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MESSAGE CONVEYER FOR PARTIALLY PARALYSED INDIVIDUALS

Suvarna Kadam
suvarna.kadam@pccoepune.org

Dr Sheetal Bhandari
Department of Electronics and Telecommunication,
Pimpri Chinchwad College of Engineering, Pune, Maharashtra, India.
sheetal.bhandari@pccoepune.org

Dr Varsha Bendre
varsha.bendre@pccoepune.org

Abstract— This paper describes how the hand motions of semi-paralysed individuals will be utilised to communicate. The user must attach his or her hand to the device. In order to transmit a message, the user must tilt the device at a precise angle. A new message is transmitted by rotating the device in a different direction.

This technology utilises an accelerometer to detect motion. The data is then transmitted to the Arduino Atmega microcontroller. The patient motion recorder's data signal is transmitted using an R.F. transmitter. In contrast, an R.F. receiver receives and decodes the data before giving it to the Arduino, which analyses the input and displays the message accordingly. The accompanying message is now displayed on the LCD screen of the Arduino. It emits a beeping sound and communicates a message when the accelerometer detects motion.

Keywords: Accelerometer, Arduino Uno, RF Communication

I. INTRODUCTION

Many hospitals and non-governmental organisations (N.G.O.s) assisting disabled people may be found worldwide. In today's environment, physically paralysed and elderly individuals rely on others because they cannot move their bodies as others do [1]. Despite the enormous number of breakthroughs made in the medical field, only a tiny percentage of them are focused on assisting people with impairments in communicating. Although monitoring tools make it simpler for doctors to gather and monitor a patient's vitals, impaired persons have few alternatives for vocal communication [2]. This project suggests a method that can assist people with paralysis partially by showing a message to the caregiver, thereby facilitating communication. Finally, this system is designed to be operated with single-hand action.

Although monitoring tools make it simpler for clinicians to gather and monitor a patient's vital signs, impaired persons have few alternatives for accurate vocal communication. This programme presents a straightforward yet efficient solution to this age-old issue. The primary goal is to replace the traditional method of patient-nurse contact with technology that is far more efficient and trustworthy [3]. India has the world's second-largest population. Disabled persons make up a sizable portion of the population. If we look at ourselves, we will see that

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many people have some form of impairment. In 2001, the census conducted a study to determine the disability population in India. According to the report, physical impairment is the second most common disability among Indians [4]. The critical aspect of the project is the suggested system and accelerometer. It is the instrument that detects motion. The accelerometer will be attached to any moveable body component of the physically challenged person. The primary goal is to replace the traditional method of patient-caregiver contact with technology that is far more efficient and trustworthy [5]. The motion-based message conveyer system will benefit the patient and make the nurse's job easier. Because a single nurse is responsible for many patients, the time spent by each nurse visiting each patient to address his requirements would be significantly reduced [6].

This project aims to conduct a literature review to study and comprehend the existing research in this field and contribute to it. To identify partially paralysed patients' hand motions to effectively express their needs to their caregivers. To make the caregiver's job even more accessible by making it easier to communicate with their patients.

II. DESIGN

1. Transmitting End:

The design consists of Accelerometer, Arduino Uno microcontroller, encoder and R.F. transmitter with antenna, as shown in Fig. No. 1.

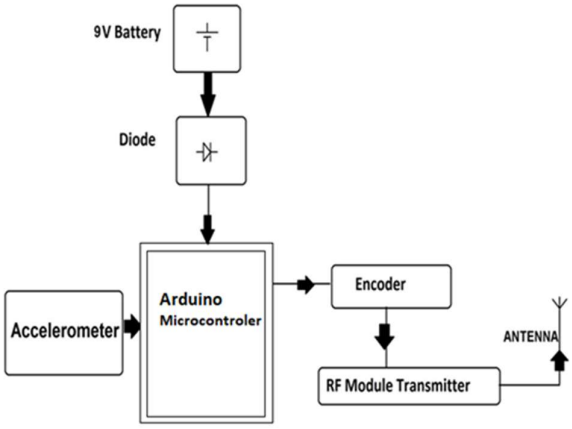

Fig-1 Transmitter

The transmitting end consists of three main components-

1. Accelerometer: The accelerometer detects upward, downward, left, and right motion in four directions. It needs to be mounted on the individual's hand for detection. The accelerometer captures the movement of the patient in the above directions. Accelerometers are commonly utilised in motion and tilt sensing applications that need minimal cost and power

2. Arduino Atmega Microcontroller: Arduino Atmega Microcontroller: The input from the accelerometer is processed and encoded by Arduino to understand the message based on the direction.

3. R. F. transmitter: The encoded information from Arduino Atmega Microcontroller is then given to the R.F. transmitter, which will transmit the data received.

2. Receiving End:

The receiving end consists of four main components R.F. receiver, Arduino, Buzzer, and LCD, as shown in Fig. No. 2.

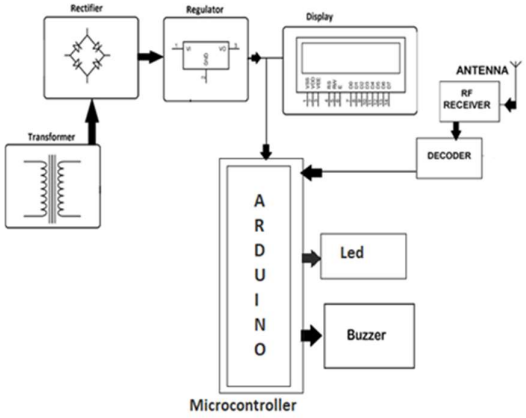

Fig-2 Receiver

1.R.F.reciever:The information broadcast by the R.F.transmitter will be received by the R.F.reciever and passed on to the decoder for decoding.

2. Arduino Atmega Microcontroller: The Arduino decodes and processes the received data, and then determines which message to show based on the motion observed.

3. LCD: The LCD will show the message on the screen. It has the capability of displaying four messages.
If the motion is observed upward, it will be classified as "food."
If the motion is observed in the downward direction, it will be classified as "water."
"Washroom" if motion is detected to the left.
"Emergency" if motion is detected to the right.

4. Buzzer: When a movement is detected in a specific direction, the buzzer will alarm the nurse or caretaker that the individual requires assistance.

III. FLOWCHART

Fig. No. 3 shows the instruction execution sequence flowchart once the accelerometer detects the motion in a particular direction.
As illustrated in the flowchart, the power is turned on first. All electronics, including the accelerometer, R.F. module, Arduino, and accelerometer, are turned on. The accelerometer detects movement. The procedure is ended if no motion is observed.

The direction of motion is explored if motion is identified. The LCD will display the message "food" if the motion is upward. Else, it will proceed further. If the motion is detected downward, the message will appear on the LCD as water. Otherwise, it will proceed further. The LCD will display the message "Washroom" if a motion is detected to the left. Then, it will proceed further. The message on the LCD will be an emergency if the observed motion is in the correct direction. If no motion is observed, the procedure is ended.

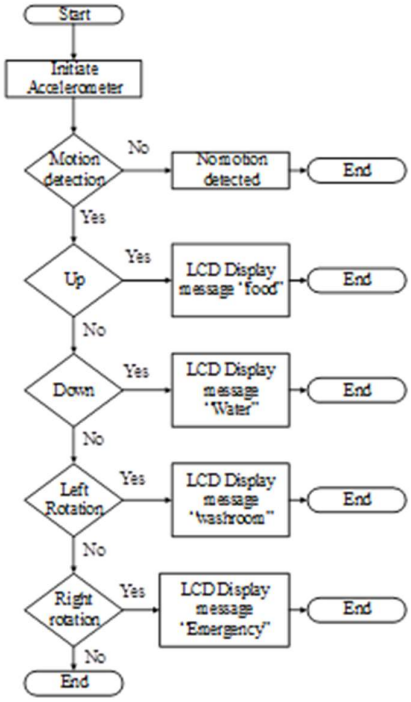

Fig-3 Flowchart

IV. SIMULATION

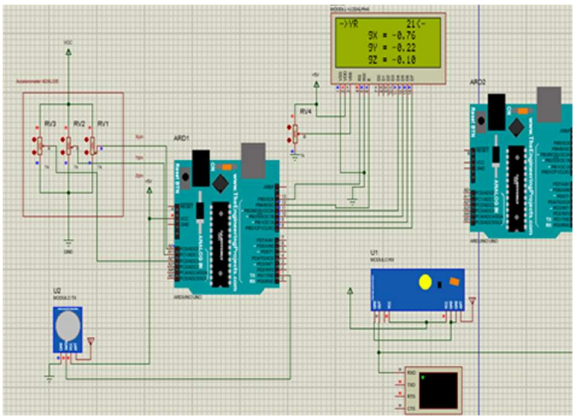

Fig-4 Simulation Result

In order to simulate the project, Arduino software is used. The framework's outcome suggests that each patient's message will be successfully transmitted.
When the accelerometer detects a tilt, the buzzer sounds, and a pre-programmed message shows on the LCD. Making both the patient's and the nurse's lives simpler This technology may also be used for many-to-one communication, where each patient is allocated a unique patient number, allowing the nurse to instantly identify the patient using the patient number provided with the message.

V. CONCLUSION

This method allows information communication to caregivers via wireless transmission of patient signals. As a result, the data will appear on the LCD. Each patient will have one of these devices implanted on or above his body. These patients will be centrally connected to the receiver on the caregiver's side.
This project will undoubtedly contribute to lowering the overall cost of the equipment by utilising alternate electronics such as an R.F. module and Arduino and making it easier to produce for a large population.
It can be utilised in hospitals for paralysed patients and nursing homes for the elderly. It can be utilised by those who are deaf or hard of hearing. Dumb and deaf persons can use it to communicate.

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