



Wireless Human-Machine Interface With Flex Sensor and to Control Domestic Appliances

Dineshkumar.S¹,Kamalanathan.G²,K.Gauravkumar³,Mrs.Mayavady⁴

Department of ECE,Dr.paul's engineering college

¹dhin21395@gmail.com,²kamal.g.1994@gmail.com,⁴maya17sasmita@gmail.com

Abstract:

This paper demonstrates necessary parameter that be able to be engaged to optimized the performance of a low cost wearable glove interface that will measure the person's hand movements. The system can able to transfer analog commands from the user's body to machine. Though, lots of plan solution are at a standstill affect by comfort and performance limitations due to wire communications, long calibration procedures, and power supplies requiring cables or batteries. Gold Finger, the HMI glove introduced in this paper, has the potential to overcome some of these limitations by using integration of advanced material, smallness of component and electronic. Hand motions are used to communicate with the machine via a resistive variation in flexi sensor. Then, information is digitalized with dedicated software that also provides the mechanism micro controller encoding in the C languages.

Keywords: Arduino processor, Flex sensor, HMI- hand gesture gloves, Zig Bee.

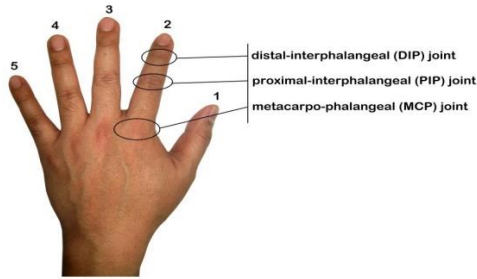
I. INTRODUCTION

Gestures play a very important role in daily routine communication. According to many sources more than 50% of the communication consists of non-verbal gestures. The gestures are also becoming an increasingly popular form of human-machine interaction. The ways in which the physical work and exertion is reduced are being applied to new technologies for ease of access. The gestures are of many types and each and every human body orientation and position can be treated as a gesture. When it comes to interaction, the moving parts of human body play the biggest role. Hand gestures are used in sign language by the people who cannot speak.They can also use in human-machine interaction tools.A lot of work has been done on the recognition, translation and application of hand gestures in the past.

II.LITERATURE REVIEW

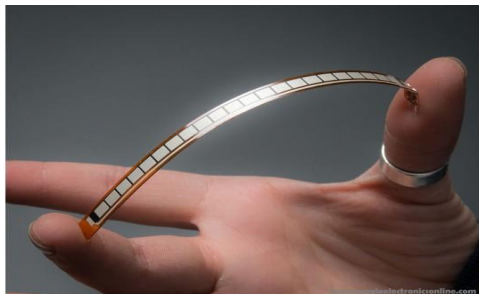
A lot of work has been done in which different forms of cameras, depth imaging, infrared and other imaging devices were used. In all of these works, the recognition demands a device in front of you. There is another very popular form of hand gesture recognition. With the rapid advancement in technology, major breakthroughs are made in the design and characterization of piezo-resistive sensors [1, 2]. These Sensors are commonly referred as flex bend sensors since

they measure the bending in the flexor tendons, such as fingers. These sensors are installed on a wearable glove, usually one for each finger [3]. The output of the sensor is fed to a microcontroller for further processing [4]. With this interface it becomes very easy to acquire the human fingers movement in neurophysiological settings [5, 6, and7].Like this interface has a number of bio-medical application, such as hand prostheses and gesture vocalization [8]. Moreover, such interfaces are also being extensively used in robotic tele-operation and human-computer interaction tools [9].Used piezoelectric sensors, an accelerometer, dispensation unit and demonstrate unit. We expect this willpower definitely aid to bridge the contact space among frequent group and dumb unable to hear [10].Hence, there is a dire need of effective technique(s) to improve the accuracy and integrity of the sensors yield so as to are very essential for the aforesaid application. In this design an electronic hand glove based on Zig bee wireless module and flex sensor. It is mainly designed for old agers, automation in home appliances and industries. It is portable and easy to handle. In this sensor output are in analogy form so to translate in digital outline at hand is ADC is use. Then ADC's output goes in Arduino processor where programming is done. Then it send the information to relay to on/off the fan, light, television, computer.



III. MATERIALS AND METHODS

3.1 Flex sensor: Flex sensors identified as curve sensor are analogs resistor. The possessions of flex sensors is that at what time we curve a sensors, it produce resistant output which is related to bend radius. When the radius is small the output will be high. The higher variations in deflection or bends of flex sensors result in higher variation of conflict within themselves. Potentiometer is use to read these conflict change and its given to ADC which converts these values intoeivalent digital values and fetched it into ZigBee module through which it gets transmitted.

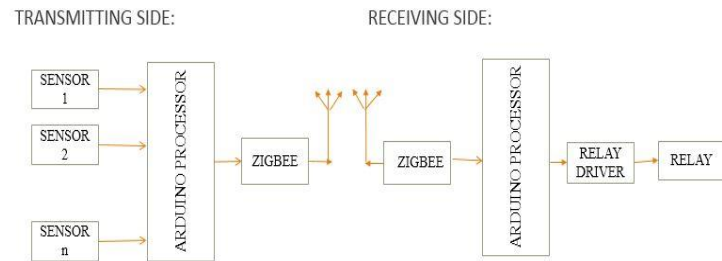


3.2 Arduino processor: The Arduino is the heart of the authentication platform uses Arduino UNO as the microcontroller which orchestrates the process of reading the input transmitted by the zigbee.The Arduino UNO is a high level microcontroller board. It is based on the ATmega328 microcontroller IC chip[10]. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. The Arduino UNO board is a basic board containing aids to meet the basic requirements of a microcontroller. It is connect to a computer with a USB cable or powered with an AC-to-DC adapter or battery to get started

3.3 Relay:The relay being used is a 230V / 2A relay and is an electromechanical relay. The excitation voltage required is +12V DC. It is driven using the relay driver IC ULN2003 /VLN 2003A. When the relay is excited by applying the 12V DC, it gets activated and in the process turns ON the device.

IV. RESULTS AND DISCUSSION

Hardware design:The electronic Glove hardware design is shown below



V. CONCLUSION

Data gloves, is a simple electronic glove that transform the hand and finger moment into real time data for applications. The proposed data glove not only has the information of finger position. The flex sensor selected to be attached to the data glove to capture the hand gesture. The flex sensor is attached firmly and the glove can easily be removed without destroying the sensor. The developed system reduces the complexity of physically challenged people. It is easily understandable and efficient time saving device

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AUTHORS BIOGRAPHY



Mr.S.Dinesh kumar was born on 21st

March 1995 in Cuddalorel. He has studied his U.G degree B.E Electronics And Communication Engineering in Dr.Pauls Engineering College in the year 2012 to 2016.



Mr.G.Kamalanathan was born on 12th october 1994 in puducherry. He has studied his U.G degree B.E Electronics And Communication Engineering in Dr.Pauls Engineering College in the year 2012 to 2016.



Mrs.K.Mayavady obtained UG and P.G degrees from Pondicherry University. Her area of specialization is wireless communication. she is having 8 year's experience in Dr.pauls engineering college. she published paper in wireless sensors and wireless communication