SIXTH SENSE – A REVIEW

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Abstract: The 'Sixth Sense' technology comes with a virtual interface that is used by humans to interact with the technology by using familiar gestures and motions. This technology can be integrated into the everyday items that we wear such as necklace, glasses, etc. It makes it easy to carry it everywhere we go without giving us the feel that we are carrying an extra gadget. The 'Sixth Sense' technology uses a projector to project content on a surface in front of the user and sensors to track motions. The surface acts as the interactive screen and the sensors help us in identifying interaction of the user with the screen. Thus, this technology connects the digital world to the real life physical world objects providing an easy and interactive user experience. This review paper deals with the general concepts of 'Sixth Sense', how it works and its future aspects.

IndexTerms **– Sixth Sense, future aspects, virtual reality, augmented reality**

I. INTRODUCTION

It has been millions of years since our evolution enabling us to sense and feel the world all around us. When something, someone or some place is encountered, we use the eyes, ears, nose, and skin as our natural senses in order to perceive it. Thus, this activity of perceiving helps us to make decisions; if something is right or is it wrong. But these five senses give us the perceiving access only around ourselves. What if we want to perceive information, data accumulated online[1].
Although the advancement of technology has reduced the size of our computer systems making it so portable that it can be carried in our pockets at all times, but still there is no connectivity between the digital world and interactions we make with the natural world. 'SixthSense' provides this link allowing us to interact with the intangible information with our hand gestures. 'SixthSense' removes information from its confinement, augmenting it to the natural world, thus, making the entire world a computer.
'SixthSense', thus is a "gesture based" device being wearable and having the capability of connecting the natural world to the digital world allowing people to use physical hand symbols and gestures in order to interact with the digital information.
'SixthSense' would allow an experience like no other. We could fetch information on anything and anywhere we want.

II. WHAT IS 'SIXTHSENSE'?

'SixthSense' is an additional perception device other than our natural senses. It receives information not acquired by any of our five natural senses. It strives to integrate digital data and technology into the day to day life. Hence, giving us decision making capabilities beyond our five natural senses, thus it is called the 'SixthSense'[1].

2.1 EARLIER PROTOTYPE

A few graduate students from MIT thought about how to connect a person to the physical world such that he has access to information without even taking out his phone from his pocket. They then designed a wristband which could identify the current book which the user is holding by reading a Radio frequency identification tag. They also designed a ring which would turn red or green, indicating whether the product purchased in the supermarket is organic or not or depending on any other criteria that we set[2].
But, in the concept of the wristband the user still had to take out his phone in order to have access to the information. So they came up with the idea of projecting the information directly onto a flat surface using a projector.
They began with a larger projector which was attached to a helmet. But this was not feasible as when a user turned to talk to someone, the information was projected on other person's face.

2.2 RECENT PROTOTYPE

In the recent prototype, they used a small-sized projector and designed a pendant which could be worn around the neck.
The prototype was designed using a webcam and a 3M projector which was powered by a battery having a mirror attached to it. All this was connected to an internet enabled phone.

COMPONENTS

1. Camera
2. Colored marker
3. Mobile phone
4. Projector
5. Mirror[3]

2.2.1Camera:
It clicks the picture of the objects in the view and identifies the hand gestures of the user. The camera then ships the captured information to the phone where it is processed. The camera forms the eye which links to the digital world.

2.2.2Colored marker:
The colored markers are put on the fingertips of the user. They may be red, yellow, and blue, green in color. These colored markers assist the camera to identify the gestures.

2.2.3Mobile phone:
The 'SixthSense' device uses a smart phone having internet access used to process the information provided by the camera. The smart phone scans the internet and identifies the hand gestures using the colored markers put on the finger tips.

2.2.4 Projector:
The information and data provided by the smart phone can be displayed onto a surface. The projector displays the information allowing surfaces and objects to be employed as interfaces. The projector uses batteries which have three hours worth of battery lifetime. A small LED projector projects the information provided by the smart phone on a surface in the view. The downward projector displays the images on a mirror.

2.2.5 Mirror:
The use of the mirror is very important as the mirror finally reflects the images on the desired surface.

III. HOW IT WORK

The 'SixthSense' technology works as follows:-

1. It clicks the image of the objects in view and identifies the user's hand movements and gestures.
2. Color markers are put on the fingertips of the user. The movements and alignments of these markers are identified as gestures that help in the interaction of the user with the digital information.
3. The smart phone then goes through the web and identifies the hand gestures by using the colored markers that are placed on the fingertips of the user.
4. The information that is then interpreted through the smart phone can be displayed on any surface.
5. Finally the mirror projects the image on to the desired surface[3].

IV. APPLICATIONS

The 'SixthSense' has its applications in various ways

4.1 Viewing map:
Using the map application, the user can open up any map which he desires to and navigate through it by displaying the map on any surface. By using recognizable gestures made by the fingers, the user can zoom in or out of the map.

4.2 Taking pictures:
Clicking pictures is another important application of the 'SixthSense' technology using a gestural camera. The camera clicks the picture of the terrain the user is currently looking at by sensing and identifying the framing gesture. After clicking as many photos as the user may like, he can then display it on any surface, sort them , resize them ,do whatever he wishes to do with them.

4.3 Drawing Application:
The drawing application enables the user to draw on to any surface by tracking the movement of the index finger. The pictures that a user draws can be stored and viewed on another surfaces.

4.5 Making calls:
Using the 'SixthSense' we can project the keyboard on our palms and thus very easily make calls by pressing the numbers of this virtual keypad.

4.6 Flight Updates:
The system will identify and analyze the boarding pass and would give you regular updates whether the flight is on time or is it delayed or if the gate has changed.

4.7 Other applications:
By using 'SixthSense' , the user can draw symbols in the air which would be recognized as interaction instructions. For example, the user can check his email by drawing a '@' symbol.

V. ADVANTAGES

1. 'SixthSense' provides a user friendly interacting interface which introduces digital data to the physical world, making the world a computer.
2. 'SixthSense' does not alter human habits but makes the computer and other devices adapt to the needs of the user.
3. It allows hand gestures and supports multi-user and multi-touch interaction.
4. Information is accessed directly from the machine in real time.

5. It is cost effective and open source.
6. Being portable, it can be easily carried and can be worn around the neck.
7. The device can be used by anyone without the need to have little knowledge of a mouse or a keyboard.

VI. FUTURE ENHANCEMENTS

1. To remove the use of coloured markers.
2. To integrate a camera and a projector inside a mobile computing device.
3. Whenever the wearable device is placed on a table, the table should become capable of being used as a multi-touch user interface.
4. Implementing this technology in different fields of interest like education system, gaming, etc.
5. To introduce 3D gesture recognition.
6. Introduce 'Sixth Sense' as a fifth sense for disabled persons.

VII. CONCLUSION

'Sixth Sense' being a wearable device allow you to keep digital information at your fingertips. The information is set free with the entire world becoming a computer. The actual strength of 'Sixth Sense' is its ability to link the physical world with the web and displaying information on the physical world. It recognizes the things and objects around the user, projecting it on a surface and allowing the user to use that information in any way he wants. Thus, 'Sixth Sense' has the capability of becoming the ultimate invisible interface and can potentially be the best interface of the future

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