ms. Shinde Sayali P et al., "A Survey Paper on Internet of Things based Healthcare System," 2017, Researchgate.

[8]   Shola Usha Rani et al., "Iot Patient Health Monitoring System," 2017, Researchgate.

[9]   R. Anandh & G. Indirani, "Real Time Health Monitoring System Using Arduino with Cloud Technology," Asian Journal of Computer Science and Technology, Volume 7, 2017.

[10]   Samir K Amin et al., "Software Design Framework for Healthcare Systems," International Journal of Computer Applications, Volume 116, April 2015.

[11]   A. D. Caballero et al., "An Accelerometer-based Embedded System-on-Chip for Measuring Human-Body Joint Angles," Health Care Exchanges 2013.