

# A Study on Sixth Sense Technology

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**Abstract-** 'Sixth Sense' is a wearable gesture interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. Sixth Sense Technology may change how we look at the world forever. Sure, it is a system that projects information about what surrounds you over objects' surfaces, but it's also much more. By using a camera and a tiny projector, Sixth Sense sees what you see and visually augments any surfaces or objects we are interacting with.

This wearable gestural interface attempts to free information from its confines by seamlessly integrating it with reality, and thus making the entire world our computer. To a layman, it would be something supernatural. Some might just consider it as 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.

**Keywords—** wearable device, gesture recognition, extra sensory perception, real time access.

## I. INTRODUCTION

We have 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 include 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. 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 your computer. Sixth Sense is a wearable gesture based device that augments the physical world with digital information and let 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. 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 Sixth Sense 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! Sixth Sense 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.

## WHAT IS SITH SENSE?

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.

## II. LITERATURE REVIEW

This paper deals with the Sixth Sense, a tool that connects the physical world with the world of data. It's a high tech device which can supplement the physical world around us with digital information. This wearable device has the capability of turning everything to touch screen just by capturing the gestures of a person. But alongside it has led to invention to another concept having the same point but by using commands instead of gestures. For orders face recognition technique is used algorithms with the sixth

sense method. Here the database is used which will be initially trained for storage. With this model, our goal is to demonstrate, within a neurobiological framework, the ability of network that process details of any person just by capturing the natural photographs. It implements the similar command which will gain access to the operation from the mobile device associated to it and action finally projector is used for projection over any surface. Because of its cost constraint it's more likely to be implemented in future. [1]

The Sixth Sense 'An Extrasensory Perception' has turned into the new called 'The Sixth Sense Technology' which has emerged in few years. We all have evolved over millions of years to sense the world around us. We always make use of our five natural senses to perceive the information around us whenever we come across a thing, a person or a place. That information helps us make judgments and embrace the appropriate action to be taken. But arguably, the most useful information that can help us take the right decision and judgments is not naturally cognoscible information with the help of our five senses, namely the data, information and knowledge that mankind has amalgamated but, rather it's the 'Sixth Sense Technology.' This paper focuses on and makes us aware with the sixth sense technology which provides an integration of the digital world with the real world; it helps us understand how the sixth sense device had overpowered the five natural senses; it also pours light over its various applications, its security related issues and further implications. [2]

The recent trends in technology have revolutionized the means of interaction between the digital world and real time applications. The primary focus of human computer interaction is to improve the intercommunication between user and computer by making computer more receptive to the user's needs. Mouse too has undergone a significant revolution right from its invention starting with mechanical mouse with two buttons and scroll to an optical mouse and finally to a cordless mouse and is still used as a predominant means to interact with a computer. In this paper our aim is to implement an invisible computer mouse that enables interaction with computer without attaching a hardware mouse. The methodology used is based on the Sixth Sense Technology where the user will be able to move the cursor by the movement of fingers. Our focus is to move the cursor on the screen as the user moves his/her fingers. [3]

### III. OBJECTIVES

1. To understand the possibilities of sixth sense technology.
2. To learn about the advantages of virtual computing and real world interaction held together.
3. To find the usefulness of this technology in the future.

### IV. EARLIER SIXTH SENCE PROTOTYPE

Maes (media lab) \_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 a 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 behavior 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 friends face. [4]

### V. RECENT PROTOTYPE

Now they have switched to a smaller projector and created the pendant prototype to be worn around the neck. The Sixth Sense 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. [6]

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. [5]

### VI. COMPONENTS

The devices which are used in Sixth Sense Technology are:

- Camera: It captures the image of the object in view and tracks the users hand gesture. The camera recognizes individuals, images, pictures, gestures that user makes with his hand. The camera then sends this data to a smart phone for processing.

Basically the camera forms a digital eye which connects to the world of digital information.

- **Colored Marker:** There are color markers placed at the tip of user's fingers. Marking the user's fingers with red, yellow, green and blue colored tape helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as an interaction instruction for the projected application interfaces.
- **Mobile Component:** The Sixth Sense device consists of a web enabled smartphone which process the data send by the camera. The smartphone searches the web and interprets the hand gestures with the help of the colored markers placed at the finger tips. Basic processing works on computer vision algorithms where approx. 50,000 lines of code are used written in Symbian C++.
- **Projector:** The information that is interpreted through the smartphone can be projected into any surface. The projector projects the visual information enabling surfaces and physical objects to be used as interfaces. The projector itself consists of batteries which have 3 hours of battery life. A Tiny LED projector displays the data sent from the smartphone on any surface in view-object, wall or person. The downward facing projector projects the image on to a mirror.
- **Mirror:** The usage of a mirror is important as the projector dangles pointing downward from the neck. The mirror reflects the image on to a desire surface. Thus finally the digital image is freed from its confines and placed in the physical world.

## VII. WORKING

The Sixth Sense Technology works as follows:

1. It captures the image of the object in view and tracks the users hand gestures.
2. There are color markers placed at the tip of users fingers. Marking the user's fingers with red, yellow, green and blue colored tape helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as an interaction instruction for the projected application interfaces.
3. The smartphone searches the web and interprets the hand gestures with the help of the colored markers placed at the finger tips.
4. The information that is interpreted through the smartphone can be projected into any surface.
5. The mirror reflects the image on to a desired surface.

## VIII. APPLICATIONS

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

- **Viewing Map:** With the help of a map application the user can call upon any map of his/her choice and navigate through them by projecting the map on to any surface. By using the thumb and index fingers movements the user can zoom in, zoom out or pan the selected map.

- **Taking Pictures:** Another application of Sixth Sense devices is the implementation of a gestural camera. This camera takes the photo of the location user is looking at by detecting the framing gesture. After taking the desired number of photos we can project them onto any surfaces and then use gestures to sort through those photos and organize and resize them.
- **Drawing Application:** The drawing application allows the user you to draw on any surface by tracking the fingertip movements of the user's index finger. The pictures that are drawn by the user can be stored and replaced on any other surface. The user can also shuffle through various pictures and drawing by using the hand gesture movements.
- **Making Calls:** We can make calls with the help of Sixth Sense device. The Sixth Sense device is used to protect the keyboard into your palm and using that virtual keypad we can make calls to anyone.
- **Interacting with Physical Objects:** The Sixth Sense system also helps to interact with physical objects we use in a better way. It augments physical objects by projecting more information about these objects projected on them. For example, a gesture of drawing a circle on the user's wrist projects a watch on the user's hand. Similarly a newspaper can show live video news or dynamic information can be provided on a regular piece of paper.
- **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.
- **Other Applications:** 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 a @ symbol lets the user check his mail.

## IX. ADVANTAGES

1. Sixth Sense is a user friendly interface which integrates digital information into the physical world and its objects, making the entire world your computer.
2. Sixth Sense does not change human habits but causes computer and other machines to adapt to human needs.
3. It uses hand gestures to interact with digital information, supports multi-touch and multi-user interaction.
4. Data access directly from machine in real time. It is an open source and cost effective and we can mind map the idea anywhere.
5. It is gesture-controlled wearable computing device that feeds our relevant information and turns any surface into an interactive display.
6. It is portable and easy to carry as we can wear it in our neck.
7. 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.
8. If we are going for a holiday, then from now on wards it will be easy to capture photos by using mere fingers.

## **X. FUTURE ENHANCEMENTS**

1. To get rid of color markers.
2. To incorporate camera and projector inside mobile Computing device.
3. Whenever we place pendant- style wearable device on table, it should allow us to use the table as multi touch user interface.
4. Applying this technology in various interest like gaming, education systems etc.
5. To have 3D gesture tracking.
6. To make sixth sense work as fifth sense for disabled person.

## **XI. FINDINGS**

Through the paper we found out that the sixth sense technology is an emerging innovation in the field of computing. It will be used widely all over the world because of its various advantages of virtual computing and real world interaction held together.

## **XII. 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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