

HAND GESTURE BY USING ROBOTIC CAR CONTROL

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Abstract—

In this work, the developed system is utilized to provide and perform laboratory task that requires manipulation of physical components. Machine based gesture recognition was developed for upper extremity of physical impairment. In this work robot can directly contact with people, so we focused on the manipulation and navigation in the environment and robotic system is used for finding the solution to the requirements. In this work, we give the command to robot for different specific actions and the commands are generated according to the gesture. The gesture movements are processing tool using image Processing.

I. INTRODUCTION

In order to support individual with physical cognitive impairments a new associated technique is found with engage edge cutting .this technology is relayed on high usability principles exploited new communication channels that is eye blinking hand gestures voice, sip and putt as effective control modalities. such channel give result to engineers interface in support of disable. Such an intelligent wheel chair system, associate robot control.

Upper extremity gestural control can serve as important human computer interaction (HCI) for those who are handicapped.

e.g. upper limb gestural control requires less targeting than joysticks, mouse and other continuous input devices.

Gestural component is effective in disturbed environment than noise control.

Apart from common example such as keyboard and joystick that require fine motor control .to hit a key or move and twist a handle ,with upper extremity gestural control only requires gross motor function for targeting and navigational task.

At last, hand gesture based HCI is very valuable because it is not necessary to directly or wear sensors.

1. Literature survey

The literature survey of our project is illustrated as given below:

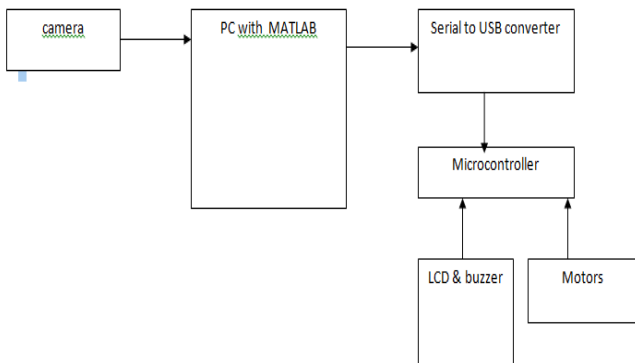
Table 1: Literature survey

Author	Title	Methodology
E. A. Suma, B. Lange, A. Rizzo, D. M. Krum, and M. Bolas(Mar 2011)	FAAST: The flexible action and articulated skeleton toolkit,”	Depth Commodity Sensors, such as kinect.
J. Wachs, M. Kolsch, H. Stern, and Y. Edan(Mar 2011)	“Vision-based applications that depends on hand gestures, and difficulties as well as innovations.”	hands, tracking them through occlusion, and the classification of hand's dynamic trajectories and static pose. For vision-based real-time gesture-based interfaces for assistive Technologies , robustness is a critical requirement.
Y. Yang, I. Saleemi, and M. Shah(Jul 2013)	Discovering motion directives for unsupervised grouping as well as shot learning with actions of human being.	adopted the extended-motion-histogram image for motion feature representation and applied it to segment and classify hand gestures.
Chairing Jiang, Bradley S. Duerstock , and Juan P. Wachs (May 2014)	A Machine Vision-Based Gestural Interface for People With Upper Extremity Physical Impairments	In this method we use Thresholding based segmentation method. In this method false merging method is used.

3. System implementation:

In system implementation consist of two parts-1. Software
 2. Hardware.

Block Diagram:



3.1 Block Diagram Description:

Camera:

We are using I-ball USB camera for image acquisition, following are the some specification of camera

I-Ball C8.0 Face2Face

- 1) High Quality CMOS sensors.
- 2) 8 Megapixels still image resolution, 4 Mega pixels video resolution.
- 3) High quality 5G wide angle lens.
- 4) USB 2.0 Interface.
- 5) 4x Digital zoom.
- 6) Video Format: RGB 24 bit

PC with MATLAB:

High performance technical computing language MATLAB. It is expressed in mathematical manner. MATLAB which solves the problem regarding technical computing, especially with matrix & vector formulations. MATLAB stands for matrix laboratory. MATLAB issues originally comprised to access a matrix software developed by the LINpacks, EISpack projects. MATLAB is the instruction tool which is used for introductory & advanced course in mathematics, engineering & science. MATLAB features a family of application specific solution called toolboxes. Toolboxes are the collection of MATLAB function. Toolboxes which includes the signal processing control system, neural network, fuzzy logic, wavelet simulation & many others.

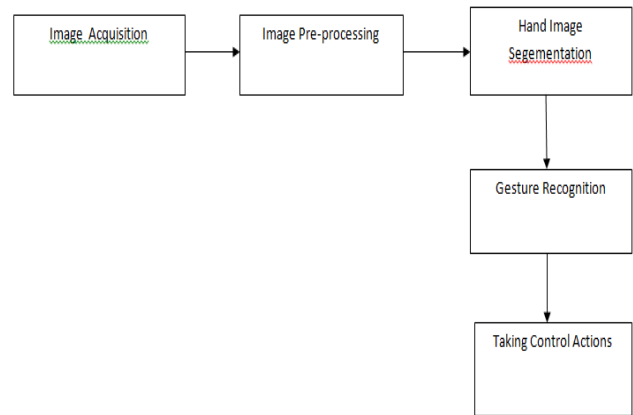
Microcontroller:

ATMEGA 16 is low power CMOS eight bit microcontroller. It is used on the AVR enhanced Reduced Instruction Set Computer architecture. ATMEGA 16 is used to provide power consumption. In the AVR having the instruction set with 32 general purpose working register. The ATMEGA 16 provides the following characteristics:

1. 16 KB at In- system programmable flash program memory with read and write capabilities.
2. 32 general purpose working register.

3. Internal & external interrupts, a serial programmable USART a byte oriented two wire serial interface an 8 channel, 10 bit ADC with optional differential input stage having programmable gains as well as programmable watchdog timer with internal oscillator, SPI serial port, & 6 selectable power saving modes.

Image Processing Part:



3.2 Block Diagram Description:

Image Acquisition:

Image Acquisition block enables to acquire image and video from iball camera into MATLAB and you can detect hardware directly. In acquiring image it results in background and synchronize various multimodal devices.

Image Pre-processing:

Histogram equalization is process of enhancing the quality of images. This can be achieved by transforming the values in an intensity of image and the values in the color map. The specified histogram is being matched with output image.

Noise from image must be removed for good accuracy. In our project we are removing 'Paper and Salt Noise. Median Filter can be used for removing noise.

Image Segmentation

For analysis of image and for pattern recognizing image segmentation is used. It is very hard task for determining the final result quality. This problem is described by segmenting an image into various viral homogeneous regions. This homogeneous regions are formed with the help of image pixel.

Gesture Recognition:

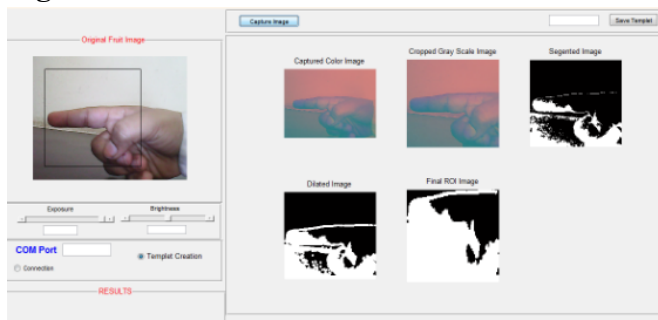
Gesture recognition is basically a term used for determining human gestures with mathematical algorithms. Gestures can originate from bodily motion or state but commonly originates from the hand. It bridges the gap between machine and humans with primitive text also called as GUI (graphical user interfaces). It also has demerits with input to keyboard as well as mouse. Gesture recognition provides a way for humans to communicate with the machine and interact naturally.

3.3 Algorithm:

1. Start
2. Image Acquisition.
3. Image Pre-processing.
 - Noise Reduction
 - Histogram Adjustment
 - Exposure Adjustment
4. Thresholding based Hand segmentation.
5. Gesture Recognition
 - Hamming distance calculation for Database and Testing Gestures.
6. Controlling based on recognized gesture.
 - Left
 - Right
 - Forward
 - Backward
 - Stop
7. Repeating steps 2 to 6 till exit.
8. Stop.

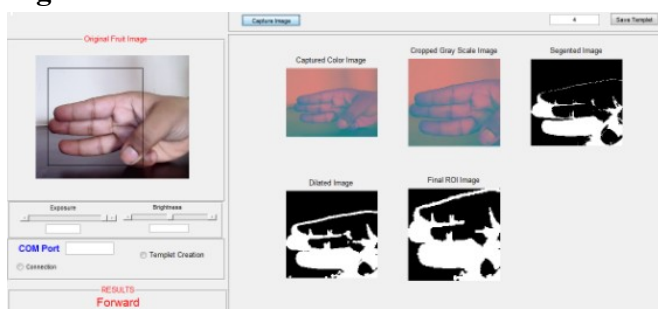
4. Result: Scenario-1

Figure-1



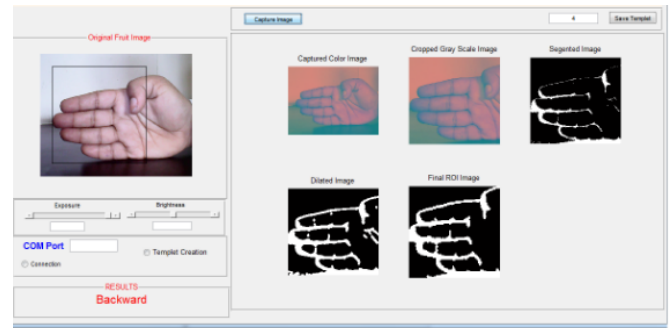
This is the image for the original video. When we are selecting device 1 then i-ball C20 camera is on then video is started.(as shown in above figure 1)at that time templet creation is done.

Figure-2



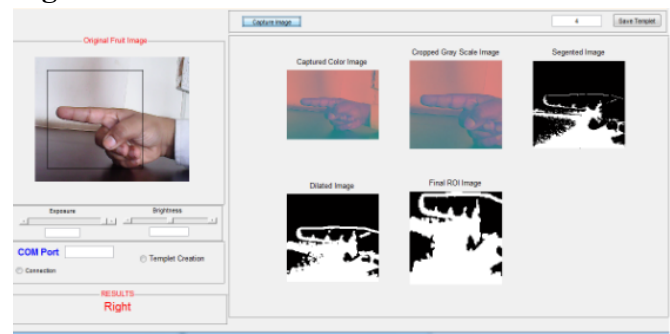
This image is for forward direction then we are taking snapshots. (as shown in above figure 2)

Figure-3



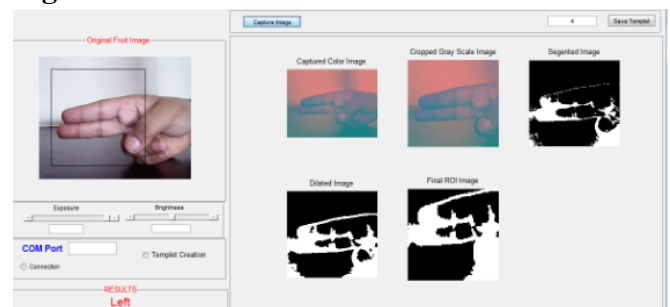
This image is for backward direction then we are taking snapshots.(as shown in above figure 3)

Figure-4



This image is for right direction then we are taking snapshots.(as shown in above figure4)

Figure-5



This image is for left direction then we are taking snapshots.(as shown in above figure 5)

Scenario 2:



As per the directives of motion of hand robotic car is being controlled. Different hand gestures are used for movement of car from one direction to other direction. The signal is passed through software module into robotic car with wireless device. In robotic car control hand gestures are captured with the help of camera and stored in database based on information stored in database controlling actions are taken.

5.Conclusion:

In this work we conclude that our project is based on physically handicapped peoples. In this we interface camera in matlab for real time image acquisition. In the preprocessing process we used median filter which is better to remove the noise present in an image. We take different snapshot for controlling action like backward, forward, right, left. We also use Dip trace software for PCB Layout Creation. and design PCB Layout using this software. In this work, without using an external hardware. We are getting the different controlled actions. Then the gesture command given to the robot and it moves to the specified direction.

6.Reference:

- 1] m. R. Ahsan, "emg signal classification for human computer interaction: a review," *eur. J. Sci. Res.*, vol. 33, no. 3, pp. 480–501, 2009.
- [2] developing a gesture based remote human-robotinteraction system using kinect
 - kun qian, jie niu and hong yang vol. 7, no. 4, july, 2013
- [3] i. H. Moon, m. Lee, j. C. Ryu, and m. Mun, "intelligent robotic wheelchair with emg-, gesture-, and voice-based interface," *intell. Robots syst.*, vol. 4, pp. 3453–3458, 2003.
- [4] gesture controlled robot using image processing Harish kumar kaura, vipul honrao, sayali patil, pravish shetty *vol. 2, no. 5, 2013*
- [5] Real Car Control Using Hand Sign Recognition
 - Ankit Multanmal Oswal, Gagan Shivarama Shetty, Mridul Anil Hiwarkar
 - Sanjeev Kumar Malik, Mrs. Hemangi Shinde Volume 1, Issue 8, April-2014

[6] Hand Gesture Control Robot Vehicle ,Riyaz Mansuri, Sandesh Vakale, Ashish Shinde, Tanveer Patel IJECT Vol. 4, Issue Spl - 2, Jan - March 2013.

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