International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.04, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

A Sixth Sense Technology for Gesture Recognition

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ABSTRACT

Sixth Sense' is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. All of us are aware of the five basic senses seeing, feeling, smelling, tasting and hearing. But there is also another sense called the sixth sense. It is basically a connection to something greater than what their physical senses are able to perceive. To a layman, it would be something supernatural. Sixth Sense is a wearable "gesture based" device that augments the physical world with digital information and lets people use natural hand gestures to interact with that information .

Keywords : Clamshell, histeq

I. INTRODUCTION

Technology is a revolutionary way to interface the physical world with digital information. Modern technologies include the touch screen techniques which is used widely and it makes ease of operation and saves utilization time. Sixth sense is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. But the bottle necks of this method such as position of camera, for capturing gestures interprets the accuracy in the projected output, lead to use of commands instead of hand gestures. The position of camera is a major constraint in the image capturing and projected output efficiency and accuracy. Therefore the actions which we regularly perform in our daily life, are converted to commands and are trained to a speech IC .They are stored as a database in the integrated circuit and corresponding actions are performed when the speech is recognized from the user. It's a hi-tech device seamlessly integrate Analog information with our everyday physical world. The voice is directly performed into operation within fractions of seconds, and the action is projected on the surface. It's a portable device and eases the operation which we regularly perform. Basically the sixth sense technology concept involves the use of hand gestures .the finger tip will contain coloured markers and hence gestures performed will be captured by the camera. Then it's given to the mobile device for the corresponding action to be performed. The action is projected on the surface through the projector. Software algorithms and computer vision technologies will be used to enable the action from the mobile device for the corresponding gesture captured in the camera. This

gesture based technology is used for variety of applications like performing basic actions, locating points in the map, watching video in newspaper, dialing number in hand etc. The slight modification of this method leads to the use of commands that is analog information into real world. The analog data is converted into digital and performed as action, as all times the hand gestures cannot be used. Fig1: Representation Of Gesture Based Design This was how the wearable device is fit to the human body .Here colour markers are used in the finger tips .In our technology we use commands for performing the same operations. Many high technology speech integrated circuits evolved which makes our operation enhanced with more advanced features. To ensure accurate gesture recognition and an intuitive interface a number of constraints are applied. A region in the front of the projection screen is defined as the active zone and the gestures are ignored, if the gestures are performed out of this area. Gestures are also defined by a set start posture, end posture and dynamic motion between the start and end postures. Perhaps the use of gestures is most powerful when combined with other input modalities, especially voice. Allowing combined voice and gestural input has several tangible advantages. The first is purely practical-ease of expression .Ease corresponds to the efficiency with which commands can be remembered and expressiveness, size of command vocabulary.

II. BLOCK DIAGRAM

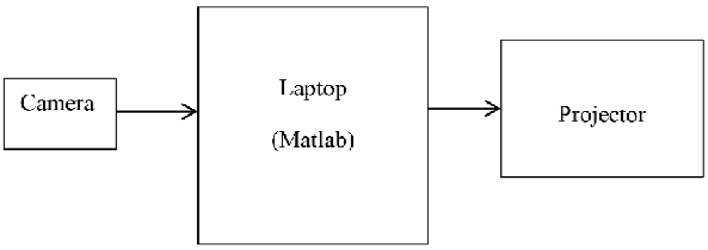

Fig.1System Block Diagram

III. WORKING

Sixth Sense is a mini-projector coupled with a camera and a cell phone—which acts as the computer and your connection to the Cloud, all the information stored on the web. The hardware components are coupled in a pendant like mobile wearable device. Both the projector and the camera are connected to the laptop computing device in the user's pocket Sixth sense device analyses what user sees and visually augments the surfaces and physical objects user is interacting with. Software program processes the video stream data captured by the camera the Sixth Sense software will be open source. As far as this seems to be a little set of items, there will not be user interfaces or much advanced programs for the users. There will be much harder and secured coding inside the device to make sure the security of the software. It will be interesting to know the new language for coding for a Sixth Sense device. What the researchers have done is combine a number of standard gadgets including a webcam, projector, and laptop, to form a brand new interaction experience. The key here is that

Sixth Sense recognizes the objects around you, displaying information automatically and letting you access it in any way you want, in the simplest way possible the technology in itself is nothing more than the combination of some stunning technologies, but the idea of combining those technologies is really great. The technology is mainly based on hand gesture recognition, image capturing, processing, and manipulation, etc. The camera is used to recognize and track user's hand gestures and physical objects using computer-vision based techniques, while the projector is used to project visual information on walls or on any physical thing around us. Other hardware includes mirror and colored caps to be used for fingers. The software of the technology uses the video stream, which is captured by the camera, and also tracks the location of the tips of the fingers to recognize the gestures. This process is done using some techniques of computer vision. Basically it is a device which is a mini projector and which can be projected on any surface, it carries the information stored in it and also collects information from the web. It is the combined technology of computer along with cell phone. It works when a person hang it on his neck and start projecting through the micro-projector attached to it. Your fingers works like the keyboard as well as the mouse

IV. COLOUR MARKER DETECTION

There are colour markers placed at the tip of users fingers. Marking the user's fingers with red, yellow, green and blue coloured tape helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as an interaction instruction for the projected application interfaces

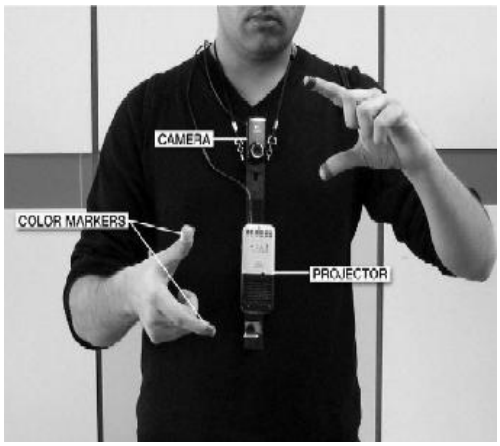

Fig.2 Color Markers

V. GESTURE RECOGNITION

Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Gestures can originate from any bodily motion or state but commonly

originate from the face or hand. Current focuses in the field include emotion recognition from the face and hand gesture recognition. Many approaches have been made using cameras and computer vision algorithms to interpret sign language. It is a technology which is aimed at interpreting human gestures with the help of mathematical algorithms. Gesture recognition technique basically special type of hand gloves which provide information about hand position orientation and flux of the fingers.

Gestures can exist in isolation or involve external objects. Free of any object, we wave, beckon, fend off, and to a greater or lesser degree (depending on training) make use of more formal sign languages. With respect to objects, we have a broad range of gestures that are almost universal, including pointing at objects, touching or moving objects, changing object shape, activating objects such as controls, or handing objects to others. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse. Gesture recognition enables humans to interface with the machine (HMI) and interact naturally without any mechanical devices.

Gestures can be used to communicate with a computer so we will be mostly concerned with empty handed semiotic gestures. These can further be categorized according to their functionality.

5.1 Symbolic gestures

These are gestures that, within each culture, have come to a single meaning. An Emblem such as the "OK" gesture is one such example; however American Sign Language gestures also fall into this category.

5.2 Deictic gestures

These are the types of gestures most generally seen in HCI and are the gestures of pointing, or otherwise directing the listener's attention to specific event or objects in the environment.

5.3 Iconic gestures

As the name suggests, these gestures are used to convey information about the size, shape or orientation of the object of discourse. They are the gestures made when someone says "The plane flew like this", while moving their hand through the air like the flight path of the aircraft

VI. RESULT

Both Colour Detected:

In both colour detection the camera detects the Red and Blue colour. In which red colour is used for pointer movement and blue colour is used for file selection.

Image Capturing:

Image Capturing consist a process in which when two red colours are detected then image is captured by the camera. For image capturing both finger should be held in right position to capture the image. After capturing the image is displayed on the projector.

PPT Slide Change:

Use colour band to detect the mouse pointer and the colour markers placed at the tip of users fingers. Marking the user's fingers with red and blue coloured tape helps the webcam to recognize the hand gestures. The movements and arrangement of this marker are interpreted intogestures that act as an interaction instruction for the projected application interfaces. Camera detects the red colour then moves the mouse pointer when red colour markers placed at the tip of users fingers. Marking the user's fingers with red and the red color is used to detect the mouse pointer and also blue is detected. Using the colour band capture the image by using hand just be clicked action by index finger and thumb and these image can be stored in the laptop and using projector project the information to the other. In fig 6 PPT slide changes or move the pages by using hand gesture, slide changes or move the pages as forward and reverse direction by using hand gesture, move the hand near to webcam or particular distance as set in the program. All the process is done in the MATLAB using programming and the image Acquisition process. In image acquisition perform various task like Image pre-processing is required to remove unwanted distortions and enhance the image features. There are numerous image representations and filtering techniques that can reduce the impact of lighting conditions and improve image quality

V. CONCLUSION

A wearable gesture interface or the Six Sense Technology can be very effective and useful in future for disabled persons who are not able to express themselves not able to speak out or hear or understand things. It could also serve as a boon in medical sector, such as for ―COMA patients‖ , who are not able to respond to external stimuli and only their mind alive while the rest of the body is dead. Six Sense can also be used in de fence system .The wearable gesture interface can be attached as ―Sixth Sense Brain‖ and it reads the mind gesture and performs task accordingly .This enhancement in the technology can make it very useful as well as can give a new life to all the disabled patients

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