Survey On Action Recognisation For Controlling Electronic Appliances In Homes

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ABSTRACT

Controlling Home appliances using infrared rays is gaining more importance now a day but the same controlling of devices can be done easily by using hand gestures. The main motive of automatic hand gestures based remote controlling home appliances is to remove the need to look into hand held remotes and to search for a specific key or function in the remote. This paper makes use of hands gestures with respect to real time image processing in infrared vision using Blob scanner and Arduiono[7].This system is been mainly used for controlling various home devices.

This paper consists of identification of gestures and various hand moments. It is been also known as hand mode. Paper has proposed a unique solution for physically challenged or blind people who find trouble in using electronic devices. This system makes use of well cameras to recognize various human actions.

KEYWORDS:

*Infrared Vision, Hand Gestures, Web Cameras, Action Recognisation and Arduino.*

1. INTRODUCTION

Nowadays all around the world Television (TV) is been widely used in every families .With the enrichment of TV programs, controlling operations such as channel switching and program searching are required. Taking an example for switching channel it requires the user to lower his/her head to first see and then press the small buttons. Next, he/she needs to look up at the TV screen to see whether the program is the expected one.Otherwise, the process has been repeated to switch the channel. To overcome with this problem hand gestures are been used. It provides user more comfort and convenience.

Gestures are the motion of any body part, which is made to emphasis speech, and communication is the ability to interact with humans. [4]Humans naturally used gesture to communicate with each other. Even in verbal communication, we use gestures to convey our message to people. Using this hand gesture recognition technique people can controlling electronic appliances [1].Millions of peoples are suffer from severe physical disabilities. They cannot even meet the basic human need. Action recognition for controlling electronic appliances is of a great use for such people.

In "Automatic hand gesture remote control for home appliances" [2] the term hand mode which referred to as the use of hand gestures recognition to control electronic appliances. Simple electronic gadgets like remote can be used to change television channels auto tune radio by finding the key on a hand held remote control and pressing it. But in this paper we have using a unique term in which hand gestures can be used for controlling the electronic devices. Hand gesture based remote that is hand mode is a device to replace all the other remote used in house hold and to perform their functions. A hand gesture recognition system provide a innovative and modern way of non verbal communication .

2. BLOCK DIAGRAM
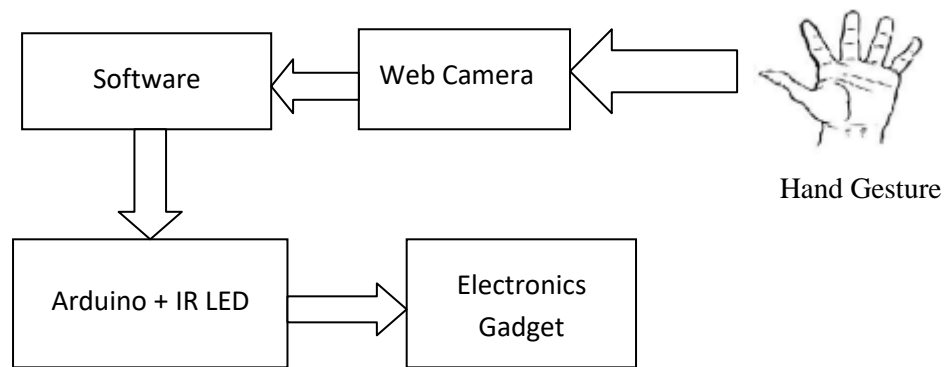
Fig 1: Functional Block Diagram

As shown in fig 1 [3] Camera is been used in handmade prototype is a simple web camera. The hand gesture images are been captured by this webcam in RGB colors format. We have to click on the start button in GUI, and the input image will be captured by web cam. Further we have to click on stop button in GUI the web cam will get stop.

2.1 SOFTWARE

JAVA Processing environment is been used for logic and run time to implement this system for image processing [6]Processing is a Java based programming structure we are using .An open source image processing library under GNL GPL v3 license named as Blob scanner processing library is used for image process. [7]Blob scanner is a small lightweight Processing Programming Environment which is been used for blob detection and analysis in images.

2.2 ARDUINO AND IR LED

For electronics projects Arduino is been used as it is an open-source platform .Through USB port its self , IR LED camera and Arduino board are powered up and the rest IR torch is using 12Volt battery supply to have very bright illumination. Each remote control keys has given unique code based on manufacturer, that is transmitted through modulating infrared light at 38 KHz at very low baud rate, 300-600 bauds/second. According to survey in this system if user wants to turn ON the TV, he/she will simply make the simple hand gesture, software recognizes it and tells the microcontroller to send TURN-ON data to TV through
IR LED. Only the Television would be able to decode it and respond it same to the user ,rest gadgets will neglect it. From the figure 1data flow from software to Arduino then to the gadget is shown.

3. TYPES OF ARDUINO BOARDS:
1. Arduino Uno: The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.
2. Arduino LilyPad: The LilyPad Arduino Main Board is based on the ATmega168V (the low-power version of the ATmega168) or the ATmega328V.
3. Arduino Mega: The Arduino Mega 2560 is a microcontroller board based on the ATmega2560
4. Arduino Mini: The Arduino Mini 05 is a small microcontroller board originally based on the ATmega168
5. Arduino Mini Pro.: The Arduino Pro Mini is a microcontroller board based on the ATmega328.

4. DIFFERENT HAND GESTURES USED:

Fig 2: Hand Gesture

Based on the different hand gestures made at the transmitter end the devices are then connected at the receiver and are controlled. As in the above fig 2 we have mentioned different hand gestures every gestures have a different meaning to control the electronic device we are also using accelerometer is been used for making the gestures. Gestures can be move up, down, left and right with the help of accelerometer. Web camera can capture images and give to the microcontroller.

5. ALGORITM
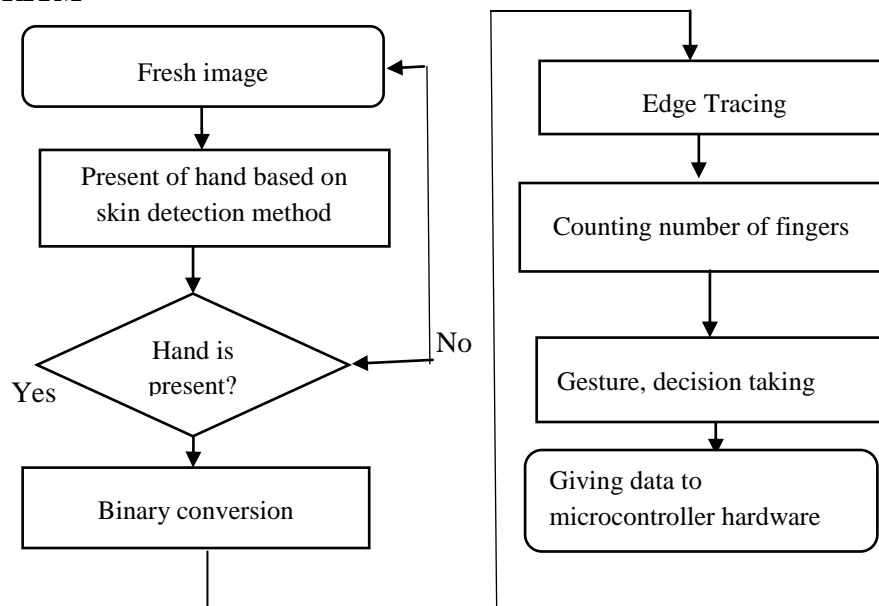
Fig 3:Application Algorithm

In the first step a fresh image is traced after taking a frame from camera is to track the hand based on skin detection algorithm using Blobscanner library. Then we check if there is presence of hand or not and move to the next step which is converting the image into binary form and then edge tracing. Once this much part is ready or hand is present in image than application search for gesture of hand or body language and behavior by counting the number of fingers and its orientation. To recognize the hand gesture angle between two successive finger gives useful flow.

Software application reference background frame stored in variable, and every time it compare with upcoming frames. This gives reliable recognition. The data so recognized is then given to the microcontroller hardware for further procedure which is to accept the data and perform the task or not. Algorithm flow is shown in figure 3. The algorithm flow gives us the basic step by step idea about the tasks performed while detection of gestures used in the controlling of home applications.

6. IMPLEMENTATION OF HAND GESTURE STEP BY STEP:

Fig 4: Implementation of Hand Gesture

In the fig. 4 we can see that the presence of hand is first detected on the basis of skin detection method and the programms of Blobscanner. After the detection of hand the various hand positions, the angle between the fingers, the size of finger, size of hand and number of fingers are counted. According to that a decision is made whether to accept the hand or not. If the hand gestures are accepted then the given task is performed and if the hand is rejected then the task to be performed is terminated. The position and gestures of hand performed by the person are reflected onto the screen and the detection process is taking place.

In the above figure, image A is showing binary converted image, image B and C are showing the edge tracing. It is an image processing technique for finding the boundaries of objects within images. It works by detecting discontinuities in brightness. And image D is showing counted numbers of fingers in the picture. In the fig 5 final appearance of the software used for image processing is shown.

Fig 5:Processing Flow

7. ADVANTAGES AND APPLICATIONS:

7.1 ADVANTAGES:

1. It provides a simple user interface and satisfies the need for more freedom in a human machine environment.

2. It is widely used in today's world as it gives human a new experience and feeling.

3. It is considered as a powerful tool for computers to begin to understand to human body language.

4. It overcomes the drawback of searching for the TV remote and a specific function in that remote.

7.2 APPLICATIONS:

1. Controlling of TV set using hand gestures.

2. It can be used while playing various video games.

3. It is suitable for physically disabled people for controlling home applications from within the room.

4. It can be used in home theaters where short distance communication is required.

5. It is suitable for blind people who find difficulty in using electronic home appliances.

8. CONCLUSION

The primary objective of this project is to developed such a system so that that blind people or physically challenged people can operate the electronics appliances through a simply hand gesture without worrying about which key to press .It also offers comfort and convenience when it comes in controlling Televisions or home theaters.

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