

Next Generation Technology

Hiral H Dangi

Lecturer in C.E, C.U.Shah University

Abstract: *As we see the past and present we would find that technology is changing rapidly. Technology is now the part of each and every person and connectivity is getting smoother between two. Aim of technology is to provide more and more easy usage. Next generation technology include 3d printing technology, Google glass, space technology, eye tribe, six sense technology, nanotechnology etc. This paper mainly emphasis on one of the next generation technology that is six sense technologies. It shows how this technology work and its application*

Keywords: next generation technology, six sense technology , its working , its application

1. Introduction

Next generation technology '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 that are seeing, feeling, smelling, tasting and hearing. But there is also another sense known as the sixth sense. It is sort of connection to something greater than what their physical senses are able to perceive. It would be something supernatural to a layman. Some might also consider it to be a superstition or something psychological. But the invention of sixth sense technology has completely shocked the world. Although it is not widely known as of now but the time is not far when this technology will change our perception of the world. Pranav Mistry, 28 year old, of Indian is the mastermind behind the sixth sense technology. The device sees what we see but it lets out information that we want to know while viewing the object. It can also project information on any surface, be it a wall, table or any other object and uses hand / arm movements to help us interact with the projected information. The device brings us closer to reality and assists us in making right decisions by providing the relevant information, thereby; making the entire world a computer.

The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system. The map application lets the user navigate a map displayed on a nearby surface using hand gestures, similar to gestures supported by Multi-Touch based systems, letting the user zoom in, zoom out or pan using intuitive hand movements. The user can stop by any surface or wall and flick through the photos he/she has taken. Sixth Sense also lets the user draw icons or symbols in the air using the movement of the index finger and recognizes those symbols as interaction instructions.

We've evolved over millions of years to sense the world around us. When we encounter something, someone or some place, we use our five natural senses to perceive information about it; that information helps us make decisions and chose the right actions to take. But arguably the most useful information that can help us make the right decision is not naturally perceivable with our five senses, namely the data, information and knowledge that mankind has accumulated about everything and which is increasingly all available

online. Although the miniaturization of computing devices allows us to carry computers in our pockets, keeping us continually connected to the digital world, there is no link between our digital devices and our interactions with the physical world. Information is confined traditionally on paper or digitally on a screen. Sixth Sense bridges this gap, bringing intangible, digital information out into the tangible world and allowing us to interact with this information via natural hand gestures. Sixth Sense frees information from its confines by seamlessly integrating it with reality and thus making the entire world our computer. Sixth Sense technology is the science of tomorrow with the aim of connecting the digital world with the physical world seamlessly, eliminating hardware devices.

WEBCAM

Webcam projector and mobile phone form a new interaction experience. In its current form the battery-powered projector is attached to a hat, the webcam is hung around the neck (or also positioned on a hat), and the mobile phone provides the connection to the Internet. User's hand gestures combined with the gadgets to perform actions. So, for example, they could make a circle over their wrist with the fingers of one hand. Sixth Sense / Wear UR World (WUW) would recognize this action and project a clock face on to their wrist. Make a picture frame with both our hands and WUW will take a picture as if it was a camera. Stand near a wall and we can get projected.

Desktop

Desktop allowing us to open applications, view the pictures we've taken or surf the internet With the invention of intuitive computer interfaces, the digital and physical worlds came together closer than ever. One just has to place an object (anything from a flight boarding pass to a key) on a Tangible Public Map on its horizontal smart screen to get inside-out information about it. Keep a coffee cup on a particular spot on the map and a whole range of cafés in the area is brought to us on a platter. All we have to do to get seamlessly connected with the digital world and wear a pendant-like equipment consisting of a camera along with a portable battery-powered projection system with a mirror (a more modish version is just round the corner). The device (now known as the Sixth Sense Device) when connected to a cell phone acts as a computation and communication tool.

The camera tracks hand gestures and helps gather “meta information” (information from the surroundings) and articulates it with the digital domain. Wearing marker caps on ones fingers (a more stylish option is to paint the said fingernails in a different color each) and making gestures with them, one can use any interface to access and modify data. Clicking a picture is as easy as conjuring up a rectangle in the air aimed at the object of visual desire with the thumb and index fingers. A few finger motions help edit and resize pictures and another set of gestures later, the pictures find themselves E-mailed to recipients.

Sixth Sense Device

Sixth Sense is a mini-projector coupled with a camera and a cell phone which acts as the computer and our 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 mobile computing device in the use pocket.

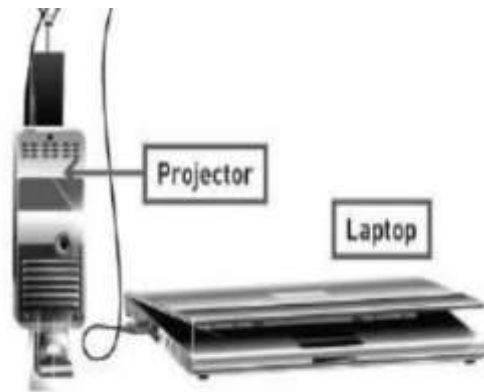


Figure 1: A Typical Sixth Sense Device

(a) **Software.** 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.

(b) **Hardware.** In order to control the Sixth Sense, it requires some advance hardware as it appears to be. In some of the public presentations, the presenter wears some controlling devices including color markers, camera and projector. They have to be compact and easily controllable. However, the hardware integration of Sixth Sense technology is quite innovative since they have managed to develop camera and pen like day to day objects.

(c) **Projector.** It projects visual information enabling surfaces, walls and physical objects around us to be used as interfaces.

(d) **Camera.** Camera recognizes and tracks user's hand gestures and physical objects using Computer vision based techniques.

(e) **Colored Markers.** Colored markers (visual tracking fiducial) placed at the tip of the user's fingers using simple computer vision techniques. It helps the webcam to track the movement of fingers. The movements and arrangements of these fiducials are interpreted into gestures that act as interaction instructions for the projected application interfaces.

(f) **Mobile Device.** Mobile device may be a laptop, PDA, smart phones etc. These are connected to other hardware devices and sends information to projector for projection. The important thing is that the device is a mobile device. It means, it is so light that we can take it with us where ever we want to. It is as small as a cell phone and is so simple to use.

2. Working

Sixth sense device analyses what user sees and visually augments the surfaces and physical objects user is interacting with. What the researchers have done is to combine a number of standard gadgets including a webcam, projector and mobile phone, to form a brand new interaction experience. The key here is that Sixth Sense recognizes the objects around us, displaying information automatically and letting us access it in any way we want, in the simplest way possible. The technology 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 users 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 one which obey hand gestures of ours and gives us what we want to see and know. 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. Our fingers works like the keyboard as well as the mouse.

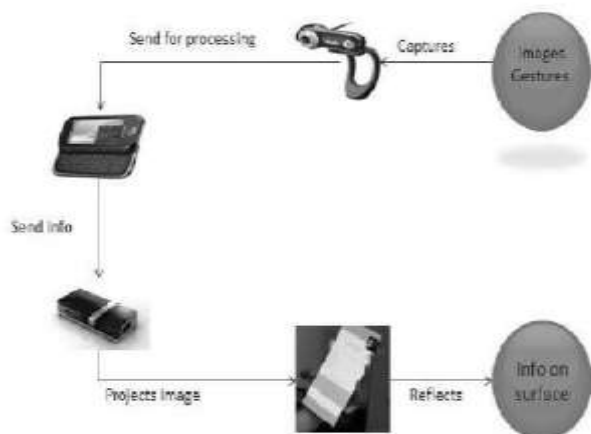


Figure 2: Working of a Sixth Sense Device

3. Applications

There are several applications that can be made using the Sixth Sense technology. It would be a great achievement for the Information Technology as well. Since it is the beginning of the Sixth Sense applications, there will be lot of tough problems ahead the Sixth Sense application developers. There are so many new applications to be developed in the near future. A remote controller for media device scan implemented to be worked with fingers using this technology. Except having the remote controller to send fast forward, rewind or next or previous options, a Sixth Sense device can be used. Many games can be made using this technology. A car race using a steering wheel will be an attractive application. The player will have to drive the vehicle as a real one using his arms. The Sixth Sense toolkit will be a good replacement for the XBOX game kit and it will not be much expensive as it is said. Other potential applications include:-

- (a) **Motion Capture.** The innovative camera is something that got applaude of the crowd in the demonstration. The photos can be taken to any interface for editing, managing the galleries and Sharing. There is an inbuilt storage device where the data can be stored. When using a surface, the whole data is taken into that surface and stored in the device after the editing and also the capturing device being so small like rubber rings can be used to capture the photos of any location.
- (b) **Capture Photos with Fingers.** Why to take camera on our holiday and no tension for the photo space as this Sixth Sense Computer will work like our camera. It captures the photo, when we make a square with our fingers, high lighting which we want to frame.
- (c) **Phone Call.** We can call to our friend by typing the numbers on our hand. It displays the keypad of the phone and the keys appear on the fore finger. Use our other hand's finger to press the keys.
- (d) **Check the Brand of the Product.** It helps us to choose the best brand product from the super market.
- (e) **Newspapers.** We have seen the moving pictures of the News Paper in the movie Harry Potter; it is quite similar to

it. It Searches the most appropriate video from the web by seeing the headlines of the News Report.

(f) **Checking Flight Status.** We can check the status of the flight while we are on Taxi. Just place the ticket in front of the projector and it checks its status from the internet.

(g) **Time without Wrist Watch.** Watches are ancient history now with the prevalence of cell phones. With sixth sense technology, it is just "drawing a circle on the wrist" away from catching the current time.

4. Conclusion

Sixth Sense technology is the science of tomorrow with the aim of connecting the digital world with the physical world seamlessly, eliminating hardware devices. This combination of devices and software together create a reality in which the digital world is merged with the physical world. This technology can be used in a plethora of positive ways, especially by enhancing daily tasks. It facilitates easily learn information about products while shopping, find instructions while building or constructing and being able to easily identify areas while travelling are all extremely positive results of Sixth Sense technology. It is essentially a wearable computer that can surf the web, make phone calls and even connect to other computing devices. It is more portable and more interactive than any Smartphone, laptop or tablet available today. It does, however, pose a threat to society in the form of privacy issues. It allows for the user to easily record and photograph anything without being notice and it can also allow for the user to gain available online information about anything just by glancing at it and performing an online search. This will surely bring up many social, legal, ethical and security concerns. Sixth Sense technology is remarkable in its intended purpose for daily task efficiency and interactive computing. We can say that it is one of most effective technology of future.

Reference

- [1] <http://wearcam.org/6ense.pdf>
- [2] http://www.ted.com/talks/pattie_maes_demos_the_sixth_sense.html
- [3] <http://www.pranavmistry.com/projects/sixthsense>
- [4] <https://github.com/sixthsense/sixthsense>