



ISSN NO. 2320-5407

Journal homepage: <http://www.journalijar.com>  
Journal DOI: [10.21474/IJAR01](https://doi.org/10.21474/IJAR01)

INTERNATIONAL JOURNAL  
OF ADVANCED RESEARCH

## RESEARCH ARTICLE

## Survey on Hand Gesture Controlled Wheelchair.

Amruta S. Magar<sup>1</sup> and Mrs.M.R.Bachute<sup>2</sup>.

1. Student, G.H.Raisoni Institute of engineering, engineering and Technology Wagholi-Pune, India.
2. Faculty, G. H. Raisoni Institute of and Technology Wagholi-Pune, India.

**Manuscript Info****Manuscript History:**

Received: 14 February 2016  
Final Accepted: 19 March 2016  
Published Online: April 2016

**Key words:**

Raspberry pi Board, Dc motor, web camera (Intex IT306EC), image processing, LED Indicator.

**\*Corresponding Author****Amruta S. Magar.****Abstract**

This paper, presents hand gesture controlled wheelchair using image processing through web camera. This system not only recognizes hand gesture but also control the wheelchair according to the hand movement i.e. wheelchair will perform according to the number of finger. The fingers will be recognized and the wheelchair movement will be done in 360°. This System approaches the vision based methodology exposed hand motion. This system mainly used for handicapped person having those persons could not move anywhere. This system mainly controls the wheelchair through detection of number of fingers. This system has using the HSV color space technique to detection of hand gesture through image processing. We have used the raspberry pi board for controlling purpose.

Copy Right, IJAR, 2016.. All rights reserved.

**Introduction:-**

Hand gestures are powerful human to human communication channel which convey a major part of information transfer every life. Hand gestures are the non verbal communication media between people takes place through hand movement. A gesture is a form of non verbal communication in which visible bodily actions communicate the particular messages, either in place of speech or together and in parallel in spoken words. Hand gesture recognition is a process of understanding and classifying meaningful movements by the human hands.

In this paper we present an approach for a human computer interaction (HCI), where we tried to control the wheelchair movement using hand gestures. Hand gesture acquired using a camera based on gesture detection technique. This method mainly focuses on the use of a Web Camera to develop a virtual human computer interaction device in a cost effective manner.

Our Objective was to create a wheelchair movement using Web camera to interact with the gesture detection in more user friendly manner that can be reduces the social issues of the society.

Machine and Human interface is nothing but the HMI display screen in today's market. But it is needs to make the physical contact with the machine if user wants to operate it. Gesture detection is nothing but detection of the hand movement according to the user has given input. It needs to distinguish and recognize the number of fingers.

This system is based on the to move wheelchair wirelessly as per the input provided by the user. Use of ARM11 processor it is possible to detect the hand gesture movement and finger detection also possible on Raspberry pi because of the raspberry pi having on board GPU module. By detecting the specific finger it is possible to move the wheelchair in specific direction like forward, reverse, left, right direction. By using different algorithm finger detection and tracking it is possible to move the wheelchair as per the input provide by the user. In view of the finger user needs to make the move.

This system is based on to detect fingers of hand .Based on the finer detection use can take the action .system will design for wheelchair control. Movement of wheelchair is based on the number of fingers will detect for Example finger one is detect that will be shown in the LED indicator then move the wheelchair forward, reverse ,left ,right according to the program will be perform on the ARM11 processor on the raspberry pi board. This system can perform the four or five wheelchair application simultaneously.

This system is designed for the social application such as the handicapped person like paralised patients they cannot move anywhere especially designed for those persons it can also be used in industries for perform the four our five application simultaneously. Complete system based on the Hardware and software with the use of ARM 11platform like raspberry pi and web cam interface.

The interaction between human and robot constantly evolve and adopt different tools and software to increase the comfort of humans. Designing for system we have to use the Open CV Software for coding purpose. Open CV is free and open source library focused on the real time image processing it can detect and recognize a large variety of objects, but our focus now is to apply the techniques and methods to detect and recognize the gestures of human hand.

### **Motivation:-**

One of the major problem of paralyzed patients is they could not move anywhere it is dependable to another. To overcome these problem this system is designed only showing the fingers on front of web camera it will detect the gesture and the movement means wheelchair will move according to the input is given. This system is used not only for paralised person but also it used for any patient he could not travel or he could not move anywhere or those patients having wheelchair this system will work effectively.

### **Literature survey:-**

#### **Diksha Goyal and Dr. S.P.S Saini [1]:-**

Presented the “Accelerometer based hand gesture controlled wheelchair “Which describes the work in gesture reorganization use as application as a wheelchair. In this case was conducted is gesture is recognized through 3 axes accelerometer sensor.

A system is consisting of use sensors for detecting the gesture or hand movements. In this system gesture is recognized by the MEMS accelerometer sensor (Micro Electro Mechanical System).An accelerometer is electromechanical device that measures the acceleration forces. This accelerometer sensor is 3 axes sensor it will attached at fingertips and back of hand .It is movable device. When it is move the gesture is recognized and wheelchair will operate according to the movement of sensor.

After studying a design of “Accelerometer based hand gesture controlled wheelchair “one come to know the system is totally depend on sensor .If the sensor cannot move in angled position or direction this system cannot work hence this system is not as much as user friendly. This system does not provided the reliable support for disabled or handicapped person.

#### **Feng-shengChen, Chin-Ming Fu, and Chung-LinHuang [2]:-**

Presented the “Hand Gesture Recoganzation using a real time tracking method and Hidden Markov Models” which describes the introduction on hand gesture reorganization system to recognize the continuous gesture before stationary background.

In this system the motion of the object gives the important and useful information for object localization and extraction. Overall system includes four modules such as follows real time tracking, extraction, feature extraction, hidden Markov Model (HMM) training. To trace the moving hand and extract the hand region when applied the real time hand tracking and extraction algorithm. To characterize the spatial feature and motion analysis to characterize the temporal feature to use a Fourier Descriptor (FD).combine the spatial and temporal feature from input image sequences as our feature vector then apply the HMM model then recognize the input gesture. After studying a design of “Hand Gesture Reorganization using a real time tracking method and Hidden Markov Models” we observe that this system is depend on the HMM model to recognize to recognize the gesture. To recognizing the gesture the complexity is more and accuracy is less so it not beneficial and not compatible to the user.

**SmithaPaulose, M.P.Fathima, Anooda GeethuMohan, M.S.Sajana, K.A.Anupama [3]:-**

Author presented by “Automatic Wheelchair Using Gesture Reorganization Along With Room Automation “using MEMS Accelerometer sensor This system approaches to real time detection, Tracking and reorganizational direction of hands which is used for interaction between human robot and intelligent wheel chair.

This system intended that the accelerometer sensor is used foe to convert fingers and hand gestures into computer interpreted signal. The accelerometer data is calibrated and filtered for gesture or finger reorganization. For the wheelchair control we use a 3 axis accelerometer, which effectively translate finger and hand gestures into computer interpreted signal. This system is not affordable for patients for handling view so it not so user friendly.

**Devikarani Patil, Varalakshmi B.D[4]:-**

Presented the “Hand Gesture Recognition for MP3player using Image processing Technique and PIC16F8779”describes the=at gesture is recognized by the image processing through Web camera.

This system proposed the gesture image is taken from web camera and image will be processed in remote interface using MATLAB controller. When capturing image is forwarded to the MATLAB it campers to the database via the (x, y and z) readings of particular objects.

The movement of the object in any direction then values is noted by accelerometer the movement of accelerometer to the particular set of directions it will recognize the gestures or particular direction to operate application. This system used the K-L Transform for recognizing purpose through image processing. One problem of this system is the captured image is always in the puzzling task of separating different sources of images when its different or noisy so it is not as much as effective.

**ChengLi, KrisM.Kitani[5]:-**

Presented by “Pixel-Level Hand Detection in Ego-Centric Videos “in this system other describes that hand gesture recognized by pixel-level using image processing.

In this system the hand gesture or any movements of hand is recognized by the Ego Centric videoed which presents such as rapid changes in illuminations, significant camera motion and complex hand detection manipulation. To quantify the performance introduce the new domain that contains dataset containing 200 millions labeled pixels using ego centric hand detection which contains hand images contains taken under the various illumination conditions. Using both dataset and available images gives the recognizing performance using wide range of local appearance features.

**Need**

Today’s world contains the 1% of people having the wheelchair .Increasing percentage of elderly and disabled people who want to enhance their personal mobility, for them wheelchair is the best assistive device.

That’s why we introduce a wide scope of smart wheelchair. That consist the wheelchair will operate thought hand gesture or finger detection. Movement of the wheelchair is depending on detection of the number of the fingers. This system is real time based system.

**Proposed work:-**

After Studying the Literature Survey and understanding the socially need, this paper are modified a new technique for recognizing the gesture through image processing. Systems will the best response to the movement of wheelchair according to the detection of hand.

The Gesture Identification process will shows the how the gesture will recognize through web camera. This system consist the both section such as hardware and software. Software controls the capturing and detection part and hardware controls the actual working movements of wheelchair.

Gesture Identification Process:

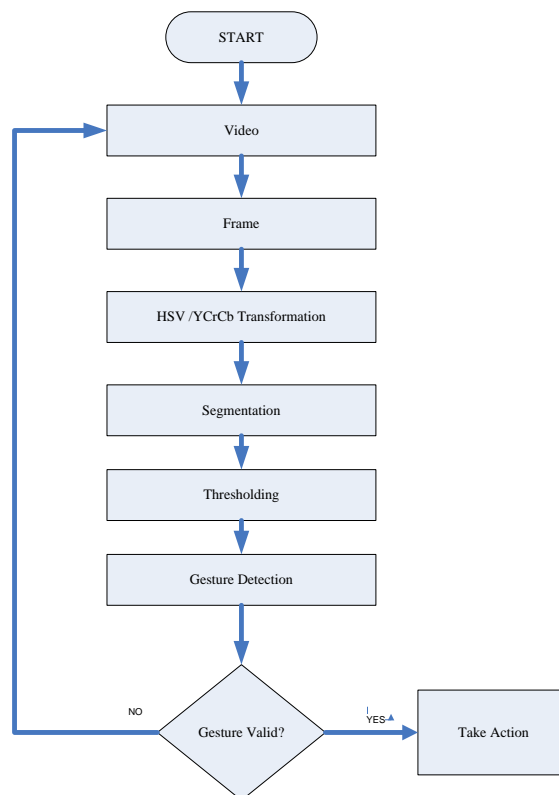


Fig: Gesture Identification Process

The gesture is detected is following way that shows the following flowchart .Web camera consist the number of frames it is in the form of recording. Web camera have 30 frames per sec .That shows a in the recording format. These videoed converts the RGB frames and these RGB frames to transforms

HSV/YCrCb format .The segments the edges of the hand and detects the gestures. Then do the Thresholding of the Segmentated frames the gesture is detected and wheelchair will move according to the input given through the Web camera.

### Conclusion:-

A Novel Technique is to be build give the best result to achieve a better gesture detection technique to implement the physiological or physical illness, injury or any disable person through wheelchair.

To reduce the social problem using this system. System controls the wheelchair through the gestures. Person can easy to interact the system via Web camera and wheelchair.

Hence we to a conclusion that Hand gesture controlled wheelchair system are more advance technique that can provide us best feature.

### Acknowledgement:-

Author is extremely thankful to research Guide”Prof. Mrs.M.R.Bachute”,G.H.Raisoni Institute of Engineering and Technology, Pune for consistent guidance ,inspiration and her valuable support.

I am Also Grateful to college Principal “Prof.Dr.R.D kharadkar” and HOD of electronics telecommunication department “Prof.N.B.Hulle”. Also thankful to P.G.Co-Ordinator Prof. Mrs.M.R.Bachute for their time to time support and guidance.

**References:-**

1. Rafiqul Zaman Khan and Noor Adnan Ibrahim "Hand Gesture Recognition: A Literature Review" *International Journal of Artificial Intelligence Application (IJAIA)*, Vol.3, No.4, July 2012.
2. Diksha Goyal and Dr. S.P. Saini "Accelerometer based Hand Gesture Controlled Wheelchair" *International Journal on Engineering Technologies* 4(2):15-20(2013).
3. Devikarani Patil, Varalakshmi B.D "Hand Gesture Recognition for MP3 Player using Image Processing Techniques and PIC16F877" *International Journal of Soft Computing and Engineering (IJSCE)* Vol-4 Issue-4, September 2014.
4. Cheng Li and Kris M. Kitani "Pixel-Level Hand Detection in Ego-Centric Videos" *IEEE Conference on Computer Vision and Pattern Recognition* 2013.
5. Smitha Paulose, M.P. Fathima, Anooda Geethu Mohan, M.S. Sajana, K.A. Anupama
6. Automatic wheelchair using Gesture Recognition Along with Room Automation " *Transaction on Engineering and Science* Vol.2, Issue5, May 2014.
7. Feng-sheng Chen, Chin-Ming Fu, Chung-Lin Huang "Hand Gesture Reorganization using a real time tracking method and Hidden Markov Models" *Image and Vision Computing* 21 (2003) 745-758.
8. Renqiang Xie, Xia Sun, Xiang Xia, and Juncheng Cao "Similarity Matching -Based Extensible Hand Gesture Recognition" *IEEE SENSORS JOURNAL*, VOL. 15 NO. 6 JUNE 2015