

## A Review Paper on Sixth Sense Technology

Jash Mehta<sup>Å\*</sup>, Nirav Nayani<sup>Å</sup> and Lakshmi Kurup<sup>Å</sup>

<sup>Å</sup>Computer Department, DJSCOE, Vile Parle (W), Mumbai – 400056, India

Accepted 02 Sept 2014, Available online 01 Oct 2014, Vol.4, No.5 (Oct 2014)

### Abstract

*Sixth Sense Technology is a neck worn gestural interface device that builds up the physical world around us with the digital information and enables the users use natural hand gestures to connect with that such information. It is a pendant like device that consist two main components; a data projector and a camera. This technology enables the user to connect with the internet persistently. The device works on the principles of gestural recognition and image processing. The name Sixth Sense was given to this technology in light of a wearable device and the digital information could act in augmentation to the five traditional senses (vision, touch, smell, hearing and taste).*

**Keywords:** Camera, projector, mirror, microphone, color markers, gestures.

### 1. Introduction

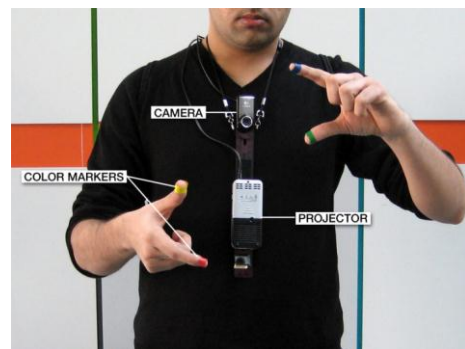
The 21<sup>st</sup> century depends entirely on technology. The importance of technology is everywhere such as in health, finance, education, corporate world etc. The technology which we use is constantly evolving due to which innovations takes place very frequently in today's world. Thus the size of computer devices are getting smaller day by day. One such innovation is Sixth Sense Technology. Steve Mann, is regarded as the brain behind this technology, who made the neck worn computers in 1997.



**Fig. 1** Former Prototype of Sixth Sense Technology

Later on this work was continued by Pranav Mistry, a PhD student at the MIT Media Lab, who is now Vice President of Research at Samsung. The information around humans regarding touch, vision, taste, smell, hearing is perceived by using the five senses. But the most important information, i.e. data, which is available online through internet, is not naturally recognized by human senses, with

six sense technology such information will be readily available to the users as the gap between the digital world and the physical world is eradicated. The Sixth Sense technology will revolutionize the world in all aspects, the tasks which take few minutes today will be performed in few milliseconds due to sixth sense technology.



**Fig. 2** Current Prototype of Sixth Sense Technology

This technology will give humans the freedom to use computer anywhere and everywhere, the entire world will be a computer due to this technology. The device is comprised of components such as data projector, camera, mobile component, color markers, mirrors and microphone. All the components have certain functions and they work in collaboration with each other.

### 2. Components

The main components of Sixth Sense Technology are as follows:

#### 2.1 Camera

This component is present at the head of the Sixth Sense Technology pendant. The function of this camera is just

\*Corresponding author: **Jash Mehta**

like that of a human eye, the only difference being it will provide digital information. This camera is capable of capturing the images that falls within its vision and also it provides information about the objects present in front of it.



**Fig. 3** Camera

The hand gestures performed by the user can be tracked with this component. Additionally, facial recognition is supported by this device. The information collected by camera is processed by the connected mobile component.

*2.2 Color Markers*

This technology makes use of four color markers: red marker, green marker, blue marker and yellow marker.



**Fig. 4** Color Markers

The user can wear these markers at the tip of their fingers which helps the camera to track hand gestures. These gestures can perform various tasks such as painting, taking a picture and many more.

*2.3 Mobile Component*



**Fig. 5** Mobile Component

One of the most important components of this technology is the mobile module. The function of this component can be carried out by any device such as smartphone, personal digital assistant, laptop etc. as long as it is mobile and web-enabled. It is a processing engine that processes the data obtained from camera and sends the output to projector.

*2.4 Projector*

The projector is basically an output gadget which is used to display any information provided by the mobile component.



**Fig. 6** Projector

Projector can project information on any kind of physical surface such as a wall, palm of user's hand, a paper etc. and the user can interact with it.

*2.5 Mirror*

Mirror is placed just below the projector.



**Fig. 7** Mirror

The projector can project the information in any direction with the help of a mirror which can be tilted in any direction as per the user's requirement.

*2.6 Microphone*

This component is used only when the projection is to be done on a piece of paper. Microphone in form of a clip is affixed on that piece of paper. The information written by user on that paper is recognized by the camera by interpreting the sound of user's touch.

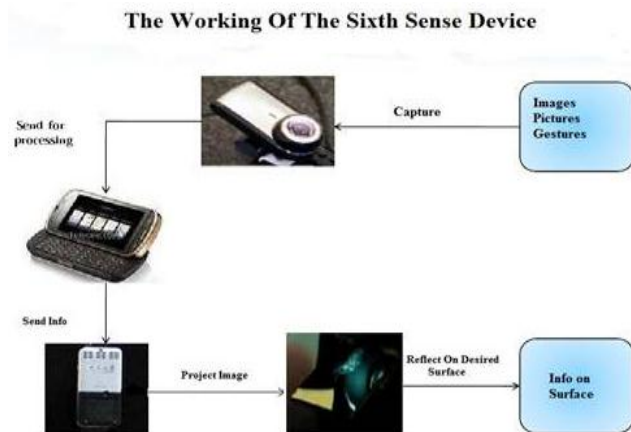


**Fig. 8** Microphone Clip

The camera is also capable of detecting the motion of the paper held in hand.

### 3. Working

Sixth sense device analyses whatever the user is watching and it augments the surfaces and physical objects user is interacting with. A number of standard gadgets are connected including a mini projector, camera, mobile phone, microphone and a mirror. The mobile phone acts as a computer and our connection to web where all the information is stored.



**Fig. 9** Working Of Sixth Sense Technology

The components in the device are managed by a mobile phone device carried by the user. The microphone and the projector are connected to the mobile phone device. The projector, projects the information enabling surfaces, walls and physical objects around the user to be used as interfaces. The microphone is trained frequently with commands; the device stores these commands which were trained by the user and executes the corresponding action through the projector.

The user gives the input to the device and when the input is received to the microphone, the command is processed and is sent to the mobile device. The mobile device interprets the command and is passed on to the projector. The projector output is seen on the screen through the mirror for accurate projection.

The tips of the user’s fingers are covered with red, yellow, green and blue colored tapes. Therefore it helps the camera to recognize the hand gestures. The movements of the user’s fingers recognized into gestures that acts as an interaction instruction for the device. The Sixth Sense technology is a blend of computer along with a cell phone.

### 4. Applications

1. Motion Capture: The new camera was praised by majority people at the time of demonstration. The pictures can be edited, managed into galleries and shared on any interface. The data is stored inside an inbuilt storage device. At the time of using a surface, the entire data is taken into that surface and after editing, it is stored in the device.
2. Capturing Photos using Fingers: The burden of carrying a camera and keeping it safe and sound on a

trip can now be avoided by simply using the Sixth sense technology. The sixth sense computer works as a camera. By making a square with our fingers and specifying the image we want to frame, the camera takes the photo.



**Fig. 10** Capture Pictures Using Frame Gesture

3. Check the Brand of the Product: A product of the best brand can be chosen



**Fig. 11** Capture Pictures Using Frame Gesture

4. Reviewing Flight Status: Any background can be used to project a screen, on which the status of flight can be checked by placing the ticket in front of this technology.



**Fig. 12** Video Newspaper

5. Time without watch: Time can be viewed merely by drawing a circle on the wrist instead of physically wearing a wristwatch.



**Fig. 13** Video Newspaper

6. 3d drawing: Provides a pencil that allows users to draw in 3D, a good way to learn for the beginners in the field of 3D modeling.
7. Call using palm as dialer: It gives the provision of using the hand as a screen onto which the dialer is projected, using which an individual can make a call.

**Fig. 14** Palm Dialer**Fig. 15** Video Newspaper

8. Video newspaper: It determines the news headline and the displays the appropriate video.
9. Zoom in Zoom out: It helps to view images and related things in the way one wants to see.

## 5. Remark

### 5.1 Advantages

- The digital information and its objects are integrated into the physical world by using the Sixth sense interface, thereby making the entire world as our own computer.
- Sixth Sense makes machines like computers to adapt to human needs and not the other way round.
- Hand gestures are used to communicate with digital information, multi-touch and multi-user interaction are also supported.
- Data from machine is directly accessed into real time. It is open source and it is cost effective and map idea can be minded anywhere.
- Our relevant information is provided by the gesture-controlled wearable computing device that manipulates any surface into a display.
- It is portable
- Comparatively easy to carry as can be worn in our neck
- Even a naïve man with little or no knowledge of mouse and computer can use this device.
- Need to carry a camera no longer persist.
- The cost that arose for the making of the sixth sense technology proto type is exceptionally low. A basic sixth sense device sums up to \$300.

### 5.2 Disadvantages

- Excessive use of a technology can cause addiction and can hamper social life as well. It will in-turn diminish humanness.
- Exposure of rays on surfaces like human arms can lead to health problems.
- This technology will affect the hardware market and will result in less revenue being generated and lower the cash inflow.
- It can affect the vision of the user because of its peculiar and better use at night time and in dark areas as compared to mornings and bright places.

## Conclusion

Use of gesture movement and speech integrated circuits has made sixth sense technology an emerging innovative idea. It provides us a smooth access to information that

may help us to make crucial decisions. The ultimate power of Sixth Sense lies within the potential it holds to connect Internet with the real world and superimposing the data on the world itself. Although upcoming technologies like 5 pen PC technology allow us to carry computers alongside with us in our pockets, a link between the digital devices we can carry and its interactions with real world, also our speech, has not yet been found. The masterstroke here is that Sixth Sense identifies the objects around oneself, let us access the information in the way we want and displays that information as well, all this in the most simplest of the ways. Felicitous awareness of this technology will point to even further development and use of this technology, which in-turn will aid in obtaining information and operating any type of function practically at any time. And this can be achieved simply by using gestures and commands.

## Future Scope

Further development in this technology will lead to evolvment of new markets. Hardware used in the current technology can be perfected as it plays an important role in this technology by interacting with the user. Security of the current technology can further be improved and more accuracy should be aimed for. Enhancements should be made so that visually impaired people can use this technology. The current technology is a little bulky to carry around, so few improvements can make it user friendly.

## Acknowledgement

We would like to thank our honorable principal Dr. Hari Vasudevan of D. J. Sanghvi College of Engineering and Dr. Narendra Shekhokar, Head of Department of Computer Engineering, for giving us the facilities and providing us with a propitious environment for working in college. We would like to thank Prof. Lakshmi Kurup for guiding us in this paper. We would also like to thank S.V.K.M. for encouraging us in such co-curricular activities.

## References

- Sixth Sense 2009 < <http://en.wikipedia.org/wiki/SixthSense>>  
 Monika Arora, (2012), Basic Principles of Sixth Sense Technology, *VSRD-IJCSIT*, Vol. 2 (8), 687-693.  
 Abhinav Sharma, Mukesh Agarwal, Anima Sharma, Sachin Gupta, (2013), Sixth Sense Technology, *IJRITCC*, Vol. 1(4), 277-282.  
 S. Sadhana Rao, (2010), Sixth Sense Technology, *Proceedings of the International Conference on Communication and Computational Intelligence*, 336-339.  
 Nalen Anand, Neha Gaur, Kavita Choudhary, (2013), Sixth Sense in a State of Radical Emergence *International Journal of Information and Computation Technology*, Vol. 3, 527-532.  
 Sixth Sense Technology 2011 < <http://www.slideshare.net/SanjayMedichetty/sixth-sense-technology>>  
 Sixth Sense Technology < <http://www.engineersgarage.com/articles/sixth-sense-technology>>