INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

ISSN
INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.488

Review on Sixth Sense Technology

Nihal Jadhav [1], Dr.Prandya Muley[2]

Student, Department of M.C.A, P.E.S.'s Modern College of Engineering Pune, Maharashtra, India [1]

Head of the Department, Department of M.C.A, P.E.S.'s Modern College of Engineering Pune, Maharashtra, India [2]

ABSTRACT: The possible definition of word Sixth Sense could be that it is wearable gestural medium that makes the physical world greater around us with digital information and allows us to make use of natural hand gestures to get involved with the information. Sixth Sense technology may be a technology with which a system might be trained to acknowledge and percept world objects and react as desired. sixth sense technology closes the gap between physical world and digital world bringing virtual reality to physical world and thus allowing us to interact with this information via natural hand gestures.

It's just born concept which allows user to attach with the web seamlessly. Without use of keyboard, mouse we will see videos access, change, move data simply .But this idea bottle necks cause modification of an equivalent by using commands rather than gestures. sixth sense technology might be integrated with voice recognition. Bluetooth device and laser projectors might be used. insight technology is that the science of tomorrow with the aim of connecting the digital world with the physical world seamlessly, eliminating hardware devices.

Keywords: Augmented, Gesture, sixth sense mobile.

I. INTRODUCTION

We use our five natural senses to perceive any information, that information helps us make decisions and choose the proper actions to require . But arguably the foremost useful information which will help us make the proper decision isn't naturally perceivable with our five senses, namely the info , information and knowledge that humans have collected all information and it is available on internet. Even if we are able to compress computing device to the extent where we can carry them in our pockets, still our interaction with physical world is different than digital world. Data is physically bounded on paper and digitally on a screen.

This technology Sixth Sense connects this phenomena of bringing non substantial digital data in substantial world, and make us freely use that data with our hand gestures, and let us use everything around us as computer device Sixth Sense technology let the digital data free from its trapped form combining it with substantial reality. WUW(Wear UR World) was developed by Pranav Mistry, who is student completed Ph.D. at Group of Fluid Interfaces at MIT Media Lab. The insight prototype implements several applications that demonstrate the usefulness, viability and adaptability of the system acts because the computer and your connection to the Cloud, all the information stored on the web.

We can use Sixth Sense to easily access as we like by recognizing objects around us. The device brings us closer to reality and assists us in making right decisions by providing the relevant information, thereby, making the whole world a computer. Sixth Sense technology is mostly used to understand hand gestures, to capture images, to process them and to edit them. The software of the technology uses the video stream, which is captured by the camera, and also tracks the situation of the ideas of the fingers to acknowledge the gestures. This process is completed using some techniques of computer vision. Sixth sense technology is comprehensive way to combine digital world with physical world. In now days we use touch screen devices which is used a lot and it's use is easy so it utilizes time.

This report deals with the latest technology called the sixth sense. Sixth sense is a wearable interface which expands the substantial world around us by digital information. It's just born concept which allows user to attach with the web seamlessly. Without use of keyboard, mouse we will see videos access, change, move data simply. But this idea bottle necks cause modification of an equivalent by using commands rather than gestures. Speech IC is employed as a database for commands which can be initially trained for storage. It performs the corresponding commands accessing the operation from the mobile device connected thereto and action is projected employing a projector over any surface.

II. LITERATURE REVIEW

A lot of research is being done in the fields of Human computer Interaction (HCI) and its application in virtual environment. Researchers have tried detecting the virtual object to control system environment using video devices for HCI.[1]Natural gestures can be detected, tracked, and analyzed by using web camera as input device. Various image characteristics and gesture templates are used to help achieve those gestures. To track deformable objects Active Shape Models (ASM) are used by Cootes et al. To address the need of represent multiple hypotheses while tracking M. Isard et al introduced random sampling filters. To solve the problem of visual tracking in clutter G. Kitagawa applied Condensation algorithm in factored sampling. Index finger for cursor movement and angle between index finger and thumb for clicking events used by Hojoon Park. Chu-Feng Lien fingertips are used to control the mouse cursor and image density was used for clicking method, and user have to hold mouse cursor for short period of time is required condition. to manipulate the mouse's movement Erdem et al used fingertip tracking. When a user's hand passed over the region, a click occurred, because a click of the mouse button was implemented by defining a screen. Robertson et al, used another method to click. They used the motion of the thumb ('thumbs-up' position -> fist) to mark a clicking event thumb movement of the hand while creating a unique hand sign to show that mouse pointer is moved. Shahzad Malik developed a real-time system which will trace the 3D position and 2D orientation of the thumb and index finger of each hand without the use of special colour object or gloves. In 3D gaming, to control 3D game, a finger based gesture recognition system developed by Nasser H. Dardas et al. [1]

III. HISTORY OF SIXTH SENSE

In 1990's Steve Mann proposed this idea behind this marvelous technology at MIT, first wearable computer was created by him. In 1994 head worn projector and camera was invented, during 1998 he created and proposed neck worn projector and camera, Later in the future at MIT Media Lab it is developed by Pranav Mistry who is a PhD student in the Fluid Interfaces Group. Late Steve Mann is the "father of emergence Sixth Sense". In the beginning the very first model was too bigger to carry around and not working effectively to daily so they developed a neck worn device similar to pendant. WUW which stands for Wear UR World, a wearable gestural interface used in Sixth Sense, which makes us interact with digital information around us by combining physical and digital world. in the beginning point of view of Radio Frequency Identification (RFID) is an electronic tagging technology that is used for detection and tracing of the tags, and thus the fixed objects applying on RFID to an enterprise setting is focused by Sixth sense technology, such as a university department or corporate office. As to speak in easy language Sixth Sense represents a form of mobile computing which is applied to non-computing entities.

The first blog by Arjun KR states that it is troublesome to project data while using helmet projector on head, onto a wall and then turned to speak with a friend the data will be casted on friend's face so Pranav Mistry came up with an alternative that is pendant typed neck worn device. An ordinary webcam and a battery-powered 3M projector, with an attached mirror and all connected to an internet-enabled mobile phone are used to build the archetype.

Fig.1 Finger-Pointing Gesture

Fig.2 Head Mounted Projector

IV. COMPONENTS

Camera: As Camera behaves we can say that it works as a digital eye of the system. It basically used to capture the scene that the user is looking at. The camera captures the video which is passed to mobile computing device which does the appropriate vision computation. The major functions of the camera are:

• Camera used to capture user's gestures and movement (used in reorganization of user gestures)

• Camera captures everything in front of user and objects that user is interacting with (used in object reorganization and tracking)

• Camera took the photo of the scenery that user making gestures to capture[2]

Projector: The Projector is the key element of this technology. The projector is used to increase the physical objects and wall or other surfaces that user is interacting with by casting digital information in them. The projector transfers the data to be cast to mobile computing device. Rechargeable batteries are used in the prototype.
The important functions of the projector have been listed below:

1. Projector casts the information on surfaces those are around user which are searched by the algorithm for the related objects which is in vision of user.

2. It casts the GUI of selected application on to the desired surface.[2]

Mirror: The projector projects user's desired output through the mirror which helps in getting the perfect output on desired surface. To change the location or angle of projection user can simply tilt the mirror. For e.g. If user wants the projection on floor rather than on wall infront of him, by changing the mirror tilt will help to achieve it. Thus, mirror helps to overcome the limitation of space of projector.[2]

Microphone: In sixth sense technology microphone is optional component. Microphone is used when user wants to use paper as computing device. Microphone is clipped to paper to use paper as computing interface. Microphone catches the sound of touch on the paper. This data is passed on to computing device to analyze tracking of finger on the paper. This helps to find precise touch location on paper which can trigger different touch events. Through the microphone tracking of sound is analyzed and camera tracks where finger is moving on the paper.[2]

Mobile Computing Device:A device need to be used for processing, for this purpose a mobile computing device is kept in user's pocket . A mobile device or any wireless device can be used.[2]
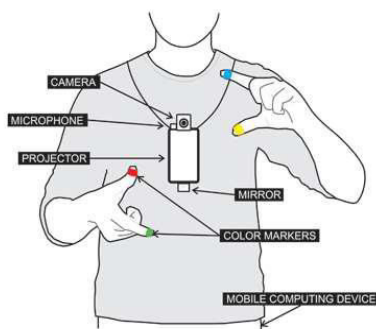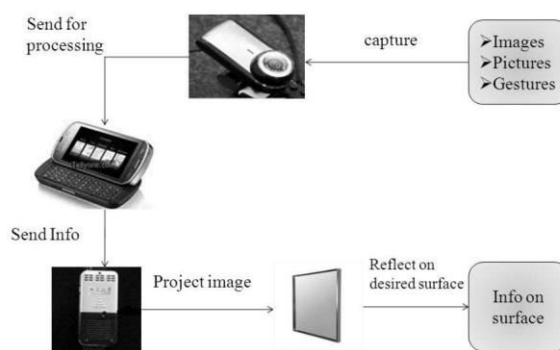

Fig.3 Pendant Device

Fig.4 Working of Sixth Sense

V. APPLICATIONS

The Numerous applications on sixth sense technology already have taken place. Some of the applications are given bellow: -

Virtual Call: To make a phone call you can project the keypad on your hand or any desired surface and make a call right away.[3]

Fig.5 Virtual Keypad

Fig.6 Virtual map

Virtual Map: User can simply project the map on desired surface, and then it can be easily navigated by thumb and index finger to zoom in and out to navigate destination.[3]

Virtual Watch: To check the time, user can simply draw a circle on his wrist and watch will be projected on his wrist. For this process user wears a colour marker on fingertip which is tracked by camera and understand the gesture.[3]

**Fig.7** Virtual Watch

Fig.8 Virtual Newspaper

Virtual Newspaper in Multimedia Mode: Sixth Sense technology can be used for live streaming for e.g. if user reading a newspaper then camera will detect it and search for related videos and project them on newspaper then user can watch that video live using newspaper as interface.[3]

Touch based interface-"Sparsh": An interaction method in which lets user transfers media conceptually to an digital device and to its body and then to the other digital device simply by touch gesture.[3]

Misc App: There are some applications like using a physical object to draw using touch gesture, To check the flight details only from boarding pass, zooming a picture, While buying a product checking product details, checking amazon ratings before buying a book, getting person's information while talking to them. Figure 9 shows some Misc application.[3]

Drawing
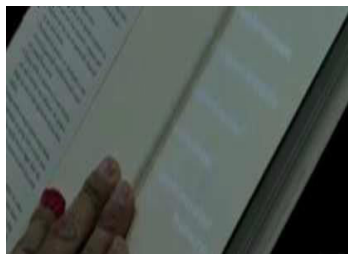
Getting Book Details

Getting Product Details

Fig.9 Misc Applications

VI. SOFTWARE USED & METHODOLOGY ADAPTED

Following technologies can be used to develop Sixth Sense Technology:-
1) Language: Java, C #, C++, OpenCV, JavaCV.
2) Image processing Software: MatLab, Mathematica, Cylab
3) Powerful Electronic Gazette: WUW v0.1 beta, Hand Gloves

Methods: Initialization: It is basically a static approach. Gesture template or cluster model is created using different algorithm of artificial intelligence such as MLP with Feed Forward Network, Visual Memory, and K-Means Clustering etc. by capturing different gestures, enhancing them, and extracting some features. Figure 10 illustrate typical hand gesture training process while figure 11 illustrates the use of k-means cluster algorithm.[4]
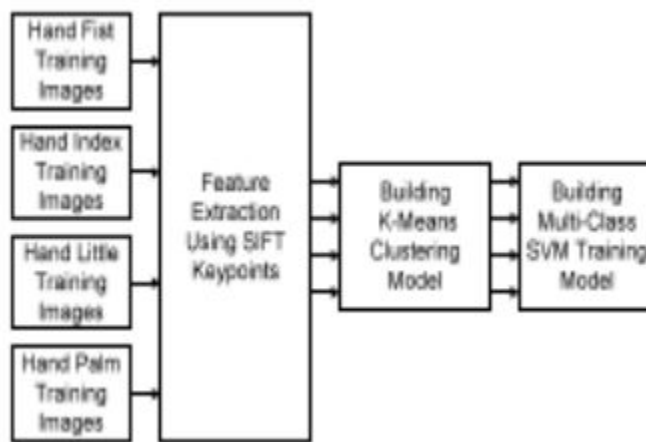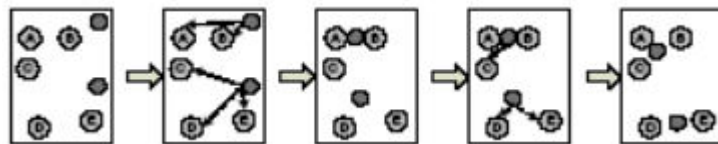

Fig. 10 Hand Gesture Training Process

Fig.11 K-means cluster with two cluster

1) **Segmentation**: In this technique each of the frames is processed separately.
Before analysis: To segment the target gesture from other background information a region detection algorithm is used after the image is smoothed, then skin pixels are labeled, noise is removed and small gaps are filled. Image edges are found, and then using popular methodology finally features are extracted [Skin detections, Sift, SURF, FAST algorithms].[4]
2) **Pattern Recognition**: Once the user's gestures has been segmented and related features are extracted, it is compared with stored gesture templates or clustering model using different matching algorithm such as Hausdorff matching, Bag of Words, Hamming Distance, correlation based approach Euclidean distance, hidden Markova model, etc. Figure 12 illustrate the typical process of testing used for hand gesture recognition.[4]
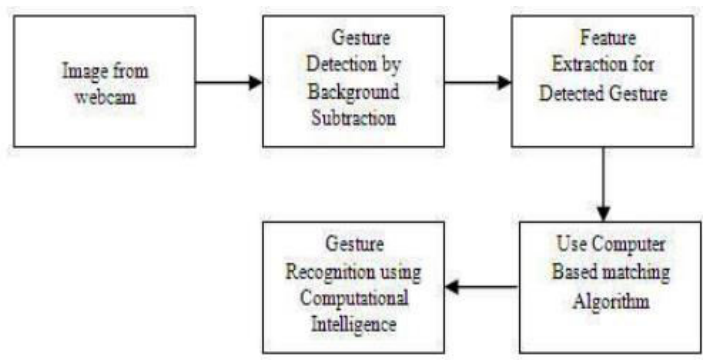
Fig.12 Hand Gesture Recognition Process

Execution: The recognized gesture according to the systemcarried out the corresponding action. Figure 13; illustrate the complete methodology adopted for sixth sense technology.[4]
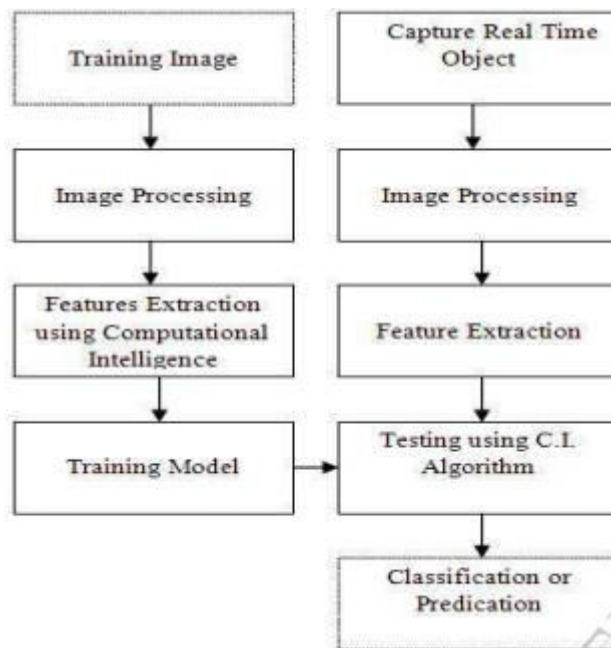

Fig.13 Block Diagram of methodology adapted for
Gesture based sixth sense technology

VI. ADVANTAGES AND DISADVANTAGES

As we know no technology can escape challenges which rise due to rapid growth in the competition in this ever increasing demand of human beings, still there are certain advantages that Sixth Sense Technology highlights. They are as follows.

Advantages:-
- Its open source
- Its Portable Technology
- It doesn't make human understand computer knowledge but it cause computer to adapt human desire.
- It is cheap to build also it connects real world and information.
- An idea can be presented on any physical object can be used by anyone who don't even have basic knowledge of keyboard and mouse

- Interface does not confines in mobile or PC display .
- Its cost is only 300$.

Disadvantages:-

- Hardware limitations of the devices, that we currently carry with us.
- For example, many phones will not permit the external camera feed to be manipulated in real-time.
- Post-processing can occur sometimes.

VII. FUTURE OF SIXTH SENSE

- To get rid of colour markers
- To embedded camera and projector inside mobile and computing devices Broadening the scope of technology[5]
- To have 3D gesture tracking.
- For disabled people it is used as fifth sense using sixth sense
- Sixth sense framework implements several applications that demonstrate usefulness, availability and flexibility of the system
- Making digital system by implementing it inside our body.[5]

VIII. CONCLUSION

We can access digital information as we need as Sixth Sense recognizes object around us and display it automatically. Usefulness, viability and flexibility of systems demonstrated by applications which implements Sixth sense prototype. We can interact information via natural hand gestures. We can access any information around us is the ultimate "transparent" potential of Sixth Sense.

REFERENCES

[1] . https://www.ijert.org/sixth-sense-technology-a-brief-literary-survey-3

[2]. https://www.slideshare.net/saugatbhatt/sixth-sense-technology-24507596

[3]https://www.engineersgarage.com/article_page/sixth-sense-technology/#:~:text=Sixth%20sense%20technology%20is%20a,more%20than%20our%20available%20senses .

[4]https://issuu.com/iserp/docs/5-ijaest-volume-no-2-issue-no-1-a-real-time-hand-g

[5]https://www.geeksforgeeks.org/sixth-sense-technology/

[6]https://liazmo.biz/qa/?u=How+sixth+sense+technology+works+pdf

[7]https://www.ted.com/talks/pattie_maes_pranav_mistry_meet_the_sixthsense_interaction?language=en

[8]https://www.pranavmistry.com/

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462   6381 907 438   ijircce@gmail.com

www.ijircce.com

Scan to save the contact details