A paper on Display Controller Hand Gesture System

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Abstract- This is the gesture based sixth sense technology that controlled output display devices like monitor. This system can control content on the screen by using gesture of fingers without touching this screen. There are many devices available in the market for controlling the display screen but without these devices such as mouse we cannot control the display, it will become useless. Implementation of our project definitely reduced the requirement of controlling device.
Using this system we convert the real world into the digital world. The gesture computing is the excellent technology that allows hand or the movement of fingers as input control. In this webcam is play most important role ,it capture the movement of fingers or recognize the color f finger and handle whole work and functionality of the system. In the project scripting language python is used as a backend of the project.
Keywords: Hand Gesture, HCI, Webcam.

1. INTRODUCTION:

Human-Computer Interaction (HCI) is exist in our daily life. It can be happen by using the physical controller devices such as mouse, keyboard and touch screen etc. These devices are the strong barrier between user and computer. There are many mjhand tracking systems are present in the market but these are more expensive as well as so complex.

In this paper, we implement the design and development of the robust marker less fingers tracking and gesture recognition method with minimum utilization of hardware. This proposed software can be translate the detected gesture into various functional inputs and also interfaces with other applications through several methods. We developed a software which take input thai is hand gestures of respective user. Our expected output show that HCI can achieved with less hardware.

This project is under the Computer Vision domain which is the sub-field of the artificial intelligence. With recent automated human interaction system was build but it must have extra electronic equipment support (aurdino kit) .This prompted my interest so I decided to make software which entirely on computer vision it means programming ,coding and algorithm based. It dose not required any additional electronic components.

2. LITERATURE REVIEW:

The purpose of my software is to train the computer to "understand" the human's hand gestures. Hand gesture detection research classified into three categories. First is, Glove Based Analysis. In this many sensors are used to detect gestures and also the hand postures. Second implementation is,Vision Based Analysis. In that human get information from their surrounding. 3D model of human hand is deployed. Third approach is,Analysis of Drawing Gestures. Stylus is used as input device. This drawing analysis used for recognizing the written text.

3. PROBLEM IDENTIFICATION:

Paper published by Muhammad Inayat Ullah Khan"**Hand Gesture Detection & Recognition System"** gives some conceptual information related to this technique. In this paper they uses high resolution camera which is very costly and whole technique is depended on a algorithm. Then paper published by Swpnil M. Mankar and Sharda A.Chhabri **"Review on Hand Gesture Based Mobile Control Application"** is refered. In this paper recognization of hand gesture through SEMG sensor and Accelerometer technique. But in my paper I am not use any sensor.

4. PROPOSED WORK:

Display Controller Hand Gesture System' ,it means to handle the display totally based on hand gestures.In our project there is no use of any sensor, only utilize the webcam.This project belongs to image processing and computer vision domain. The name of this software is DCHGS. It is scripted in python language. Software completed in three levels as:
▪ Design main software.
▪ Create memory or storage space for that database.
▪ Build interfacing software.

International Journal of Research in Advent Technology, Vol.7, No.3, March 2019
E-ISSN: 2321-9637
Available online at www.ijrat.org

This software operated in four stages:

A.   *Capturing*
B.   *Recognizing*
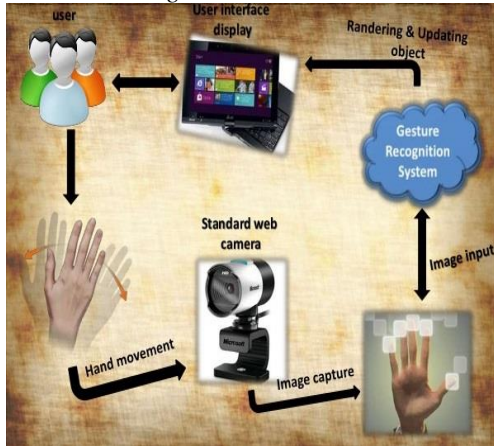C.   *Matching*
D.   *Processing*

Fig.1. Gesture reorganization operating stages

The first stage in which webcam   take image of hand gesture as input .Then detect it and match with already stored database of hand gestures' patterns. After prediction of result processing on that data images to get proper outcome.

Flowchart:

To understand the step by step working of this software, we design a following flowchart-
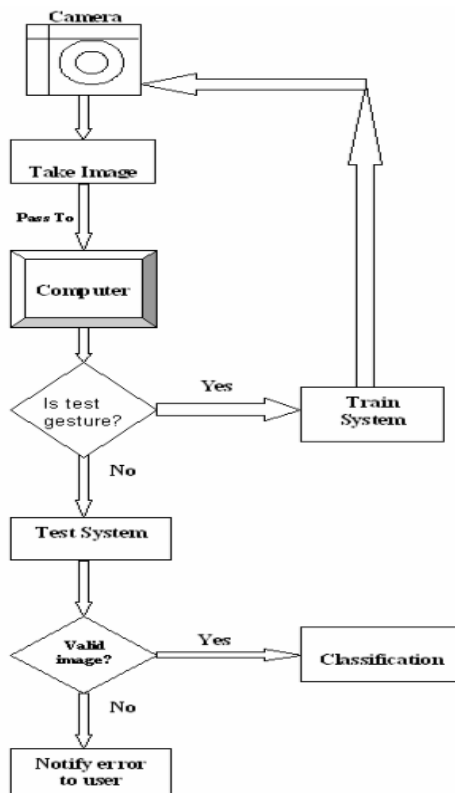

Fig.2 of flowchart of software's   functioning

5. METHODOLOGY:

To build this software, initially I design a windows of main software which shows the outlook of DCHGS application. We are not use any external hardware device rather than webcam, but it is inbuild in the laptop. After that we make a program in python to activate the webcam when this DCHGS software will be installed. There are many webcam checking tests are done.

Then we want the dataset of different hand gestures for training the computer system. Some specific finger's patterens, hand posture,hand orientation, lightining conditions and hand pose are stored into database which we have to be created. It is necessary to introduce all hand gestures and hand movements to the computer system.Then computer aware about that gestures.

We set the specific gestures for computer functioning such as:

Fig. 3 Different hand gestures

Above all gestures are set in the database of our software. First for scroll-up then second for maximization, third for shutdown, fourth for minimization of windows and last for the scroll-down functioning.

Computer should know about these gestures. To train the computer, we required positive and negative images dataset. Then arrange these images in proper format. Generate the haarcascade file and train this file. To build the interfacing software is important task. It will interfaces the main software with stored database and computer system. For that purpose we design the object detection algorithm.

After that we work on proper interaction of DCHGS software with operating system then interagation is completed. We take the closed source license for this software.

International Journal of Research in Advent Technology, Vol.7, No.3, March 2019
E-ISSN: 2321-9637
Available online at www.ijrat.org

6. APPLICATIONS:

DCHGS software is user friendly .In the world, there are so many touchless technologies are present, but these are more complex to use. Their setup is too vast and external hardware devices are required(sensors, camera), but our project required only webcam. Touchless laptops are so costly .When you install this software in your normal laptop then your laptop can work like touchless laptop, there is no requirement of mouse. Your money will be save. Due to this software, no more time required for any mouse movement. The cost of this software is less than any touchless device.

Public display screen: Information display screens in banks, post office and supermarkets that allows control without touch the device. To control robots without any physical contact between computer and human. Applicable for manipulating in virtual environment.

7. CONCLUSION AND FUTURE EXPECTATION:

DCHGS system is the most a most advanced system. This system is a software which analyze our gesture and operate all activities. In this there is no any external hardware will be used so it having reasonable. In future definitely it has great scope. Valuable time will be save.

In this software, we set some by default gestures for particular functioning of computer, user cannot change it. But in future we will definitely modify this software.We add one more functionality through which user can set their own desired hand gesture for any computer's feature. We will give specific alphabet patterens to open particular applications(e.g. 'M' for music, 'C' for camera etc.) .

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