iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH
IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 Issue: IV Month of publication: April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4311

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Speaking Glove for Dumb Patients

T. Vasudeva Reddy[1], M. Sai Kiran[2], B. Ch. Dheeraj Reddy[3], N. Jaishik[4], R. V. S Mohith[5]
[1, 2,3 4,5] Department of Electronics and Communication Engineering, B. V. Raju Institute of Technology, Narsapur, Medak, Telangana- 502313.

Abstract:** A more reliable system for speechless patients to supplement their limited communication abilities is being presented in the paper. A normal human cannot understand the sign language shown by dumb people, and due to this the effective communication decreases. In order to help dumb people express their abilities in a regular manner similar to normal people, the sign language shown by them is converted into audible voice through gesture recognition. Important things that are related to signs shown by dumb people are the movement of fingers and the position of fingers. This is done with the help of flex sensors. The data taken from flex sensors is fed to MSP430 microprocessor, which is pre-programmed using Energia software tool. Then the required audible message is chosen from APR9600 voice module and the voice is heard through speaker. All these components are to be placed on a wearable glove which is worn by the user.

Keywords: Gesture Recognition, Flex Sensors, MSP430, Energia, APR9600.

I. INTRODUCTION

Gesture recognition is a process by which the gestures made by the user are used by the receiver. Human gestures are an efficient and powerful way of interaction. These are sometimes used to express ourselves. For example nodding may be used to show our consent, or raising a hand can be used to indicate that we are willing to speak something. This paper focuses on developing an aid for disabled people using this gesture recognition technique. In this system the gestures are converted into voice for people surrounding so that dumb patients cannot depend upon on the people for translation of their voice. A number of techniques are used to convert these gestures into required output, typically either image based or device based, although hybrids are beginning to come about. Although this technology is still in its emerging state, a number of applications have been implemented in real time. The basic concept involves the use of data gloves worn by disabled people. These gloves are designed using Flex sensors. The flex sensors are normally attached to the glove. Flex sensors are analog resistors that function as analog voltage dividers. The details of flex sensors are studied in further chapters. All the gestures made are analyzed by microcontroller which interfaces the input and sends the information to voice module. Voice module outputs the voice through speaker. Flex Sensors are primary components of the project and these sensors play a vital role in selection of the required message signal. This paper makes the suggestion that gesture based input is a very useful technique to convey the information for disabled people.

II. SYSTEM IMPLEMENTATION

Gestures these days are of great importance, as every action can be controlled using simple hand movements. Gesture recognition has been an important part in today's innovation, which is being implemented in many sectors such as health care and many more applications. We make use of these gestures to implement the system. This system is implemented on a glove. All the sensors are integrated on a glove from where the sensory data is sent into the microcontroller. We make use of flex sensors, which are variable resistance sensors which decide the voice output that needs to be produced, based on the resistance and the bend angle of the flex sensors.

III.SYSTEM ARCHITECTURE

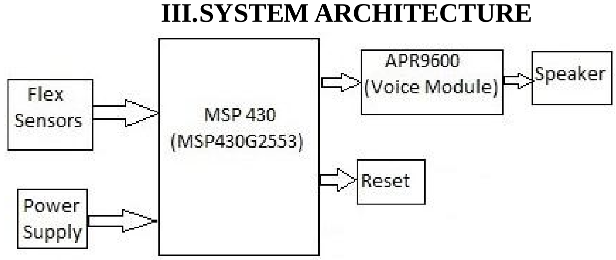


Figure 1: Block Diagram

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

A. Flex Sensors

Flex sensors are nothing but variable resistance sensors, whose resistance varies depending upon the angle of bend of the sensors. These are reliable, cost effective sensors which offer accurate measurements and resistance values. It is a single thin flexible plastic coated with a proprietary carbon. When the substrate is bent the sensor produces a resistive output relative to the bend radius. The resistance range of the flex sensor used in the project is 600 Ω to 1500 Ω. Main principle of a flex sensor is that change in resistance gives respective amount of change in voltage.

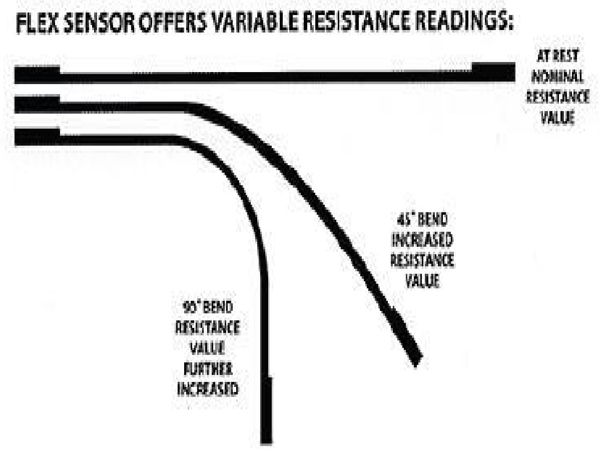


Figure 2: Angle of bend of flex sensors.

Thus, as the sensor is bent, the resistance of sensor varies and the output voltage of sensor varies accordingly. The most convenient way of obtaining a varying voltage from varying resistance is by using a voltage divider circuit which is shown in figure 2. The output voltage is obtained using the equation: Vout =Vin*R1/(R1+R2).

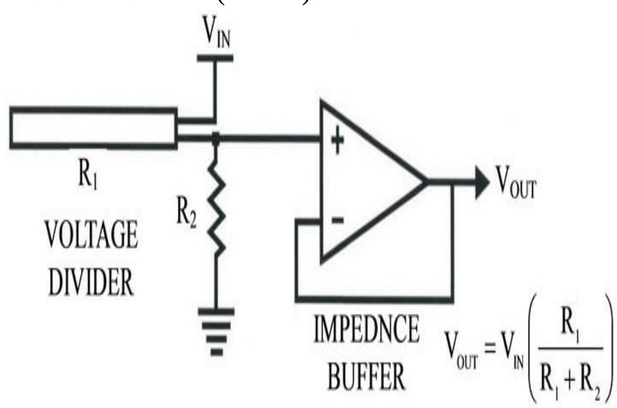


Figure 3: Voltage Divider Circuit.

B. MSP430G2553

MSP430 is a mixed signal microcontroller, which is a low cost device. It consumes ultra low power whose voltage ranges from 1.8V to 3.6V and a low crystal oscillator frequency of 32-kHz. It is built-in 16-bit timers, up to 24 I/O capacitive-touch enabled pins, a versatile analog comparator, and built-in communication capability using the universal serial communication interface. It has 512B of volatile memory and 16KB of non-volatile memory. The microcontroller is pre programmed using energia software, which takes in the inputs from the flex sensors and then outputs them to the speaker.

C. APR9600

APR9600 is a single chip voice recording module which possess on board non volatile memory, which is capable of playback of 40-60 seconds. The MSP430 is an eight channel voice module. This module has an in built mic which can be used to change the voice outputs if needed. Flow Chart of the system is shown below in figure 4:

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

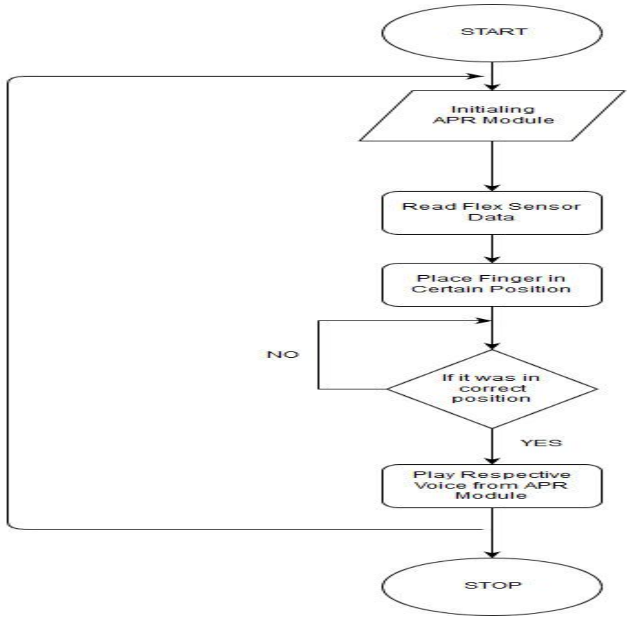


Figure 4: Flow Chart of the system

IV. RESULTS

After the whole project is done, the followed results were recorded when experimented. The MSP430 microcontroller was programmed, so that for different resistance values, there would be different outputs. The first flex sensor was programmed in such a way that the output is heard in the form of voice as" GESTURE 1". This is shown in the figure 5 below:

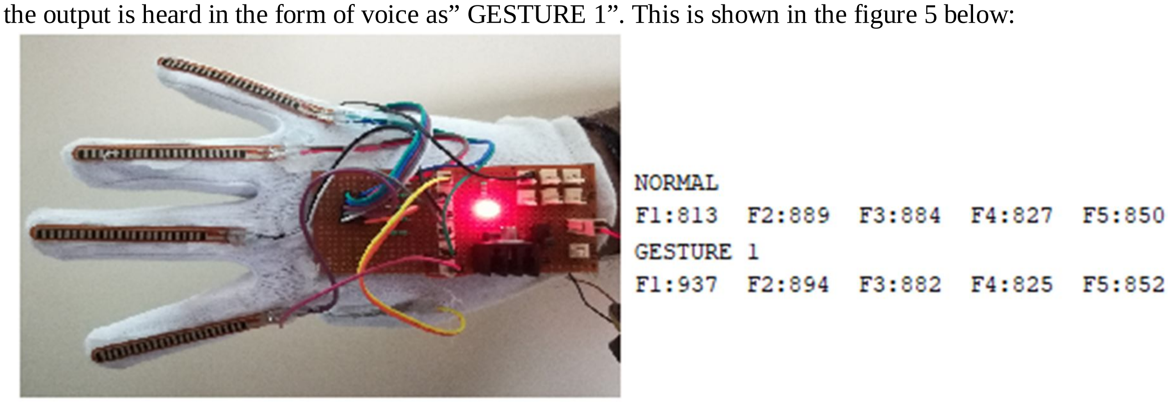


Figure 5: Result for GESTURE 1

The second flex sensor was programmed in such a way that the output is heard in the form of voice as" GESTURE 2". This is shown in the figure 6 below:

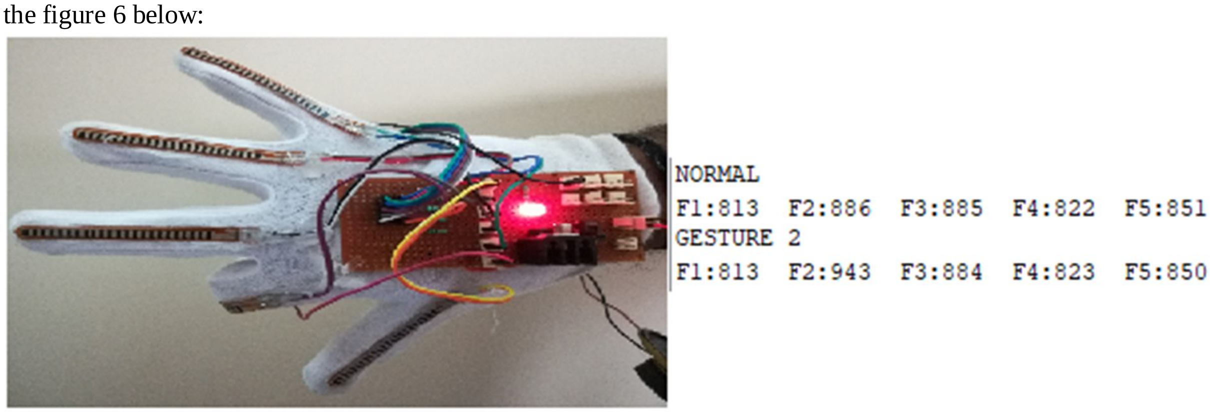


Figure 6: Result for GESTURE 2

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

The third flex sensor was programmed in such a way that the output is heard in the form of voice as" GESTURE 3". This is shown in the figure 7 below:

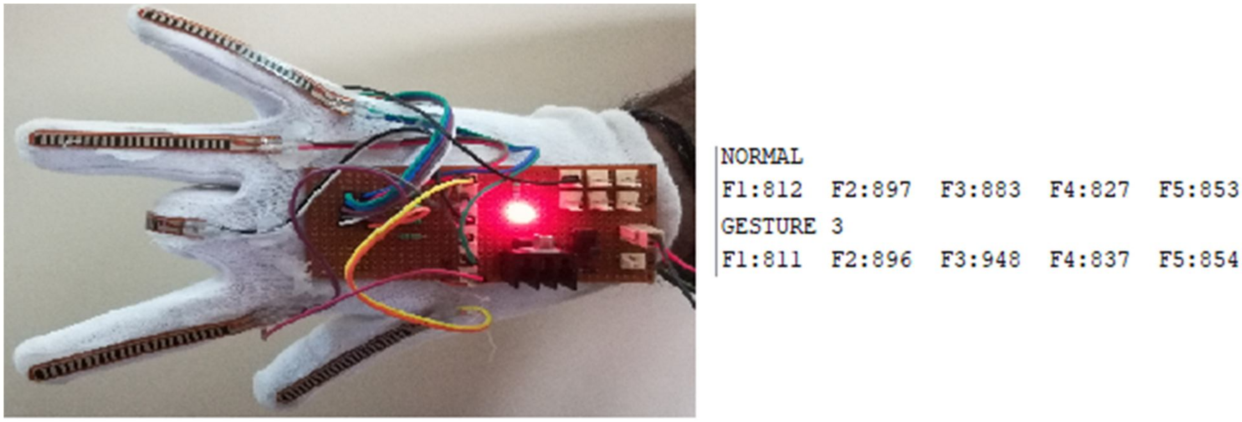


Figure 7: Result for GESTURE 3

The fourth flex sensor was programmed in such a way that the output is heard in the form of voice as "GESTURE 4". This is shown in the figure 8 below:

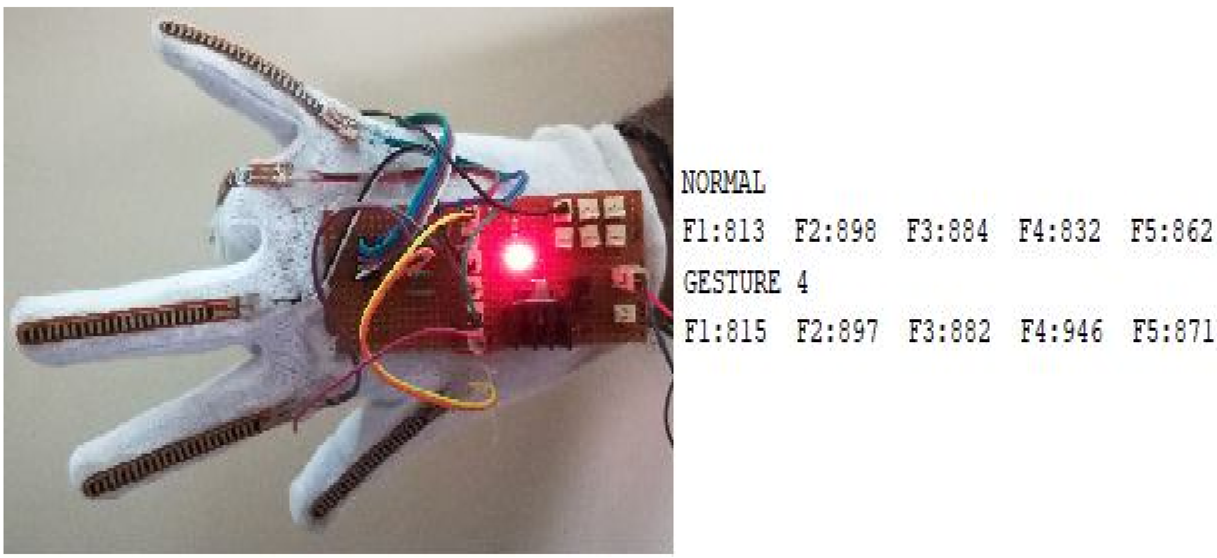


Figure 8: Result for GESTURE 4

The fifth flex sensor was programmed in such a way that the output is heard in the form of voice as "GESTURE 5". This is shown in the figure 9 below

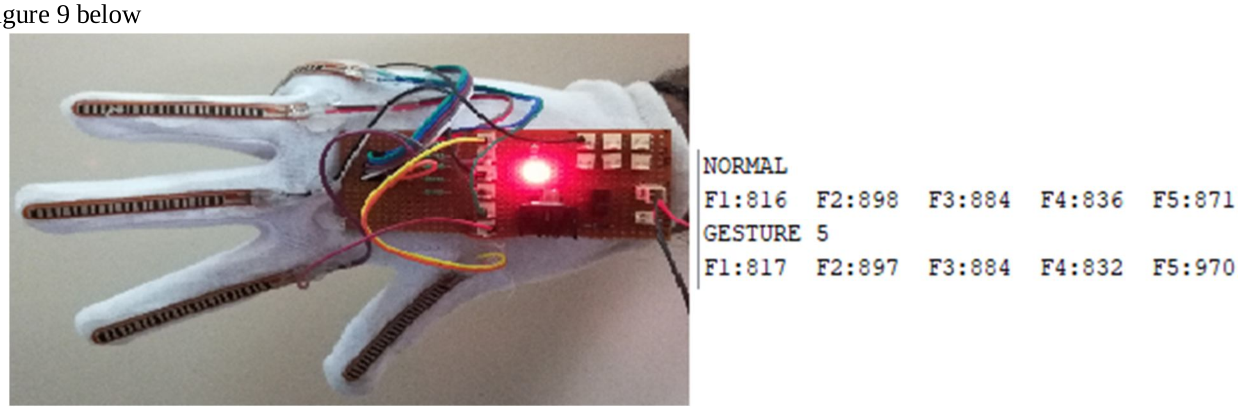


Figure 9: Result for GESTURE 5

©IJRASET (UGC Approved Journal): All Rights are Reserved

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

In order for the sixth output to take its form, flex sensors 1&2 are put to use, and voice heard is "GESTURE 6". This is shown in the figure 10 below

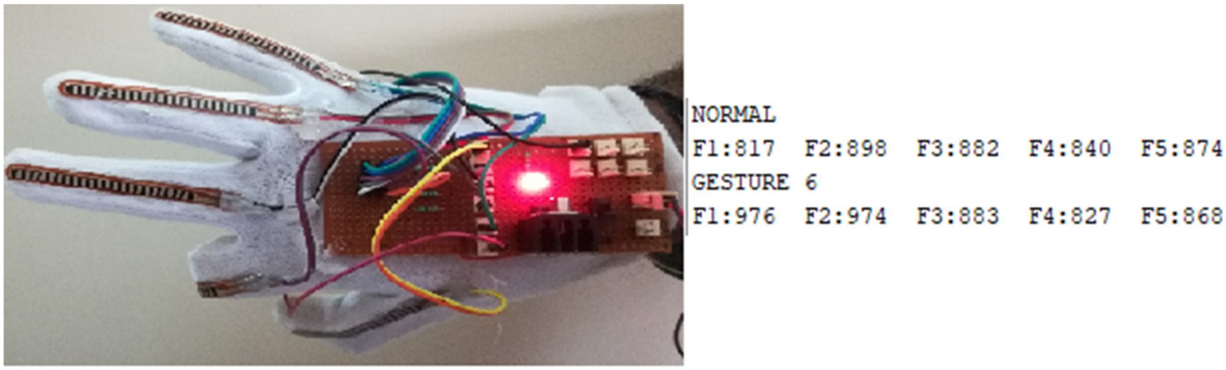


Figure 10: Result for GESTURE 6

In order for the seventh output to take its form, flex sensors 4&5 are put to use, and voice heard is "GESTURE 7". This is shown in the figure 11 below

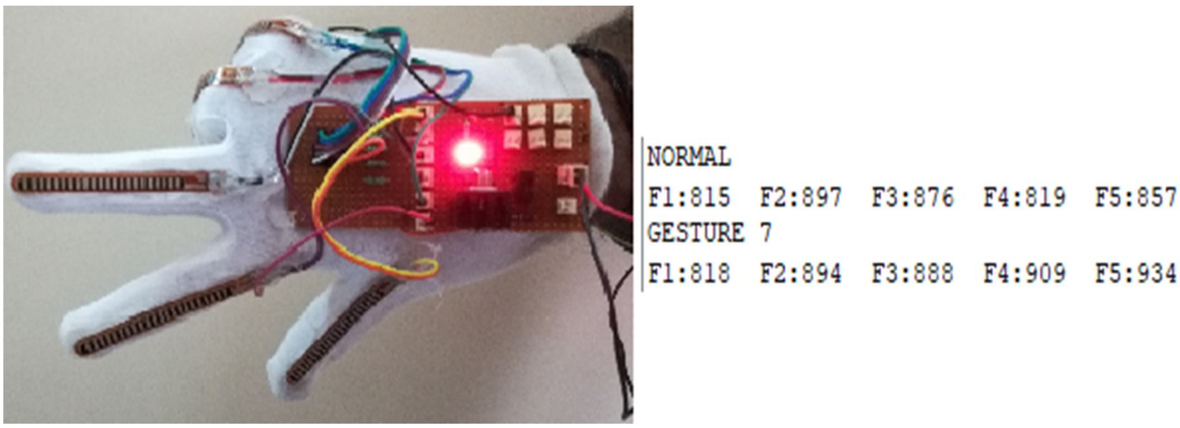


Figure 11: Result for GESTURE 7

In order for the eighth output to take its form, flex sensors 3, 4 and 5 are put to use, and voice heard is "GESTURE 8". This is shown in the figure 12 below:

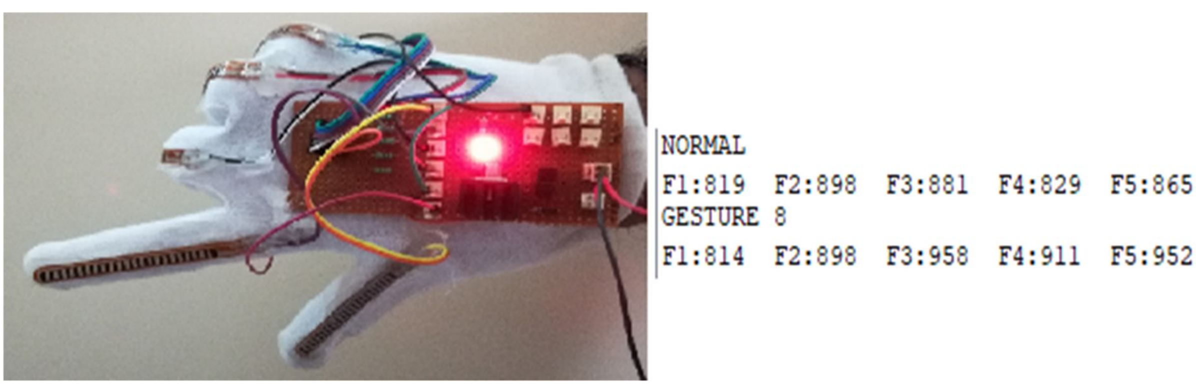


Figure 12: Result for GESTURE 8

V. CONCLUSION

Thus, a more reliable, user independent and portable device which consumes less power because of the usage of ultra low power MSP430 microcontroller is designed and thus the limited communication between the dumb people and rest of the people is set to overcome.

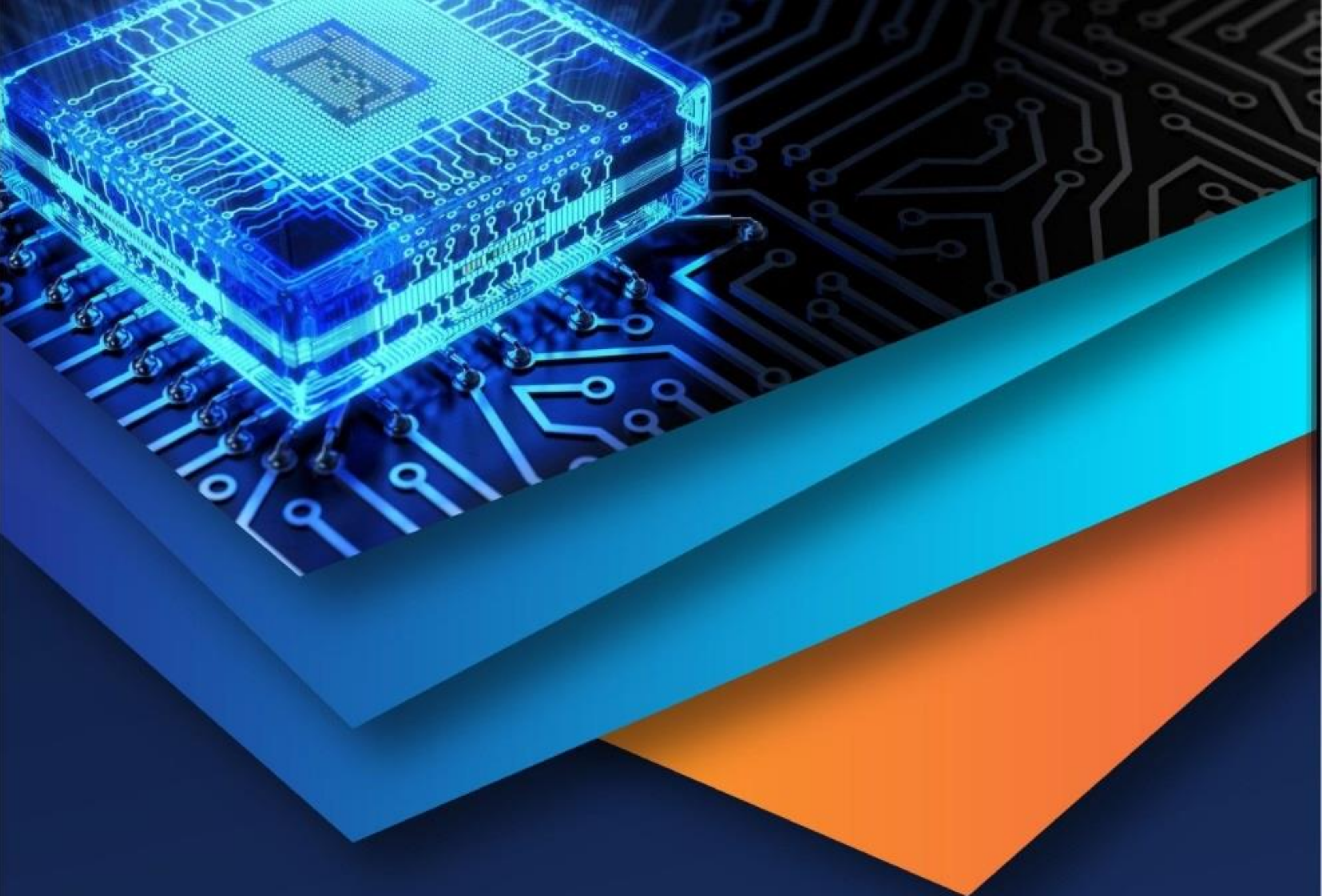
©IJRASET (UGC Approved Journal): All Rights are Reserved

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

REFERENCES

[1] Arefin Shamsil and Thilakshan McMaster University “Motion Tracking Glove for Human- Machine Interaction: Grasp & Release”, 4-23-2010.
[2] S. Cobos, M. Ferre, M.A. Sanchéz-Urán, J. Ortego and C. Peña, “Efficient Human Hand Kinematics for manipulation Task”, IEEE/RSJ International conference on intelligent Robots and Systems, pp. 2246 – 2250,2008.
[3] Saggio G., Bocchetti S., Pinto C.A., Orengo G, “Wireless Data Glove System developed for HMI. ISABEL”, 3rd International Symposium on Applied Sciences in Biomedical and Communication Technologies, Rome, Italy, November 7-10,2010.
[4] Oz, C., Leu, M.C, “American Sign Language word recognition with a sensory glove using artificial neural networks”, Engineering Applications of Artificial Intelligence 24, 1204–1213,2011.
[5] V.I. Pavlovic, R. Sharma, T.S. Huang. Visual interpretation of hand gestures for human- computer interaction, A Review, IEEE Transactions on Pattern Analysis and Machine Intelligence 19(7): 677-695, 1997.
[6] Starner, T. and Pentland. Real-Time American Sign Language Recognition from Video Using Hidden Markov Models, TR-375, MIT Media Lab, 1995.
[7] L. K. Simone, E. Elovic, U. Kalambur, D. Kamper, “ A Low Cost Method to Measure Finger Flexion in Individuals with Reduced Hand and Finger Range of Motion”, 26th Annual International conference of the IEEE Engineering in the Medicine and Biology society 2004, Volume 2, 2004.
[8] Prateem Chakraborty, Prashant Sarawgi, Ankit Mehrotra, Gaurav Agarwal, Ratika Pradhan ―Hand Gesture Recognition: A Comparative Study‖ Proc. The International Multi Conference of Engineers and Computer Scientist 2008 Vol. 1
[9] Gregory P. Slota, Mark L. Latash, Vladimir M. Zatsiorsky, “Grip forces during object manipulation: experiment, mathematical model, and validation”, in Exp Brain Res 213:125–139, 2011.
[10] D.J. Turman, D. Zeltzer. Survey of glove-based input. IEEE Computer Graphics and Application 14:30-39, 1994.

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)