Grenze International Journal of Engineering and Technology, June Issue

Hemicare: In-home Health Monitoring for Hemiplegia

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***Abstract*—These This review paper explores the innovative realm of in-home health monitoring for individualities affected by hemiplegia, a enervating condition constantly stemming from neurological conditions analogous as strokes. The paper delves into the development and integration of a comprehensive system with wearable bias designed to empower individualities with hemiplegia to manage their health within the comfort of their homes. The system incorporates wearable sensors for real- time monitoring of vital signs, movement, and fall discovery. This system accompanies and provides a user-friendly interface, enabling indefectible communication with healthcare professionals, medicine operation, and substantiated rehabilitation exercises. The paper highlights the implicit impact of Hemicare in enhancing the overall quality of life for individualities with hemiplegia, emphasizing user vacuity, data security, and collaboration with healthcare providers.**

***Index Terms*— Health monitoring, Hemipelgia.**

I. INTRODUCTION

Hemicare represents a groundbreaking approach to in- home health monitoring, specifically acclimatized for individualities scuffling with hemiplegia a enervating condition frequently arising from neurological diseases similar as strokes. This innovative system, detailed in this review paper, emerges as a comprehensive result to empower individualities with hemiplegia in managing their health within the familiar confinesof their homes. By seamlessly integrating wearable bias equipped with advanced detectors and a stoner-friendly mobile operation, Hemicare offers real- time monitoring of vital signs, movement, and fall discovery. This paper explores the experimental complications and the implicit impact of Hemicare on the quality of life for those affected by hemiplegia, emphasizing aspects similar as stoner interface design, data security, and cooperative engagement with healthcare professionals. Within the evolving geography of technology- driven healthcare results, this review aims to contribute to the ongoing converse by probing into the emulsion of current literature and technological advancements, slipping light on the promising part of Hemicare inaddressing the unique healthcare requirements of individualities with hemiplegia. As we navigate the crossroad of healthcare and technology, Hemicare stands as a lamp of progress, offering a acclimatized and holistic approach to in- home health monitoringfor those with hemiplegia.

II. PROBLEM STATEMENT

People suffering from hemiplegia face many challenges in managing their health and well-being, often requiring visits to health services for follow-ups and procedures. However, access to up-to-date and comprehensive health

Grenze ID: 01.GIJET.10.2.540_2

services can be difficult, especially for people with mobility impairments or those living in remote areas. In addition, traditional health care models may not adequately address the unique needs of people with hemiplegia, leading to suboptimal health outcomes and reduced quality of life. Therefore, it is very important to develop a customized solution that allows people with hemiplegia to effectively control their health from the comfort of their own homes, allowing them to actively participate in the management of their condition and improving their general well-being. This project aims to address these challenges by developing a home health monitoring system for hemiplegia that provides personalized real-time monitoring, proactive intervention and seamless integration with existing health systems, ultimately improving people's quality of life and health outcomes. living with hemiplegia..

III. Proposed Solution

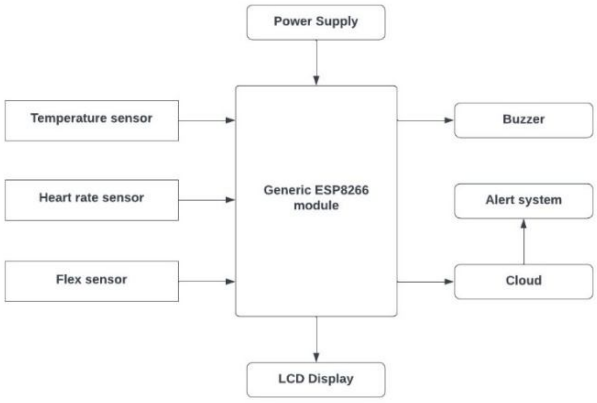

Figure 1. Block Diagram

Above block diagram describes the In-home health monitoring for hemiplegia condition remotely. Breakdown of block diagram

Control System:

- Generic ESP8266 – A Wi-fi enabled microcontroller, which will process the data given by sensors.

Sensors:

- Flex sensor- The sensor which will measure the amount of deflection.
- Temperature sensor- The sensor which measures the body temperature of the patient.
- Heart rate sensor- The sensor used to calculate the oxygen content in the blood and the blood pressure.

Output System:

- LCD Display- It is used to display the message which the patient has to convey to the caregivers.
- Cloud- All the data can be viewed here for statistical analytics and used to create a alert system.

IV. Literature

Bante et al.[1] proposed a design which aims to develop a wrist stir detector system that uses an accelerometer to cover paralyzed cases. The device measures the cock angle of the case's hand, allowing caregivers to cover their condition. A Wi- Fi module and Blynk operation will shoot announcements to the guardian in case of an exigency. This system ensures effective communication and timely case care. The device is quick, safe, and effective, allowing paralyzed cases to communicate their requirements to caregivers. dispatches are displayed on an LED with pre-set settings for each cock direction, and a buzzer cautions the guardian. This affordable, straightforward outfit is suitable for cases with colorful types of palsy. A digital multiplexer upgrade could reduce the device's tackle conditions. The system has implicit for covering further fleshly functions in the future, making it a precious tool for active communication with minimum patient involvement.

Kumar et al. [2] presented a system which help paralyzed individualities in communicating their requirements through simple hand movements. The device uses an accelerometer to measure stir statistics and sends the data to a microcontroller, which displays the communication grounded on the input. The system also sounds a buzzer when the detector receives stir signals. The data is transmitted online to an IoT garçon, allowing the case to communicate their requirements. This system is vital for IoT- enabled palsy case healthcare, furnishing remote health status updates. The IoT cloud stores the dispatches, furnishing an overview of the case's health over time.

farther development could include gyro and flex detectors, which measure rotational movement of the hand and descry individual cutlet stir. A GSM module can also be used to shoot dispatches registered individualities. This system plays a vital part in furnishing assistive aid for paralyzed individualities.

Srinivasan et al. [3] developed a system which helps people withpalsy who cannot communicate due to their lack of motor collaboration. The system allows the impaired person to move any part of their body to display a textbook on a TV screen and shoot an SMS communication using GSM. The device can be made to fit within a person's apparel or be placed on their cutlet.The system tracks case-specific data, similar as heart rate, and sends cautions to the croaker if there are any anomalies or changes in the case's status. The system also sends a GSM communication to each croaker if the case isn't in their chamber. The system is sturdy, featherlight, and affordable, making it a precious result for those with habitual or temporary disabilities. The microprocessor can be used to make the system latterly, andthe tackle includes all necessary factors.

Godavari et al. [5] has proposed a IoT-based paralysis patient healthcare model uses microcontroller-based circuitry to send messages to doctors, nurses, or loved ones over the internet. The system uses a hand motion recognition circuit and a receiver plustransmitter circuit to detect hand movements and transmit this information wirelessly over RF to the receiver system. The receiver system receives and processes these commands, displays them on an LCD display, and transmits the data online to the IoT gecko server. This system aims to improve the quality of life for paralysis patients in India, where challenges such as inadequate funds, shortage of trained health staff, poor communication, and transport infrastructure hinder the development of the country's health system. The system also alerts caregivers and family members if a patient tries to stand up without help.

Kad et al. [6] have made a review paper on a IoT-based paralysis healthcare system is designed to provide real-time patient data to caregivers, nanny, or loved ones via the internet. This system is crucial for those who require continuous monitoring outside hospitals, especially in rural areas where hospitals are not easily accessible. The system uses biomedical detectors to check the patient's condition and communicates the information via the internet. The data is then read by an Arduino UNO regulator, which is then connected to a TV display or diurnal examiner. Thedata is stored and converted into JSON for easy viewing on smartphones. An Android app is also designed for easy access to the case's information.

Hira et al. [7] has proposed and implemented a system which is intended to help the paralyzed patient and the caregiver communicate by enabling the paralyzed patient to use hand signals to express their needs finger and foot motion. To detect movement, the gyro MPU6050 is connected to an Arduino UNO that is mounted on the gloves. Flex sensors track the movement of the fingers, and gyro sensors are placed on the patient's hand to identify any changes in the patient's hand. Three main responsibilities are linked to the system. With the use of hand, finger, and foot movements, these are intended to convey messages in order to comprehend and communicate the patient's demands. Following the hand, finger, and foot movements, the system will alert the caretaker to the patient's needs. Because they are unable to voice their issues and needs correctly, paralyzed patients have difficulty communicating with caregivers to meet their needs. They have created a paralysis patient healthcare system integrating IoT and GSM to tackle this challenge 3 faced by the paralyzed patient. In this system, the paralyzed patient sends signals to the caregiver using gyro gloves. The GSM module activates when the patient tilts their hand, fingers, or feet, sending a message to the pre-programmed caretaker's contact numbers.

Alekya et al.[8] This paper explores the integration of IoT into healthcare procedures, focusing on the Mobile Healthcare Management System (HMS) as a key application. The IoT- based smart HMS allows caretakers to monitor patients remotely, eliminating geographical and time barriers. The IoT also collaborates with technologies like Wireless Sensor Network (WSN), which communicate through protocols like Coap, 6LoWPAN, REST, and radio frequency data. The IoT based health revolution aims to provide fair, affordable, and high-quality care to people at any moment and region. The paper highlights the importance of cloud computing for efficient data processing in the health sector, which can handle cloud device and network data specific to a patient. The cloud app allows for direct connection of sensor devices and is versatile for serving stored data, users, and sensors.

Abrami at al. [9] has proposed a system which allow the patient to just move their hand to display a message on the LCD.The suggested method reads the hand's different tilt directions to function. The patient wears a glove with the transmitter linked to it. To communicate different messages, the user only needs to tilt the gadget in different ways. Motion data are measured with an accelerometer. It then transmits this data to the microcontroller, which interprets it and shows the appropriate message based on the received input. As soon as the accelerometer detects motion, it sends out a buzzer sounding the message. The message is then shown online when the data has been sent to a machine learning server. Along with the use of this device, paralyzed people can communicate their vital needs to others.

Basavaraj et al. [10] has developed a system where the message from the patient is transmitted by the system's sensor and shown on the LCD display. The message will alter based on the accelerometer's position. The caregiver must therefore be aware of their needs and provide assistance accordingly. This system made use of a pulse meter, humidity sensor, and temperature sensor. These sensors, which can sense a patient's temperature, moisture content, and pulses, are intended for use with gloves or patients with special needs. When the patient is in the critical care unit, the system will sound an alert through a buzzer. If the patient is lying on the ground or when the heart rate is higher than usual. This technique can assist in the treatment of patients with paralysis, and it's also quite. affordable and simple to purchase for less money.

Ananth et al[11] has explained in his paper that IOT is a rapidly expanding field that will have a significant impact on the healthcare industry in the years to come. Through the intelligent use of wearable technology. IOT empowers people's health and wealth, fostering human connection. A fresh internet of things movement has been sparked by recent advancements in wireless sensor networks. One significant Internet of things application is smart health. With the use of a smart health care system, people with unusual medical conditions can be promptly monitored and given prompt treatment. These kinds of solutions are available through wearable technology, which continuously and consistently monitors the patient's status and activity. This work's primary goal is to offer a thorough investigation of capturing the sensor data, evaluating the information, and giving patients feedback according to various health metrics.

Sravya et al[12] has introduced a system which focus on the cost and patient-connected sensors, like with conventional monitoring techniques. It is possible to employ machine learning techniques to enhance the non-invasive monitoring system. In this project, a dataset on paralysis is utilized to create a machine learning technique that includes decision trees, label encoding, and KNN for preprocessing and categorization of data. The suggested technique can evaluate a patient's condition rapidly by utilizing a decision tree to estimate the probability of paralysis and a KNN to recommend suitable workout regimens for patients experiencing challenges. Label encoding can also convert labels into a machine-readable numerical format.

Malgaonkar et al. [13] worked on a patient health monitoring system. which uses a microcontroller, Wi-Fi module, and sensor technology . When there is no one available to care for the patient, this system sends the message he wishes to send by SMS over GSM. It then gives the microcontroller access to this data. In accordance with the input received, the microcontroller processes the data and displays the specific message. The related message is now shown on the LCD panel by the microcontroller. In addition, it emits a buzzing sound and a message when receiving a motion signal from the accelerometer. In the event that nobody In this manner, the Automated Paralysis Patient Care System genuinely automates the patient's ability to take care of themselves, ensuring a prompt

Viancy et al. [14] has worked on a wearable, Internet of Things-based paralyzed patient monitoring system is an effective tool for the patients who are unable to move. With the use of hand gestures,patients can use this low cost method to alert their caretaker to any needs. And the apparatus keeps an eye on the patient's vital signs, such as heart rate. If a parameter deviates from the normal range to an unsafe range, the patient's caregiver or family is alerted right away, allowing for the provision of critical care before the patient becomes serious.

V. CONCLUSION

In conclusion, Hemicare emerges as a pioneering result in the realm of in- home health monitoring, specifically designed to address the complex challenges faced by individualities scuffling with hemiplegia. A condition intricately linked to neurological diseases similar as strokes. Through the flawless integration of wearable bias, advanced detectors, and a stoner-friendly mobile operation, Hemicare not only provides real- time monitoring of vital signs, movement, and fall discovery but also empowers individualities to laboriously manage their health within the comfort of their homes. This review has explored the experimental complications of Hemicare, emphasizing its implicit impact on enhancing the overall quality of life for those affected by hemiplegia.

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