



SIXTH SENSE TECHNOLOGY

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ABSTRACT:-Sixth Sense Technology is a mini-projector coupled with a camera and a cellphone—which acts as the computer and connected to the Cloud, all the information stored on the web. Sixth Sense can also obey hand gestures. The camera recognizes objects around a person instantly, with the micro-projector overlaying the information on any surface, including the object itself or hand. Also can access or manipulate the information using fingers. make a call by Extend hand on front of the projector and numbers will appear for to click. know the time by Draw a circle on wrist and a watch will appear. take a photo by Just make a square with fingers, highlighting what want to frame, and the system will make the photo—which can later organize with the others using own hands over the air.and The device has a huge number of applications , it is portable and easily to carry as can wear it in neck. The drawing application lets user draw on any surface by observing the movement of index finger. Mapping can also be doneanywhere with the feature of zooming in or zooming out. The camera also helps user to take pictures of the scene is viewing and later can arrange them on any surface. Some of the more practical uses are reading a newspaper. reading a newspaper and viewing videos instead of the photos in the paper. Or live sports updates while reading the newspaper. The device can also tell arrival, departure or delay time of air plane on tickets. For book lovers it is nothing less than a blessing. Open any book and find the Amazon ratings of the book. To add to it, pick any page and the device gives additional information on the text, comments and lot more add on feature.

I. INTRODUCTION

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 which includes eye, ear,nose, tongue mind and body 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. SixthSense bridges this gap, bringing intangible, digital information out into the tangible world, and allowing us to interact with this information via natural hand gestures. 'SixthSense' frees information from its confines by seamlessly integrating it with reality, and thus making the entire world your computer.

Sixth Sense Technology, it is the newest jargon that has proclaimed its presence in the technical arena. This technology has emerged, which has its relation to the power of these six senses. Our ordinary computers will soon be able to sense the different feelings accumulated in the surroundings and it is all a gift of the "Sixth Sense Technology" newly introduced.

SixthSense 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. It was developed by Pranav Mistry, a PhD student in the Fluid Interfaces Group at the MIT Media Lab. A grad student with the Fluid Interfaces Group at MIT, he caused a storm with his creation of SixthSense. He says that the movies "Robocop" and "Minority Report" gave him the inspiration to create his view of a world not dominated by computers, digital information and human robots, but one where computers and other digital devices enhance people's enjoyment of the physical world. Right now, we use our "devices" (computers, mobile phones, tablets, etc.) to go into the internet and get information that we want. With SixthSense we will use a device no bigger than current cell phones and probably eventually as small as a button on our shirts to bring the internet to us in order to interact with our world!

SixthSense will allow us to interact with our world like never before. We can get information on anything we want from anywhere within a few moments! We will not only be able to interact with things on a whole new level but also with people! One great part of the device is its ability to scan objects or even people and project out information regarding what you are looking at.

SIXTH SENSE TECHNOLOGY

What is SixthSense?



Sixth Sense in scientific (or non-scientific) terms is defined as Extra Sensory Perception

or in short ESP. It involves the reception of information not gained through any of the five senses. Nor is it taken from any experiences from the past or known. Sixth Sense aims to more seamlessly integrate online information and tech into everyday life. By making available information needed for decision-making beyond what we have access to with our five senses, it effectively gives users a sixth sense.

Earlier SixthSense Prototype

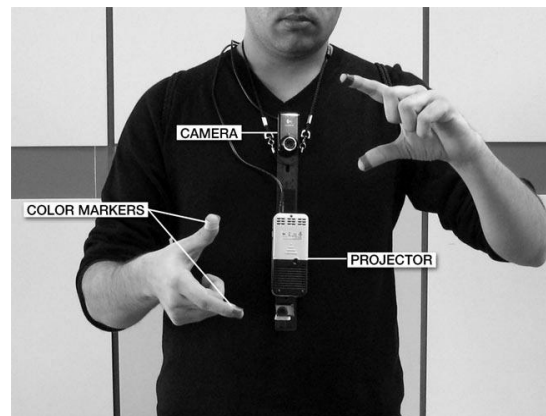


Maes' MIT group, which includes seven graduate students, were thinking about how a person could be more integrated into the world around them and access information without having to do something like take out a phone. They initially produced a wristband that would read an Radio Frequency Identification tag to know, for example, which book a user is holding in a store. They also had a ring that used infrared to communicate by beacon to supermarket smart shelves to give you information about products. As we grab a package of macaroni, the ring would glow red or green to tell us if the product was organic or free of peanut traces — whatever criteria we program into the system. They wanted to make information more useful to people in real time with minimal effort in a way that doesn't require any behaviour changes. The wristband was getting close, but we still had to take out our cell phone

to look at the information. That's when they struck on the idea of accessing information from the internet and projecting it. So someone wearing the wristband could pick up a paperback in the bookstore and immediately call up reviews about the book, projecting them onto a surface in the store or doing a keyword search through the book by accessing digitized pages on Amazon or Google books.

They started with a larger projector that was mounted on a helmet. But that proved cumbersome if someone was projecting data onto a wall then turned to speak to friend — the data would project on the friend's face.

Recent Prototype



Now they have switched to a smaller projector and created the pendant prototype to be worn around the neck.

The SixthSense prototype is composed of a pocket projector, a mirror and a camera. 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 user's pocket. We can very well consider the Sixth Sense Technology as a blend of the computer and the cell phone. It works as the device associated to it is hanged around the neck of a person and thus the projection starts by means of the micro projector attached to the device. Therefore, in course, you turn out to be a moving computer in yourself and the fingers act like a mouse and a keyboard.

The prototype was built from an ordinary webcam and a battery-powered 3M projector, with an attached mirror — all connected to an internet-enabled mobile phone. The setup, which costs less than \$350, allows the user to project information from the phone onto any surface — walls, the body of another person or even your hand.

Mistry wore the device on a lanyard around his neck, and colored Magic Marker caps on four fingers (red, blue, green and yellow) helped the camera distinguish the four fingers and recognize his hand gestures with software that Mistry created.

COMPONENT OF SIXTH SENSE TECHNOLOGY

The hardware components are coupled in a pendant like mobile wearable device.

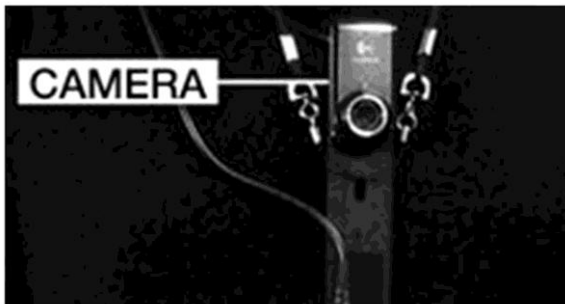
- Camera
- Projector
- Mirror
- Mobile Component
- Color Markers

Camera

A webcam captures and recognises an object in view and tracks the user's hand gestures

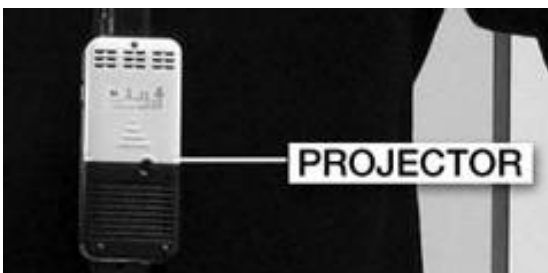
using computer-vision based techniques. It sends the data to the smart phone. The camera, in a sense, acts as a digital eye, seeing what the user sees. It also tracks the movements of the thumbs and index fingers of both of the user's hands. The camera recognizes objects around you instantly, with the microprojector overlaying the information on any surface, including the object itself or your hand.

Mirror



The usage of the mirror is significant as the projector dangles pointing downwards from the neck.

Projector



Also, a projector opens up interaction and sharing. The project itself contains a battery inside, with 3 hours of

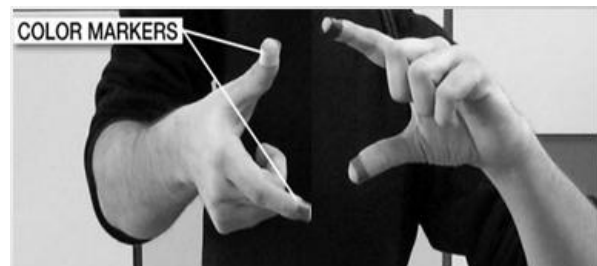
battery life. The projector projects visual information enabling surfaces, walls and physical objects around us to be used as interfaces. We want this thing to merge with the physical world in a real physical sense. You are touching that object and projecting info onto that object. The information will look like it is part of the object. A tiny LED projector displays data sent from the smart phone on any surface in view—object, wall, or person.

Mobile Component



The mobile devices like Smartphone in our pockets transmit and receive voice and data anywhere and to anyone via the mobile internet. An accompanying Smartphone runs the SixthSense software, and handles the connection to the internet. A Web-enabled smart phone in the user's pocket processes the video data. Other software searches the Web and interprets the hand gestures.

Color Markers



It is at the tip of the user's fingers. Marking the user's fingers with red, yellow, green, and blue tape helps the webcam recognize gestures. The movements and arrangements of these markers are interpreted into gestures that act as interaction instructions for the projected application interfaces.

WORKING OF SIXTH SENSE TECHNOLOGY

The hardware that makes Sixth Sense work is a pendant like mobile wearable interface.

- It has a camera, a mirror and a projector and is connected wirelessly to a Bluetooth or 3G or wifi smart phone that can slip comfortably into one's pocket.
- The camera recognizes individuals, images, pictures, gestures one makes with their hands.
- Information is sent to the Smartphone for processing.

- The downward-facing projector projects the output image on to the mirror.
- Mirror reflects image on to the desired surface.
- Thus, digital information is freed from its confines and placed in the physical world.
- The entire hardware apparatus is encompassed in a pendant-shaped mobile wearable device. Basically the camera recognises individuals, images, pictures, gestures one makes with their hands and the projector assists in projecting any information on whatever type of surface is present in front of the person. The usage of the mirror is significant as the projector angles pointing downwards from the neck. To bring out variations on a much higher plane, in the demo video which was broadcasted to showcase the prototype to the world, Mistry uses coloured caps on his fingers so that it becomes simpler for the software to differentiate between the fingers, demanding various applications.
- The software program analyses the video data caught by the camera and also tracks down the locations of the coloured markers by utilising single computer vision techniques. One can have any number of hand gestures and movements as long as they are all reasonably identified and differentiated for the system to interpret it, preferably through unique and varied fiducials. This is possible only because the 'Sixth Sense' device supports multi-touch and multi-user interaction.
- MIT basically plans to augment reality with a pendant picoprojector: hold up an object at the store and the device blasts relevant information onto it (like environmental stats, for instance), which can be browsed and manipulated with hand gestures. The "sixth sense" in question is the internet, which naturally supplies the data, and that can be just about anything
- MIT has shown off the device projecting information about a person you meet at a party on that actual person (pictured), projecting flight status on a boarding pass, along with an entire non-contextual interface for reading email or making calls. It's pretty interesting technology that, like many MIT Media Lab projects, makes the wearer look like a complete dork -- if the projector doesn't give it away, the colored finger bands the device uses to detect finger motion certainly might.
- The idea is that SixthSense tries to determine not only what someone is interacting with, but also how he or she is interacting with it. The software searches the internet for information that is potentially relevant to that situation, and then the projector takes over.
- All the work is in the software," says Dr Maes. "The system is constantly trying to figure out what's around you, and what you're trying to do. It has to recognize the images you see, track your gestures, and then relate it all to relevant information at the same time."
- The software recognizes 3 kinds of gestures:
 - Multitouch gestures, like the ones you see in Microsoft Surface or the iPhone -
 - where you touch the screen and make the map move by pinching and dragging.
 - Freehand gestures, like when you take a picture [as in the photo above]. Or, you might have noticed in the demo, because of my culture, I do a namaste gesture to start the projection on the wall.
 - Iconic gestures, drawing an icon in the air. Like, whenever I draw a star, show me the weather. When I draw a magnifying glass, show me the map. You might want to use other gestures that you use in everyday life. This system is very customizable.
- The technology is mainly based on hand gesture recognition, image capturing, processing, and manipulation, etc. 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 drawing application lets the user draw on any surface by tracking the fingertip movements of the user's index finger.

APPLICATIONS

The SixthSense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system.

The SixthSense device has a huge number of applications. The following are few of the applications of Sixth Sense Technology.

- Make a call
- Call up a map
- Check the time
- Create multimedia reading experience
- Drawing application
- Zooming features
- Get product information
- Get book information
- Get flight updates
- Feed information on people
- Take pictures
- Check the email

Make a call



You can use the Sixth Sense to project a keypad onto your hand, then use that virtual

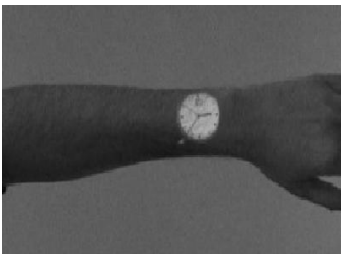
keypad to make a call. Calling a number also will not be a great task with the introduction of Sixth Sense Technology. No mobile device will be required, just type in the number with your palm acting as the virtual keypad. The keys will come up on the fingers. The fingers of the other hand will then be used to key in the number and call.

Call Up a Map



The sixth sense also implements map which lets the user display the map on any physical surface and find his destination and he can use his thumbs and index fingers to navigate the map, for example, to zoom in and out and do other controls.

Check the Time



Sixth Sense all we have to do is draw a circle on our wrist with our index finger to get a virtual watch that gives us the correct time. The computer tracks the red marker cap or piece of tape, recognizes the gesture, and instructs the projector to flash the image of a watch onto his wrist.

Create multimedia reading experiences



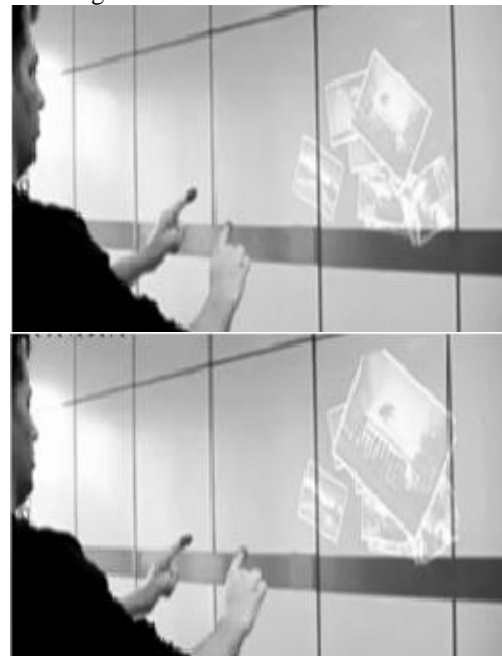
The SixthSense system also augments physical objects the user is interacting with by projecting more information about these objects projected on them. For example, a newspaper can show live video news or dynamic information can be provide on a regular piece of paper. Thus a piece of paper turns into a video display.

Drawing application



The drawing application lets the user draw on any surface by tracking the fingertip movements of the user's index finger.

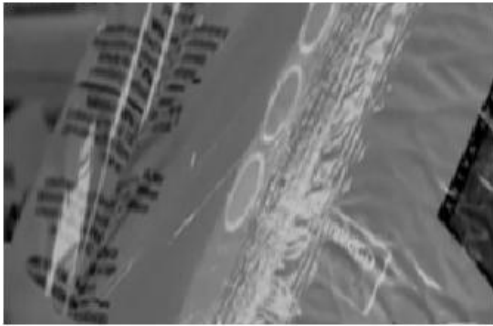
Zooming features



(Zoom in and Zoom out)

The user can zoom in or zoom out using intuitive hand movements.

Get product information



Maes says Sixth Sense uses image recognition or marker technology to recognize products you pick up, then feeds you information on those products. For example, if you're trying to shop "green" and are looking for paper towels with the least amount of bleach in them, the system will scan the product you pick up off the shelf and give you guidance on whether this product is a good choice for you.

Get book information



Maes says Sixth Sense uses image recognition or marker technology to recognize products you pick up, then feeds you information on books. The system can project Amazon ratings on that book, as well as reviews and other relevant information.

Take pictures



If we fashion our index fingers and thumbs into a square (the typical "framing" gesture),

the system will snap a photo. After taking the desired number of photos, we can project them onto a surface, and use gestures to sort through the photos, and organize and resize them.

Get flight updates



The system will recognize your boarding pass and let you know whether your flight is on time and if the gate has changed.

Feed information on people



Sixth Sense also is capable of "a more controversial use". When you go out and meet someone, projecting relevant information such as what they do, where they work, and also m it could display tags about the person floating on their shirt. It could be handy if it displayed their facebook relationship status so that you knew not to waste your time.

ADVANTAGES AND ENHANCEMENTS

Advantages

- SixthSense is an user friendly interface which integrates digital information into the physical world and its objects, making the entire world your computer.
- SixthSense does not change human habits but causes computer and other machines to adapt to human needs.
- It uses hand gestures to interact with digital information.

- Supports multi-touch and multi-user interaction.
- Data access directly from machine in real time.
- It is an open source and cost effective and we can mind map the idea anywhere.
- It is gesture-controlled wearable computing device that feeds our relevant information and turns any surface into an interactive display.
- It is portable and easy to carry as we can wear it in our neck.
- The device could be used by anyone without even a basic knowledge of a keyboard or mouse.
- There is no need to carry a camera anymore. If we are going for a holiday, then from now on wards it will be easy to capture photos by using mere fingers.

Future Enhancements

- To get rid of color markers.
- To incorporate camera and projector inside mobile computing device.
- Whenever we place pendant- style wearable device on table, it should allow us to use the table as multi touch user interface.
- Applying this technology in various interest like gaming, education systems etc.
- To have 3D gesture tracking.

- To make sixth sense work as fifth sense for disabled person.

CONCLUSION

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. Clearly, this has the potential of becoming the ultimate "transparent" user interface for accessing information about everything around us. If they can get rid of the colored finger caps and it ever goes beyond the initial development phase, that is. But as it is now, it may change the way we interact with the real world and truly give everyone complete awareness of the environment around us.

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