

Smart Amigo-An Assistant for Paralytics

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Abstract— Loss of motion is a significant neurological issue that causes loss of movement of at least one muscles of the body, wherein relying upon the reason, it might influence a particular muscle gathering or locale of the body, or a bigger region might be included. In quest for restoration, the eye can be viewed as one of the organs that can assist an incapacitated individual with communicating reasonably. This project focuses on the acquisition and analysis of eye movements for the activation of home appliances for paralysis patients. The framework here utilizes an eye development sensor for eye development securing, further followed by a straightforward hardware for execution of sign handling. This prepared sign can be utilized as a contribution for a microcontroller so as to control equipments. There is a pupil sensor that is linked to the webcam system on the display screen. For better utilize the plan of the hand glove wherein the flex sensor is likewise utilized as a sub item. The flex sensor interface which assists with controlling the slider developments, indoor machines along these lines instructing the PC with the hand motion signals. By utilizing the hand signal acknowledgment strategy, the flex sensor sends the orders to microcontroller and afterward transmitted by transmitter and afterward got by the recipient. The got orders on the other hand took care of to the PIC microcontroller in which it can control the machines utilizing transfers.

Keywords— Eye movement, paralyzed patient, monitoring, flex sensor, Wi-Fi module, sensors, controller.

I. INTRODUCTION

Paralysed patients can't ordinarily speak with their condition. The most concerning issue that incapacitated patients face, is driving their own existence without anybody's assistance. This incorporates essential everyday tasks like turning on an apparatus or speeding up fan. For these patients, the main piece of their body that is heavily influenced by them, as far as solid development, is their eyeballs. Some exploration around there has concentrated on researching new productive specialized apparatuses for incapacitated patients for making an interpretation of their eye developments into suitable correspondence messages. A large portion of the current

framework utilize advanced equipment and programming to make the control simpler and proficient. One system that offers such capacity is the natural eye.

The venture means to build up a model of Smart Amigo-An assistant for paralytics which uses eyeball development of the paralysed individual. The eyeball development is followed as the underlying directing sign which thusly imparts the sign to the microcontroller which thusly separates the got guidance from the client and gives a yield to the transfer. The Relay circuits assumes a key job in exchanging between two circuits which are totally isolated. The transmitter area comprises of IR sensors which will detect the input control signals and afterward it is given to Arduino Uno which changes over the relating signs to computerized information and afterward it is given to the Wi-Fi transmitter. This may incorporate different frameworks that may add to an improved life as far as solace, straightforwardness, and comfort. The framework can be improved by utilizing the trend setting innovation like internet of things which thus assists with envisioning the task into a more extensive edge with more opportunities for the client.

By conducting several literature survey we came to an objective that to develop a prototype model of a home automation system which can assist paralyzed patients to do their daily basic activities by using eye ball movements or hand gestures.

The point of this undertaking was to plan an eye following framework that met the accompanying prerequisites:

1. Intuitive and simple to use by individual with incapacities
2. Non-meddlesome, with the goal that it doesn't make any damage or inconvenience the client
3. Accurate in order to give 16 unique alternatives in a 4 by 4 framework at some random time
4. Reliable to guarantee a predictable yield to permit ease in correspondence
5. Able to furnish the client with enough alternatives to empower useful correspondence.

6. Able to run continuously so the client can communicate without delays.

II. LITERATURE REVIEW

The Home Automated System (HAS) which is an extension of current home-based operations and this home-based application (HAS) can now be easily developed on the devices, because of the power of computational network and wireless sensor network (WSN), providing the user the operating costs of the home automation. For the home automation (HAS), using various technologies such as Wi-Fi, Bluetooth and ZigBee communications, and tablet used to control various equipment. In this system real estate can be monitored and managed, and the user can interact with the system through a user friendly interface [1]. Eye-tracking technologies that would enable children. With extreme discourse and motor hindrance correspondence. Eye-following frameworks with the utilization of intelligent human PCs have for quite some time been a fascinating region with regards to the field of assistive innovation. In any case, there are numerous variables that have forestalled eye following from being open innovation, including assault, assault force, accessibility, and cost of eye following frameworks. This work portrays the structure and checking program for kids with disabilities. The framework is financially not the same as industrially accessible gadgets [2]. Several people around the world have some sort of physical disability that prevents them from living a usual life. A few conditions, for example, Amyotrophic lateral Sclerosis (ALS) or stroke can bring about loss of muscle portability, in this way rendering the individual incapacitated. [3]. Security structures expect a critical activity in prosperity affirmation and theory. Mechanization is a reality today, when things are controlled consequently, regularly the fundamental elements of killing on/certain gadgets and past, either remotely or extremely close [4]. The improvement of the social economy there has been an expanded gracefulness of family things. An issue emerges on the most proficient method to oversee and control these different machines all the more productively and adequately to accomplish more opportunity, security and a more beneficial condition at home. In this paper, a decent control framework dependent on the Internet of Things innovation has been proposed to take care of the above issue. The smart home control framework utilizes a standard 433 MHz remote radio recurrence controller and actuator organize. Application servers, customer PCs, tablets or smart telephones can speak with the remote controller through a remote switch by means of the Wi-Fi interface. With WSN, the application can be included inside or pulled back from the control framework without any problem. A decent control framework incorporates tasks checking, control and the board, home security, power measurements and analysis [5]. Home security frameworks and smart homes have worked out as expected these days as a result of their different advantages of everyday life. This should be possible by changing the remote landline frameworks utilizing this we can control the entire framework by utilizing our Android gadgets utilizing the Bluetooth association. [6]. Hands are one of the most significant pieces of the human body in performing every day undertakings. Treatment is important to reestablish the's engine work. Notwithstanding the dangers, incapacity hand

might be brought about by specific illnesses, eg. Stroke. The inspiration driving this assessment is to perform biofeedback watching equipment for post-clinical strategy myopathy patients. Biofeedback [7] is another treatment that incorporates assessing physical development that evaluations subjects, for instance, skin temperature, sweating limit, circulatory strain, heartbeat and hand mutilation due to stroke. The Flex sensor is an easy to-use gadget that changes its deterrent as the sensor twists. The Flex sensor changes over the significance of the bend to electric, which is the spot the contort is the most extraordinary proportion of check [7]. Gestures have also become the most popular form of computer communication. The ways in which physical activity and performance are reduced are used in new access technologies. Gestures can take many forms and a person's physical condition and behavior can be treated as gestures. When it comes to coordination, the moving parts of the human body play a major role. Sign language is used in sign language by people who cannot speak. They are also used in computer communication tools. In this paper, outlining how a flexible sensor recognition system works, what are the limitations of this gloves interface and how to optimize the performance of the gloves virtual cloud. The project proposes a system to automatically detect the state of the door by hearing any movement on the door [8].

III. PROPOSED SYSTEM

Streaming video of the eye movement is taken using an external camera. The PC consistently investigations the video picture of the eye and figures out where the client is looking on the screen. The microcontroller takes choice dependent on different arrangements of data sources and the yield of the microcontroller board is utilized to control the apparatuses. Here microcontroller board is utilized to check the accuracy of the succession. Opto-couplers are utilized to confine the low force circuit from the powerful circuit and a high supply and flow driver IC is utilized to actuate the transfers which turns ON/OFF the machines. A 12V connector is utilized to give consistent voltage to the IC's and transfers. Driven's are utilized to demonstrate the yield status of the framework. At the point when an apparatus is chosen, the comparing assistant curl fixes and shuts the fundamental working circuit of the working framework. At the point when an apparatus is de-chosen, the hand-off curl gets the opening of the de-invigorated circuit and making the machine switch OFF. Here the machine is associated with 230V, the 1 ϕ gracefulness to which the hand-off is associated with arrangement and transmissions. For working apparatuses utilizing hand gestures we use flex sensor. This sensor applies to the guideline of bend which intends that at whatever point a strip is wound then its opposition will be changed. This can be estimated with the assistance of any controller. This sensor works a lot of like an adaptable resistor since where it bends then the obstruction will be changed. Obstruction changes may rely upon the surface line in light of the fact that the opposition will be diverse where the level is. At the point when the sensor is turned 450 then the obstruction will be lopsided. Similarly, when this cell has been gone to 900 then opposition can be an exemption. These three are the conditions for twisting the flexor sensor. The opposition will be expanded when the point is expanded.

IV. COMPONENTS DESCRIPTION

A. SENSORS

1) Flex sensor

Flex sensors are hand sensors that bend and adjust their resistance depending on the number of bending nerves. Flex sensors are also called the Bend sensor. There are two types of sensors

[1] 2.2inch Flex sensor.

[2] 4.5inch Flex sensor.

An optical sensor interface that helps control slider movement, household items thus instructing the PC by hand signals. By using a hand-held recognition system, the changing sensor sends instructions to the microcontroller and is then passed with a knife and received by the receiver. The commands received are then transmitted to the PIC microcontroller where they can control the equipment using the transmission and can control the movement of the slider in combination with a personal computer.

B. BOARDS

1) ARDUINO UNO

The Arduino UNO, an open-source microcontroller board supported the Microchip ATmega328P microcontroller and developed by Arduino. It is supplied with sets of digital and analog input/output (I/O) pins which will be interfaced to numerous expansion boards (shields) and other circuits. It has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a kind B USB cable. It can be powered by USB cable or by an external 9-volt battery, even though it accepts voltages between 7 to 20 volts.

2) NODE MCU

NodeMCU, a low-cost open source IoT platform. It included a firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which was supported the ESP-12 module. Later, support for the ESP32 32-bit MCU was implemented.

It is a programmable, smart and Wi-Fi enabled. The device consists of 4MB storage, 80MHz of system clock, 50k of usable RAM and also an on-chip Wi-Fi Transceiver.

C. COMMUNICATION MODULE

1) Relay Driver Module

The ULN2803 IC comprises of an eight-center NPN Darlington pair giving the suitable increment in current burden required. We as a whole realize that transistors are utilized to intensify the current yet here are utilizing a couple of Darlington transistors inside the IC to play out the necessary intensification. In this pair the current intensifier is the primary transistor is enhanced with the following transistor at the yield terminal providing high voltage. On the off chance that an electrical outlet is introduced that without the sign has been provided to the IC input sticks, the flow won't be available and the transistor is in an inadequate state. At the point when a high-voltage sealing is applied to the information the two transistors start to work by giving a descending way to the outer associated load.

2) Relay

The relay module is a separate hardware unit which is used to move remote devices. With it, you can access devices remotely over a network or over the Internet. Through commands

coming from Clock Watch Enterprise transmitted over a local or wide area network, devices can be remotely switched on or off. Computers, peripherals, or other powered machines may be operated from around the workplace or across the globe.

3) Wi-Fi Modem

The ESP8266 Wi-Fi Module is a completely coordinated SOC with incorporated TCP/IP convention that can give any microcontroller access to your Wi-Fi organize.ESP8266 can have an application or reload all Wi-Fi connection exercises from another application processor. Every module of the ESP8266 comes pre-customized with the utilized AT firmware, that is, you can just charge this on your Arduino gadget and increase the greatest Wi-Fi ability with the provision of the Wi-Fi Shield. The ESP8266 module is an extremely effective board with an enormous, ever-growing network.

V. RESULTS

On performing the eye tracking procedure, the cursor moves and select the respective option where the gaze point is finally located.

The camera is placed far in front of the user as per requirements which is aligned to be in front of one of the eyes and the tracking process is initiated. The pointer falls according to eye movements and corresponding commands lights on, lights off, help or assistance commands will be processed according to the need. Figure 1 depicts how the eyeball is detected and is represented by a green circle. According to the movement, the options shown in GUI screen Figure 2is activated.

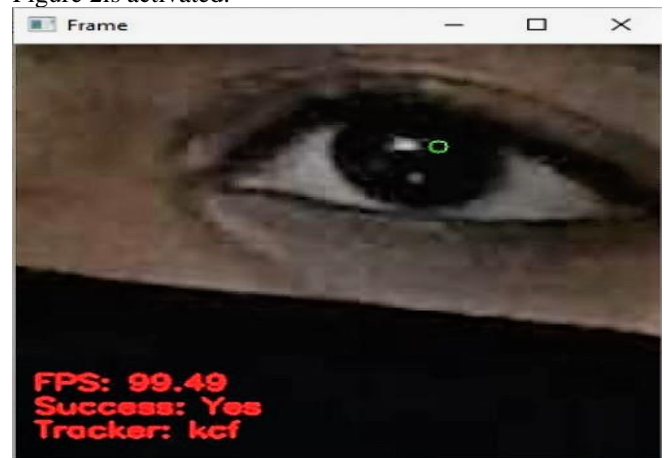


Figure 1-Eye Tracking

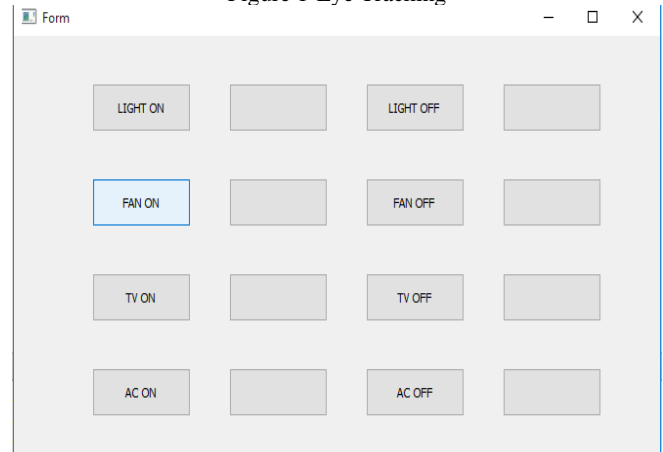


Figure 2- GUI screen

The device is compact and user friendly and also poses an add on feature with flux sensor in a hand glove for the patients. Figure 3 shows the hardware configuration of hand glove, the speaker output will be according to the movement of hand.

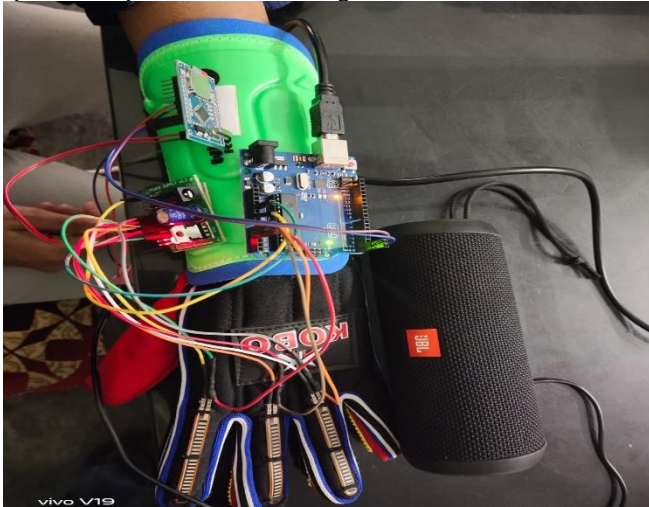


Figure 3- Hand Glove

VI. FUTURE SCOPE

In the current situation of Covid'19 pandemic, the scope of such a device has increased vastly .

- It can lessen worry for hands and muscles by moving the contribution from hand to the eyes. This doesn't put additional heap on the eye muscles. Video-based eye tracking requires less maintenance.
- The eyes enlighten a great deal regarding what someone is doing. In least difficult case an eye tracker can tells about the consideration , which has a major potential for the execution of setting mindfulness.
- For those who are partially paralysed they can use their fingertips to do their desired activities.concerned with public healthcare.

VII. CONCLUSION

The undertaking intends to build up a model of Smart Amigo – An assistant for paralytics which uses eye ball development of the paralysed individual for whom portability is a state of concern. The proposed model depends on the procurement of eye flickers which is nearly cheap, productive as far as direct relationship of the sign over the eye developments that makes it appropriate for the application. The model fuses actuation and deactivation of apparatuses, for example, fan, bulb and caution and so on. The acquisition is a more primitive method for tracking eyeball movements, technical capability of this method is due to poor noise to signal ratio & also precise filters are required for this method. The method of eye tracking using camera requires a fully dedicated system with image processing software during the entire working of the unit. We have presented our work on Hand Glove controlled indoor environments which is designed with Flex sensor Interfacing. This system provides the enhanced and user friendly mechanism in power point presentation slider movements, appliance control by this, one can manage the overall control within the environment. This is accomplished by using advanced communication protocols which has been monitored and recorded with personal computer. Advantages of this

system is a potential of mobility and accuracy thus can be more helpful in physically challenged people also..

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