HOME AUTOMATION USING EYE BLINK SENSOR FOR PARALYZED PEOPLE

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Abstract: The constant demand to improve daily living standards for paralysis patients serves as a motivation to develop newer technology. The task once performed by big traditional computers is now solved with smaller smart devices. Paralysis is defined as the complete loss of muscle function in any part of the body. It occurs when there is a problem with the passage of messages between the muscles and the brain. The main objective is to design a real time interactive system that can assist the paralysis patients to control appliances such as lights, fans etc. The eye blink sensor is able to detect an intentional blink from a normal blink, which is useful for the paralysis patients especially Tetraplegic patients to regulate their home devices easily without any help.

KEY WORDS: Eye blink sensor, Arduino NANO, Relay module, RF LINK.

1. INTRODUCTION

In the era of modern technology, automation is taking place everywhere. From Home to Industries, the blessing of automated system has improved the efficiency by a large magnitude. One of the great examples of the Automation System is the Home Automation. Though, the automation is meant for simplifying our daily life however, a very targeted group of people have always been overlooked by all of these companies. Therefore, we mainly focused on this group of people who are physically challenged or paralyzed. As, this group of people are physically challenged, they mostly rely on other people's assistance. Even, they have to rely on someone else for day to day tasks.

Therefore, any innovative and effective home automation technologies can be a great help for senior citizen, disabled people and paralysis patients. As mostly these patients have limitations on physical movement, they even cannot move their hands or even talk. Furthermore, there has not been any significant medical improvement to remedy this type of disability. Though, in many cases, physical exercises and proper medication can benefit the patient, but again thesis a very lengthy process and the success rate is very negligible. Consequences are lifelong physical disability. However, the only controls they have are their eyes. Therefore, we decided to work on an automation technology, which they can control easily using their eyes

Hence, to develop a home automation system for patients which could be used with least or minimal effort to control the home appliances such 2 as light, fan, air conditioner. In this paper we have worked on a Home Automation Project mainly aimed for paralyzed people to develop an IR based eye blink sensor which will be used to control electronic devices as mentioned earlier. The solo purpose of our work is to make a sustainable and effective solution for people with physical disability.

2. METHODOLOGY

The system consists of four major embedded electronics: TCRT 5000 as the Eye Blink sensor, Arduino compatible Micro-controllers, RF LINK Pair modules. Additionally, a rechargeable lithium ION battery is attached with the both Transmitter Glass Frame Module and the Receiver Module. Both Transmitter Glass and Receiver Modules are connected wirelessly over RF LINK modules. The TCRT 5000 sensor is a Reflective Optical Sensor which can measure the intensity of IR bounced back on the eye or eyelid. As of it's cheap price and availability it suits best for our needs. When the

eyes are closed the reflection value gets lower than when the eye lids are open.Therefore, we caneasily identify whenever the user closes the eyes for a specific interval. Additionally, we can also detect eye blinks. As eye blink is a natural process of human body, therefore, we specified a pattern to activate the system. Whenever the user closes the eyes for 4 seconds, the system identifies it as the start for taking action and gets ready. Otherwise it will take the eye blink as usual unintentional human behavior and the system willdo nothing. Here the input will take after the system is ready to take the action after triggering the IR sensor and this system will work as perinstructions
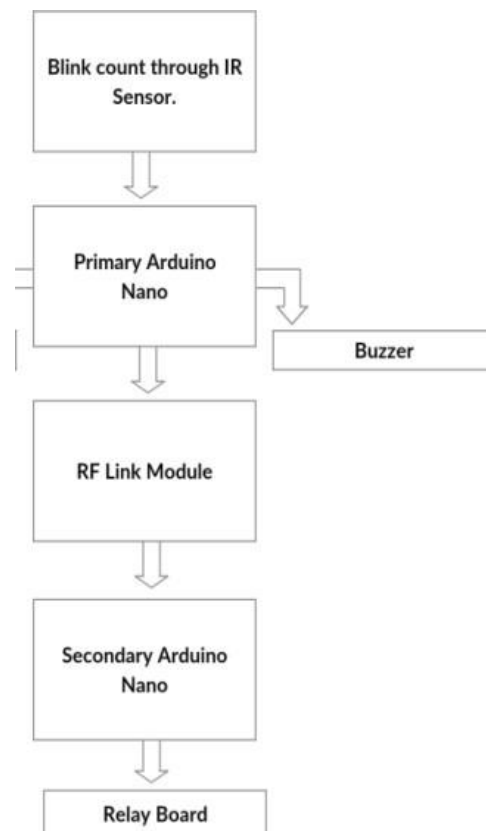
Blink Sensor
The TCRT5000 and TCRT5000L are reflective sensors which include an infrared emitter and phototransistor in a leaded package which blocks visible light. The package includes two mounting clips. TCRT5000L is the long lead version

Arduino NANO
Arduino Nano is a surface mount breadboard embedded version with integrated USB. It is the smallest, complete, and breadboard friendly. It has everything that Decimal/Duemilanove has (electrically) with more Analog input pins and onboard +5V AREF jumper. Physically, it is missing power jack. The Nano is automatically sense and switch to the higher potential source of power, there is no need for the power select jumper

RF Link Module
This Radio Transmitter & Receiver pair is perfectlymatched to control items from a distance up to 500 feet wirelessly. Connectingthe transmitter to the Arduino Nano, this is connected with eye sensor and the receiver to another Arduino Nano which isconnected to relay board. Both the transmitter and receiver are in tune to the same Radio Frequency so that when the transmitter emits a signal,the receiver will hear it wirelessly. This component is great for easy and simple wireless control

Relay Module
This is a 5V 4-Channel Relay interface board, be able to control various appliances, and other

equipment with large current. It can becontrolled directly by ant Micro-controller . We use this for our prototype

Buzzer

This buzzer generates a continuous beep usually when supplied with power but, we generate a single beep to provide user hints when he should blink to operate the system and it also confirm thatthe command executed or not by double beep tone

3. Results

After complete assembly and dumping of code intoRaspberry Pi a prototype of Electronic assistance for paralyzed is made which can be able to controlthe home appliances through their eye blinks.
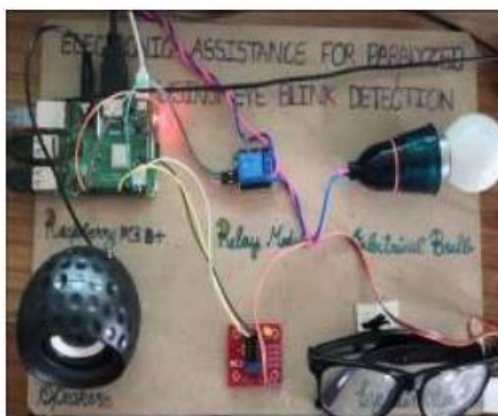

Fig 5.1 Electronic Assistance for Paralyzed using Eye Blink Detection

Figure 5.3 Application 1 'Bulb glows on'

4. CONCLUSION

This venture is essentially for paralysis patients who endure a great deal. We are attempting a littlebit through this venture so that at any rate they can control the home appliances. We have additionally planto enhance this venture with better showing advantages an eye blink sensor is transducer which detects an eye blink, and gives a yield voltage at whatever point the eye is shut thatcan help the patient to control the home apparatusand others, for example, switch on off the light or control the fan speed and also call for assistance. To sum up we want to say this is doing works using Arduino Nano and various sensors was a great experience as we got to know many valuable things. Our project will be useful mainly for the paralysis patients and senior citizen. Though we are thinking about prototype of the project our model has implemented and tested but to introduce it in real life a lot more

improvements and also equipment are needed. One of the main motives of our project was to help patient to make their life easier and our system will be fulfilled when we can use the system in real life and people will be benefited.

5.   FUTURE WORK PLAN

This system is working only for patients or disables persons that can make their life more comfortable. Through this system they can operate the home appliances by blinking their eyes, even then can also send message. Our motive is not only the controlling of the home appliances or sending message, but also this project has long way to go. Our focus on patients or disable person, so our future long way also depends on their comfortable lifestyle. In future we have clear view that a patient can run their own wheel chair by blinking their eyes for that we are planning to control motor sensors by sending instruction & through eye blinking. In that case, both eyes will be covered by IR sensor; if left eye closed for a while then wheel chair will go to the left and vice versa. Normal blinking will do nothing. Long blink will move for forward, and short blink will move backward.

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