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GESTURE BASED PATIENT NEED ALERTING SMART GLOVE

Chaitra C[1], Rohit Kumar [2], Shreyas C.R[3], Shwetha K[4]

ETE, KSIT, Bangaluru, India[1-4]

Abstract: Even after the advent of voice assistants, virtual assistants and other new technologies, many still struggle to use them effectively and practically. Our project is mainly applicable to old people, physically challenged, and bedridden people. Our project application areas are hospitals and old age homes. During emergency situations where the user is not able to access his/her mobile phone, our prototype can handle such situations effectively by detecting the user's hand gestures and sending alerts to caretakers and hospitals. Our model also has a medical alert system. According to the prior initialization of the time for the medicines to be taken, this prototype alerts the user at that exact time. The alarm message appears on the OLED and by an audible signal. This glove is equipped with an integrated temperature sensor, Flex sensors and pulse sensors that give continuous readings of the user's health parameters and are displayed on the OLED placed in the glove. The main feature of the glove is to communicate the needs of the user, which can be accomplished by a flex sensor.

Keywords: Hand gestures, Emergency Alert System, Medicine Alerts, Temperature, Heartbeat.

I. INTRODUCTION

There are an enormous number of people around the world who are dying because of delayed access to health care. There are many cases where people died only due to late access to medication or delay in reaching the hospital. Thus, ongoing monitoring of health outcomes is important not only for patients in hospitals, but also for those suffering from long term health complications and who are taking health care at home caretakers. The second problem is that, despite the emergence of many new technologies in the medical field, few people know how to use these technologies. People who are deaf, dumb, paralyzed, affected, and taken care of by caretakers need to have a system with which they can effectively communicate with caretakers or doctors.

As a solution to the above-mentioned problems, we have designed a glove that can continuously monitor patient health parameters, store the data in the cloud, and display them in the mobile app. The second characteristic of this glove is to help the user communicate effectively with the guardian or physician using the gestures of the user's hand.

II. LITERATURE SURVEY

The work [1] consists of multiple hardware components linked together. The data acquisition block is made up of a skin temperature sensor, a GSR sensor, a pulse sensor, and a data logging unit. These components are all built into one portable glove. Data transmission can be requested through a push button that is embedded within the glove. In this paper, a mobile mental health monitoring system is proposed. The system is based on a wearable wireless multisensory glove and a user interface. It is primarily developed as a tool for continuous monitoring and recording of skin temperature, galvanic skin resistance, and signals of heart rate variability during simple everyday activities. These signals can be later viewed and interpreted by an expert to provide insight into mental health and mental states.

No use of Flex sensors. There are only other monitoring features in these gloves and smart reflex tracking and alerting. The proposed system [2] aims to introduce a new system for continuous finger recognition using flexible sensors. This module had Lilypad Arduino, Flex sensors, Bluetooth, and Batteries to power up the glove.

They programmed the Arduino to obtain the Sensed resistance values of flex sensor. Once the maximum threshold is reached the values are recorded and further used. Different flex reflexes were given different labelling schemes. Built training and testing systems for the recognition of a sequence of finger gestures based on a wireless smart glove equipped with flex sensors. The test systems are constructed on Raspberry Pi 3 computers so that inference operations can be performed on onboard devices at low cost. Experimental results reveal that the wireless smart glove can effectively capture the finger movements.

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The new labelling system for GRU-based sign recognition operations is also beneficial in mitigating the interference introduced by transitions between successive actions. Proposed paper [3] is a smart glove-based fitness tracking system that can detect athletes' activities in any indoor fitness facility, with no need of attaching multiple sensors on the athlete's body. The system utilizes force-sensitive resistance (FSR) sensors to identify the type of exercise by analysing the pressure distribution in the palm of the hand during fitness activities. The current prototype of GIFT systems consists of three main components: 16 FSR sensors, a data sampling unit (DSU) and a computing and visualization terminal.

The 16 pressure sensors are used to read the force applied to the palm during a fitness activity. In this paper, GIFT, a smart glove-based system for indoor fitness activity tracking. Using the Ensemble subspace KNN method, the system attained an average classification accuracy of 87%. This paper intended only health monitoring for the athletes only. As part of this project, we could implement the use of sensors to monitor various aspects of health.

The proposed system [4] is based on a device which uses flex sensor, touch sensor and accelerometer for detecting hand gesture. Consequently, all fingers except the thumb have two sensors of flexibility and can bend to two different degrees. In paper [5] The algorithms used for recognition of gestures use an IoT based smart wearable gadget capable of performing various tasks like temperature monitoring, Ambient light detection and gesture control has been proposed.

The Data Glove is very effective in the provision of data from various sensors and the data can be read via serial monitor on Arduino IDE software In the work [6], system which supports the two-way communication between the disabled and normal person. The system is made up of two modules i.e. gloves with flexibility sensor for converting gestures to speech and Android app to convert speech to text. This project aims to lower the barrier of communication between mute and deaf communities with the normal world.

This project will be used by people who are deaf-mute as support for themselves. The [7] Proposed system that uses different sensors and Arduino nano to detect pulse rate and oxygen level in blood. When the heart rate or temperature exceeds the normal range, it will alert the people involved and the GPS module will provide the user's current location. The work [8] developed here This module is used by soldiers to give hand signals such as stop, come, and hurry up, and a voice kit is used to produce the voice signal.

The aim of this project was to develop smart gloves that are useful for defence forces at the borders and in surgical strikes. and to maintain the health records of the soldiers. In the proposed system [9] model deals with a flex sensor placed on the finger or toe. It picks up the bending of the finger and translates to a selective control. Further, an Arduino microcontroller is used to assist the patient and communicate the patient's condition to the concerned person. It is mainly for people with paralysis.

This model helps people with facial and limb paralysis to control their surroundings like control AC, TV, or any other devices. The paper [10], system detects the movement of the hand and respective fingers and will generate the corresponding output. The glove is equipped with an IR sensor. This project is focused on disabled people and irrespective of monitoring health. It can show the exact location of the person, which can be tracked down to his or her family members. The paper [11] proposed a system that recognizes gestures with a mathematical interpretation of the human body by a computing device. Inertial sensors are used to identify gestures.

The endpoint algorithm and a few mono-vision techniques .This [12] The proposed model used various types of sensors, like resistance transducers, fiber optic bend sensors, Imus, etc., to determine the physical characteristics. This project is being developed using a combination of bendable and lightweight technologies to correct the finger stiffness of patients arising from arthritis. This [13] proposed system uses sensors to measure health parameters like body temperature, heart rate, fall detection and alarm system for patients who are suffering from diseases like Down syndrome etc. This model uses a glove as the outer covering, and the respective sensors are connected to the fingers, and the module is placed on the wrist of the patient's hand. This paper [14] proposes a model in which the patient's bed position is automatically controlled based on the needs using hand gesture recognition.

A DC motor, along with the help of the DC motor driver, is used to control the bed. This proposed system will be a helping hand to stroke patients as well as speech impaired people. of bed system to minimize the requirement of caretakers. And the sensors are used to monitor the patient's health. The paper [15] describes a system that uses specific sensors, the Raspberry Pi, and the Internet of Things to monitor a person's heart rate and body temperature. The sensors take multiple readings of a person's heart rate and temperature. On the IBM Watson IoT platform, the data is shown as graphs.

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III. CONCLUSION

Our prototype solves real-time problems faced by bedridden, paralyzed, deaf, and dumb people. This model develops a user-friendly interface between user and caretaker. No training is required for the user to handle this model. As the alert systems are automated, in case of an emergency, the hospitals are alerted, and necessary actions can be taken to save the lives of the users. This model can be developed using machine learning and artificial intelligence to enlarge the scope of communication between users and caretakers and to increase the efficiency of the current model. This model can be further improved by developing a smart band using EMG sensors, which are used to detect motion between the muscles using electric signals and machine learning.

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