iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VI **Month of publication:** June 2020

DOI: http://doi.org/10.22214/ijraset.2020.6142

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

Hand Assistive Device for Physically Challenged People

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Abstract: ***Inability to talk is considered to be true disability. People with this disability use different modes to talk with others, there are n number of methods available for their communication one such common method of communication is sign language. Sign language plays a major role for dumb people to communicate with normal people. It is very hard for mute people to convey their message to normal people. Since normal people are not trained on sign language. In emergency time conveying their message is very difficult. So the solution for this problem is to convert the signing into human hearing voice. There are two major techniques available to detect hand motion or gesture such as vision and non-vision technique and convert the detected information into voice through a controller. In vision based technique camera are going to be used for gesture detection and non-vision based technique sensors are used. In this project non-vision based technique are going to be used. The proposed model also deals with using hand gesture to perform the basic controls in electronic equipment like and other domestic appliances. The main motive of this project is to bridge the gap between dumb and normal people. The design of the device is based on embedded systems.***

Keywords: Speaking disability, Sign language, Hand Gestures, Vision-based technique, Non-vision based technique, Domestic appliances, Embedded systems.

I. INTRODUCTION

This world consists of both abled and disabled people. An abled person can perform activities of daily living (ADL) with ease. However, for a disabled person, he/she has difficulty in performing ADLs. Hence, they require assistance. Assistance can be provided either by humans or by machines. Assistance is provided either manually or automatically. Before the invention of assistive devices, humans used to take care of disabled people. Assistive devices are invented later to overcome disadvantages in the traditional method of assistance. Assistive devices are used for different disabilities. Hearing aids for people who have a disability in hearing. Mobility aids which consist of wheelchairs, walkers, prosthetic devices. Cognitive aids to help people who face challenges in thinking skills. In this project, a hand assistive device is a fabric glove. This glove is used to assist the mute community in their daily life activities. This glove consists of flex sensors and an accelerometer to read the movement of the hand and thereby performing the operation based on the hand gesture. Appliance control in which the hand gestures of the glove can be used to wirelessly control home appliances like Television, AC, Lights, Fans, Heater, Mobile Charger, Motor. Environmental control can also be performed in which the state of the appliances is controlled using hand gestures. Phone calls can also be answered, rejected, connected and disconnected using hand gestures from the glove.

II. BLOCK DIAGRAMS

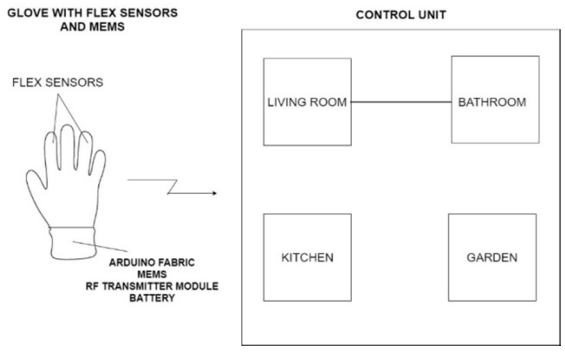


Fig no.1: Hand Assistive device with Control unit.

The above figure consists of a fabric Hand glove from where the sensors detect the gesture. This hand glove is connected with different rooms by control unit.

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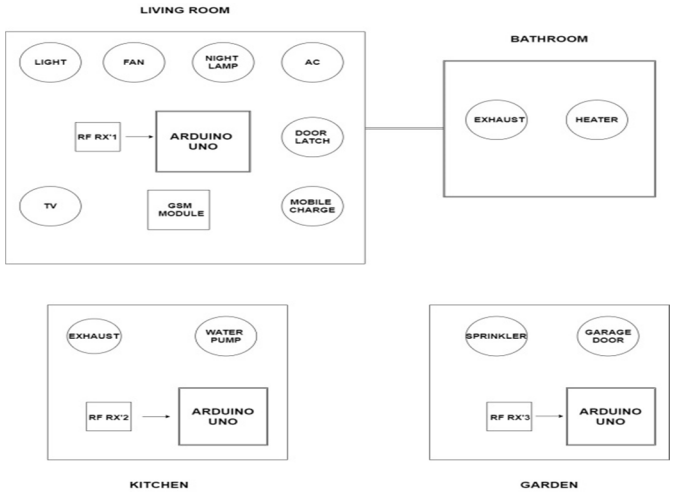


Fig no.2: Internal block diagram of Control unit and its components.

The figure 2 shows different electronic and domestic appliances which are located at different rooms. These are connected through a control unit.

III. PROPOSED METHOD

The wireless control is achieved using a single RF transmitter module in the glove that interfaces with multiple RF receivers. A fabric Arduino is fixed into the glove. Arduino UNO's are fixed in the living room, garden and kitchen. Turning ON or OFF of television, varying volume, switching of channels come under environmental control. The speed of the fan can be regulated. As shown in the block diagram a single Arduino UNO is used for both the living room and bathroom. So only the living room and bathroom are connected through wire. A GSM module is used for sending predefined messages to registered contacts. With the help of this, a mute person can easily answer calls, connect or disconnect calls using hand gestures.

IV. IMPLEMENTATION

Here Implementation mainly consists of two sections. They are Transmitter section and Receiver section. Transmitting section consists of Arduino Nano as processor, Flex sensors and RF transmitter. In Transmitter section Processor collects the data from the sensor and performs a function on that data. The processed data is sent to the receiver through RF Transmitter. Receiving section consists of Arduino Uno as processor, RF receiver and electronic devices on which predefined task have to be performed. At Receiver section Processor analyse the received data which is received by RF receiver and performs the predefined task.

V. HARDWARE EQUIPMENT

A. Flex Sensor



Fig no.3: Flex sensor

Flex sensors shows resistance because the output depending upon the bending angle. Thus, these resistance values are converted to corresponding voltages mainly high and low just in case of microcontrollers. Since, microcontrollers are basically digital devices therefore, during this case the low value voltage represents '0' logic level and high value voltage represents '1' logic level. In this project we are going to use 5 flex sensors thereby obtaining 32 different combinations of sign conventions can be implemented which will cover all daily communication normally used by the deaf and dumb people.

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ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
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B. Arduino Uno

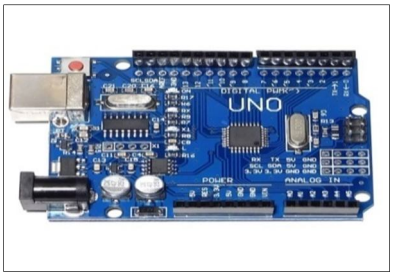


Fig no.4: Arduino Uno

Arduino board designs use a spread of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ('shields') or breadboards (For prototyping) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are often programmed using C and C++ programming languages.

C. Arduino Nano

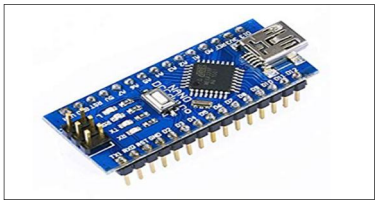


Fig no.5: Arduino Nano

It comes with precisely the same functionality as in Arduino UNO but quite in small. Tiny size and breadboard friendly nature make this device an ideal choice for most of the applications where sizes of the electronic components are of great concern. It consists of analog pins that can be used as an analog to digital converter where A4 and A5 pins can also be used for I2C communication. Similarly, there are 14 digital pins, out of which 6 pins are used for generating PWM.

D. RF Module

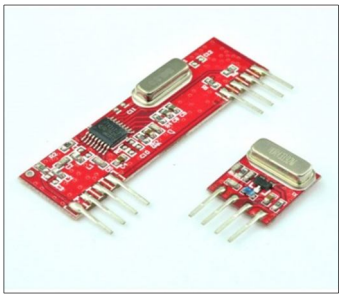


Fig no.6: RF module

These components play a major role in this project, as these define the wireless communication between the glove and control unit. RF refers to radio frequency that is a wireless electromagnetic signal. RF signals range from 3 kHz to about 300 GHz. Both Bluetooth and RF provide wires-free connectivity, but RF powered devices provide good connection through walls and Ceilings for up to about 300 feet. Bluetooth is engineered for very small distances; the idea is that Bluetooth is personal. This technology is good within 50 meters or so. Although Bluetooth has its advantages over RF like better connectivity and longer range it is not used in this project for one reason. This system utilises a Single Transmitter interfacing with multiple receivers. If a Bluetooth module is used it cannot communicate with multiple receivers so there is a complexity in setting up of Bluetooth modules. But an RF Transmitter module can interface with multiple RF receivers having different ID's. This is why RF module is chosen over Bluetooth.

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E. GSM Module



Fig no.6: GSM module

GSM module is employed to establish communication between a computer and a GSM system. Global System for Mobile communication (GSM) is an architecture employed for mobile communication in most of the countries. GSM module consists of a GSM modem assembled alongside power supply circuit and communication interfaces (like RS-232, USB, etc.) for computer. GSM module uses the AT Commands for performing different task like Sending SMS, Call and Data Connections. Here SIM 900A GSM module is used as it is cheap and useful for 3G network signals.

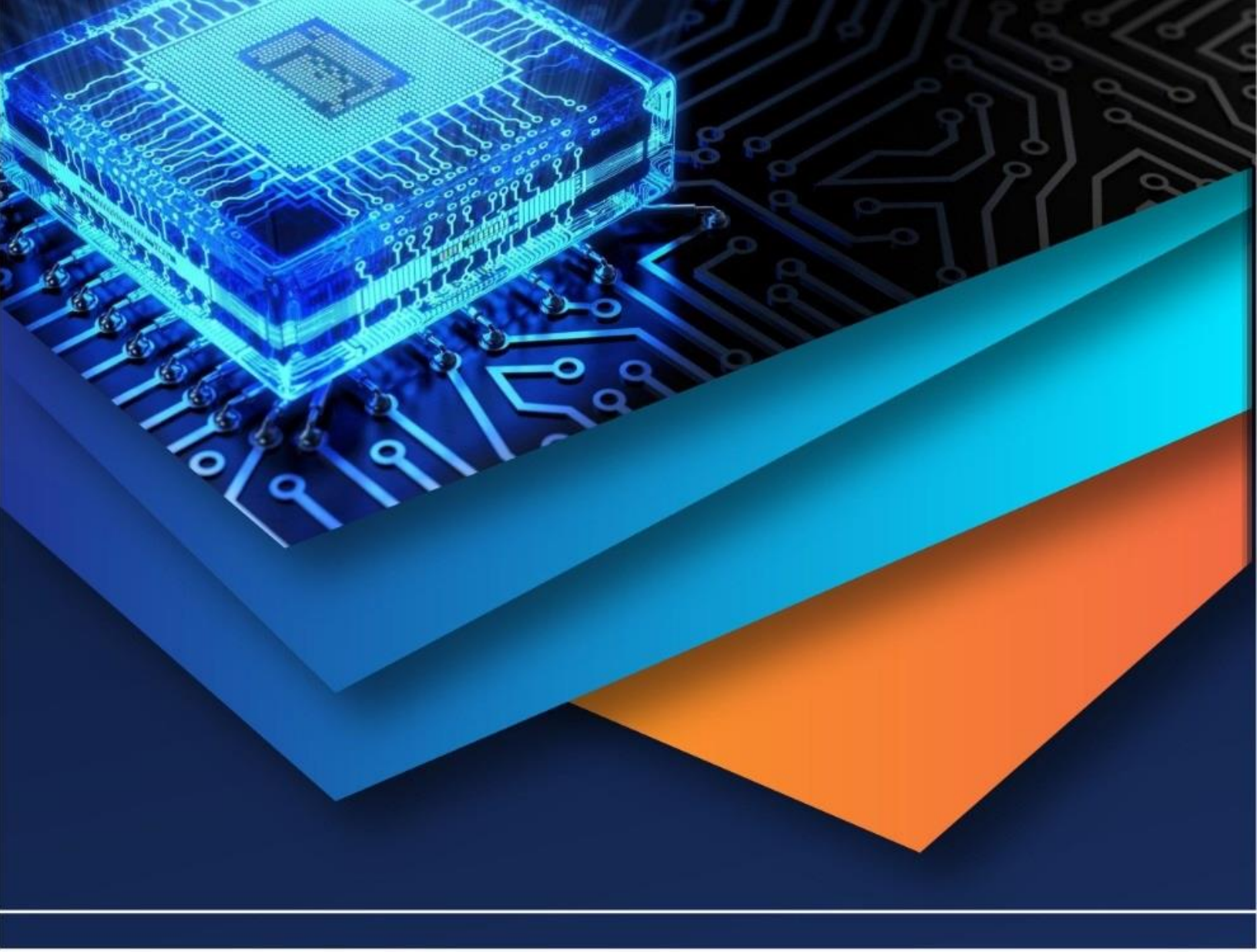
VI. CONCLUSIONS

In this presentation the role of sign language between normal and dumb people is seen. The goal of this project is to design a useful and fully functional real-world product that efficiently translates the movement of hand to electrical signals to control the home appliances and perform functions of a mobile phone. Our motivation is to help differently abled, speech-impaired and paralyzed people to control the electrical appliances more easily. The proposed system has the advantage of low power consumption, simple hardware and hand gestures, easy to operate and user friendly. The main feature of this research work is that the gesture recognizer is a standalone system applicable in daily life and for biomedical purposes.

REFERENCES

[1] Abhijit M. Anjana Nair, Jikhil John, ShabasBasheer, Munna Basil Mathai,"Hand Gesture Based Home Automation", IJAREEIE Conference Publications, Nellimattom, Kerala, India, March 2017.
[2] Pomboza-Junez Gonzalo , Holgado-Terriza Juan A, "Control of home devices based on hand gestures", Proceedings of the 5th International Conference on consumer electronics Berlin, Volume:5, IEEE Conference Publications, 2015.
[3] Kamalpreet Sharma, Naresh Kumar Garg; "Hand Gestures Recognition for Deaf and Dumb" International Journal of Computer application and Technology (s), May - 2014
[4] E. Stergiopoulou, N. Papamarkos. (2009). ―Hand gesture recognition using a neural network shape fitting technique, Elsevier Engineering Applications of Artificial Intelligence.
[5] K.C. Shriharipriya and K. Arthy, "Flex sensor based hand gesture recognition system", Proceedings of International Journal Of Innovative Research. Vellore, India, May 2013.

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