

A

Seminar report

on

Sixth Sense Technology

Submitted in partial fulfillment of the requirement for the award of
degree
of Computer Science

SUBMITTED TO:

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Preface

I have made this report file on the topic **Sixth Sense Technology**; I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude towho assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

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INTRODUCTION

We humans, interact with the world using our five senses. But as the name suggests this technology brings forward an additional sixth sense. A sixth sense is an ESP(Extra Sensory Perception) that aims at a more developed future with both the physical and digital world connected without the help of hardware devices. We come a step nearer to this goal of the sixth sense by the introduction of sixth sense technology.

The sixth sense technology employs a sixth sense which is in reality a wearable pendent like device. This device is actually a mini projector coupled with a camera and a cell phone, designed for obeying hand gestures. Using simple hand gestures, touch screens can be obtained from any surface for various applications.

The origin of sixth sense technology can be traced back to Steve Mann who implemented a wearable computer in the form of neck-projector coupled with a camera system in 1990. In later years, following his footsteps, Pranav Mistry, a young research scientist at MIT came up with new applications of this technology. Thus, the sixth sense technology was developed at Media labs in MIT and was coined as Wear Ur World (WUW).

The device has various applications such as the drawing application in which movement of the index finger is recognized and the user can draw on any surface. The other applications include mapping, reading newspaper, checking time by drawing a wrist watch etc. Other than being portable, this device also serves as a computer and saves time spent on searching information.

History

Steve Mann is father of sixth sense who made a wearable computer in 1990. The Sixth Sense Technology was first implemented as the neck worn projector + camera system. He was a media lab student at that time.

There after it was used and implemented by an Indian who is the man has become very famous in the recent Pranav Mistry. There will be a long future rather than the short period of history for the Sixth Sense technology.

WHY CHOOSE SIXTH SENSE TECHNOLOGY?

This sixth sense technology provides us with the freedom of interacting with the digital world using hand gestures. This technology has a wide application in the field of artificial intelligence. This methodology can aid in synthesis of bots that will be able to interact with humans.

This technology enables people to interact in the digital world as if they are interacting in the real world. The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system.

COMPONENTS

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

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

Camera: If there is any object in view, then the object is recognized by the webcam and using computer-vision based techniques the user's gestures are tracked and it sends the data to the Smartphone.



Projector: The projector projects the visual information on any surface, including the object itself or your hand. The project itself contains a battery inside, with 3 hours of battery life. The projector showcases the information enabling surfaces, walls and physical objects around us to be *used as interfaces*



Mirror: The downward-facing projector projects the output image on to the mirror

And the mirror reflects this image on to the desired surface.



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Mobile Component: The mobile devices like the Smartphone are used to handle connection to the internet. Using mobile internet data and voice can be communicated across the world either by transmitting or by receiving it. Similarly video data can also be processed by a web enabled Smartphone.



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Colour Markers: The software program processes the video stream data captured by the camera and tracks the locations of the colored markers at the tip of the user's fingers. The movements and arrangements of these markers are then interpreted into gestures.



WORKING

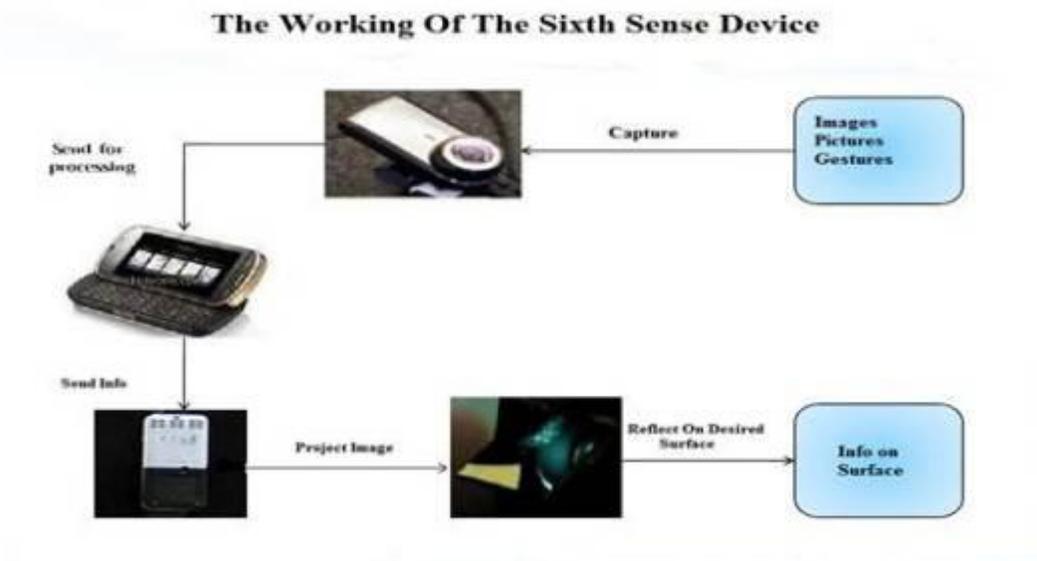
The object in view is captured by the camera and sends it to webcam for processing. With the help of the markers, the gestures are identified. The software program analyses the video data caught by the camera and also tracks down

The locations of the colored markers by utilizing single computer vision techniques.

The software recognizes 3 kinds of gestures:

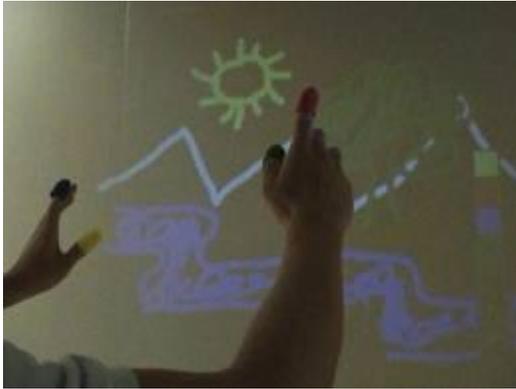
- Multitouch gestures
- Freehand gestures
- Iconic gestures

Then the processed information is projected by the projector onto the mirror which in turn reflects it on the desired surface.



APPLICATION OF SIXTH SENSE TECHNOLOGY

- The drawing application lets user draw on any surface by observing the movement of index finger



- 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. For example, drawing a magnifying glass symbol takes the user to the map application or drawing an '@' symbol lets the user check his mail.
- Mapping can also be done anywhere with the features of zooming in or zooming out.



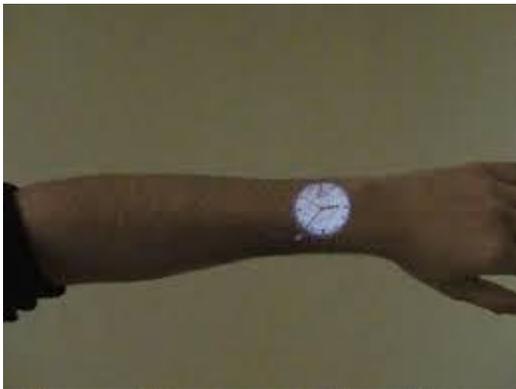
- Some of the more practical uses are reading a newspaper.



- The device can also tell us arrival, departure or delay time of our air plane on our tickets.



- In the case of more information needed , pick any page and the device gives additional information on the text, comments and lot more add on features and also helps us to view the rating and to add more.
- To know the time, all one has to do is to just gesture drawing circle on the wrist and there appears a wrist watch.



- Call can be made by typing the numbers on the hand. It displays the keypad of the phone over your palm and the keys appear on the four fingers... Use another hand's finger to press the keys.



TECHNOLOGIES THAT ARE RELATED TO SIXTH SENSE DEVICES

Augmented Reality

The augmented reality is a visualization technology that allows the user to experience the virtual experience added over real world in real time. Augmented reality adds graphics, sounds, hepatic feedback and smell to the natural world as it exists.

Gesture Recognition

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.

Computer Vision

Computer Vision is the technology in which machines are able to interpret necessary information from an image. This technology includes various fields like image processing, image analysis and machine vision. It includes certain aspect of artificial intelligence techniques like pattern recognition.

Radio Frequency Identification

Radio Frequency Identification systems transmit the identity of an object wirelessly, using radio magnetic waves. The main purpose of this technology is to enable the transfer of a data via a portable device. This technology is widely used in the fields like asset tracking, supply chain management, manufacturing, payment system etc.

ADVANTAGES

Ø **Portable:**

One of the main advantages of the sixth sense devices is its small size and portability. It can be easily carried around without any difficulty. The prototype of the sixth sense is designed in such a way that it gives more importance to the portability factor. All the devices are light in weight and the smart phone can easily fit into the user's pocket.

Ø **Support multi touch and multi user interaction:**

Multi touch and multi user interaction is another added feature of the sixth sense devices. Multi sensing technique allows the user to interact with system with more than one than one finger at a time.. Sixth sense devices also in-cooperates multi user functionality. This is typically useful for large interaction scenarios such as interactive table tops and walls.

Ø **Cost effective:**

The cost incurred for the construction of the sixth sense proto type is quiet low. It was made from parts collected together from common devices. And a typical sixth sense device cost up to \$300. The sixth sense devices have not been made in large scale for commercial purpose. Once that happens it's almost certain that the device will cost much lower than the current price.

Ø **Connectedness between real world and digital world:**

Forming a connection between the real world and the digital world was the main aim of the sixth sense technology.

Ø **Data access directly from the machines in real time:**

With help of a sixth sense device the user can easily access data from any machine at real time speed. The user doesn't require any machine-human interface to access the

data. The data access through recognition of hand gestures is much easier and user friendlier compared to the text user interface or graphical user interface which requires keyboard or mouse.

Ø **Mind map the idea anywhere:**

With the advent of the sixth sense device, requirement of a platform or a screen to analyze and interpret the data has become obsolete. We can project the information into any surface and can work and manage the data as per our convenience..

Ø **Open source software:**

The software that is used to interpret and analysis the data collected by the device is made open source. This enables other developers to contribute to the development of the system

Disadvantages

1. We have to give correct instruction.
2. The projectors runs on batteries for power where regularly have to place.

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Current status

Although the Sixth Sense technology achieved wide press coverage in 2009, no commercial product had been released at that time. As of September 2013, the open source code published has not been updated since October 2012, and the Java development branch of the project was similarly stalled. With many users encountering difficulties compiling and running the source code, the technology itself has not spread as widely as its media coverage. Pranav Mistry hinted at several reasons for not able to deliver the technology so far, including the need to incorporate newer hardware's and to remove the dependencies on proprietary Microsoft code libraries.

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FUTURE SCOPE

As this technology will emerge may be new devices and hence forth new markets will evolve. Mystery made his own tablet computer much before they hit the market, using just a piece of paper, a microphone and a camera.

This technology enables one to account, compute and browse data on any piece of paper we can find around. Sixth Sense devices are very much different from the computers; this will be a new topic for the hackers and the other people also. First thing is to provide the security for the Sixth Sense applications and devices.

Lot of good technologies came and died due to the security threats. There are some weaknesses that can reduce the accuracy of the data. Some of them were the on palm phone keypad. It allows the user to dial a number of the phone using the keypad available on the palm.

There will be a significant market competitor to the Sixth Sense technology since it still required some hardware involvement with the user.

CONCLUSION

Sixth Sense recognizes the objects around us, displaying information automatically and letting us to access it in any way we need. This prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system, allowing us to interact with this information via natural hand gestures.

This became the ultimate “transparent” user interface for accessing information about everything around us.

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