Sixth Sense Technologies: A Review Paper

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Abstract— Sixth Sense technology gives the way to interact with digital world from the real world by natural human gestures. Anybody who is equipped with sixth sense device can use its applications at any place and any time. Electronic gazettes like camera can be used by criminals at sensitive places like Court, Bank and parliament Areas for achieving their criminal activities and that may be harmful for government and public of the country. In this paper, we purpose an approach to stop camera at sensitive places to improve the safety using Augmented Reality.

Keywords— Recognition , MIT, Six Sense.

I. INTRODUCTION

From so many years we use our five natural senses eye, ear, nose, tongue mind and body to gather information about around us that information helps us make decisions and chose the right actions to take. But in this modern technology based environment we are unable to make decision on the base of 5 senses. Modern technology is a revolutionary way to interface the physical world with digital information. Modern computing devices allows us to carry computers always with us also in our pockets, keeping us continually connected to the digital world, but there is no link between our digital devices with the physical world. Information can be shown on the digital screen or on the paper with traditional way[1][2].

Sixth Sense in scientific terms is defined as ESP (Extra Sensory Perception). ESP includes the term information do not gained through our natural Senses. And not taken from the experience of past Survey. Sixth Sense aims to integrate online information and technologies into everyday life. So it can help the human to make decision effectively. It gives users a sixth sense. Sixth Sense Technology bridges this gap, bringing intangible, digital information out into the tangible world; 'Sixth Sense' is a wearable gestural interface that helps us to share digital information with the physical world to use natural

Figure 1.1 Six Sense Technologies

The Sixth Sense model is combination of pocket projector, a mirror and a camera. The hardware components are attached in a hanging like mobile wearable device. Both the projector and the camera are connected to the smart phone device in the user's pocket [3].

1.1 The Inventor

Six Senses is Developed by a PhD student at MIT belongs to Indian region Parnav Mistry, 28 year old, He invented 'Sixth Sense WUW (Wear UR World)' Which is wearable gestural, user friendly interfaces which connect us to the physical world with digital information with the use of hand gestures. He won the 'Invention of the Year 2009 '- by Popular Science [2].

II. ARCHITECTURE OF SIX SENSE DEVICE

The Device was built from a webcam and a battery powered projector with an attached mirror. All these hardware equipment are connected to Smart phone. There is no need of digital screen for the output it needs a simple surface like a wall, the body of another person, and even your hand. four fingers covered with tape color red, blue, green and yellow. Camera follows user's hand gestures distinguish with the four fingers.

Figure 2.1 : Original Device

2.1 Basic Component of Six sense device
- Camera
- Projector
- Mirror
- Mobile Component
- Color Markers

2.1.1 Camera
A wearable webcam provides the feature of capturing with the user's hand gestures using computer-vision based techniques. It captures the image of the object in view and tracks the user's hand gesture. The camera recognizes individuals,

Figure: 2.1.1 Camera

Images, pictures, gestures that user makes with his hand. It sends the data to the smart phone in user pocket. That connects to the world of digital information. The camera, works in the sense of digital eye seeing what the user sees.

2.1.2 Projector
Capturing information by webcam is interpreted through the smart phone 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 contains a battery inside, with 3 hours of battery life.

Figure 2.1.2: Projector

We want this thing to merge with the physical world in a real physical sense. A tiny LED projector displays data sent from the smart phone on any surface in view–object, wall, or person.

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

Figure: 2.1.3 Mirror

2.1.4 Mobile Component

The mobile phone like Smartphone in our pockets get and receive voice ,text ,data anywhere and to anyone via the internet. In the six sense these devise use as the interpreter between the all hardware components like camera, projector etc. Smartphone runs the Sixth Sense software, and handles the connection to the internet. A smart phone with preloaded internet connection in the user's pocket processes the video data. Other software searches the Web and interprets the hand gestures.

Figure 2.1.4: Smartphone

2.1.5. Color Markers

Four colored tapes red, green, blue, yellow, covered the human figure from the tip. These tapes help the webcam recognize gestures. The movements and arrangements of these tape covered figures covered interpreted .Into gestures that act as interaction instructions for the projected application interfaces
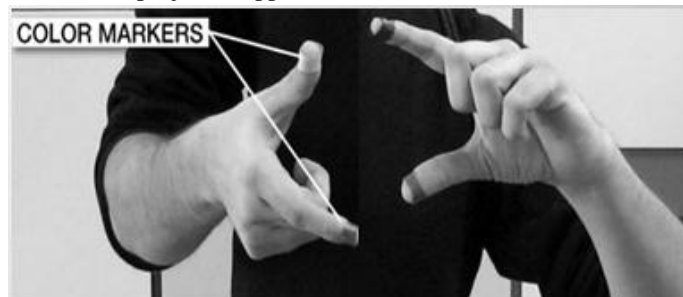
Figure 2.1.5 : Color Markers

III.   WORKING OF SIX SENSE DEVICE

The hardware that makes Sixth Sense work is a pendant like mobile wearable Device. It has a camera, a mirror and a projector and is connected smart phone .The camera recognizes the gestures According to the hand movement of the user. Information is sent to the Smartphone for processing. The projector projects visual images on a surface. This surface can
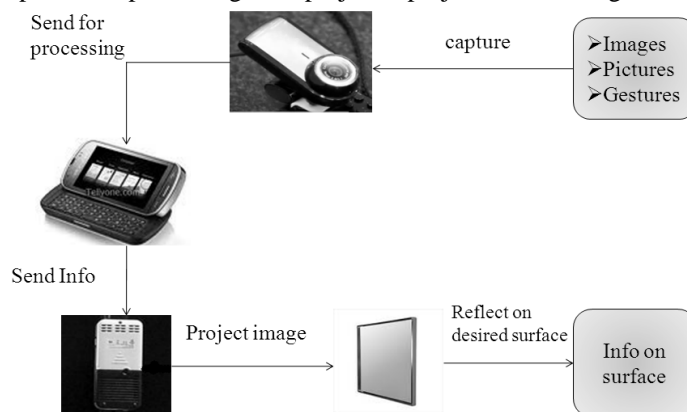
Figure: 3.1 Working of six Sense Device

be wall, table or even your hand. Thus, the entire world is available on your screen now. When user moves their hands to form different movements with coloured markers on the finger tips, the camera captures these movements.

Recognition is made using computer vision technique. These markers act as visual tracking fiducially. This is possible only because the 'Sixth Sense' device supports multi-touch and multi-user interaction.

Basically the camera recognizes 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 dangles 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 colored 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 colored markers by utilizing 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 fiducially. 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 picprojector: 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.[9][10]

IV.   APPLICATION OF SIXTH SENSE TECHNOLOGY

There are huge numbers of applications of sixth sense technology. Some of them are as following:

4.1 Viewing Maps: We can view maps and also navigate our location. And also can zoom in and out by gestures of hands.

Figure 4.1: Viewing Maps

4.2 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.

Figure 4.2 : Make a call

4.3 Check the time: Check the time on wrist by draw circle by hand on our wrist.
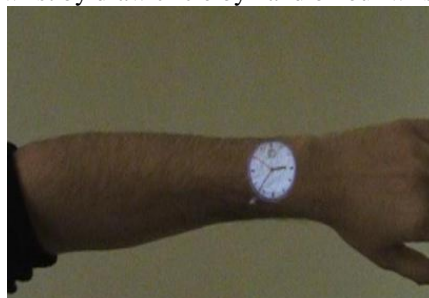

Figure-4.3 : Time on wrist

4.4 Create multimedia reading experience: The Sixth Sense 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 provided on a regular piece of paper. Thus a piece of paper turns into a video display [7].

Figure 4.4: Create multimedia reading experien

4.5 Drawing application: Make a picture on any surface by movement of your index finger.
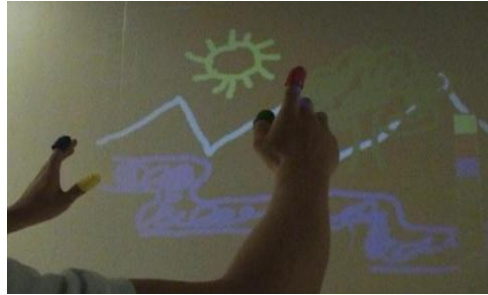

Figure 4.5: Drawing application

4.6 Zooming features: We can zoom in and out by hand gestures by pinching fingers of both hands and make both hands closer to each other to zoom out and make both hands away from each other to zoom in.

Figure 4.6: Zoom in and Zoom out

4.7 Get product information: Get information about product in our hand and give Amazon rating to make a right decision to buy.

Figure 4.7: Get product information

4.8 Get book information: Get book information that holding in our hand like star rating of that book from Amazon book store.
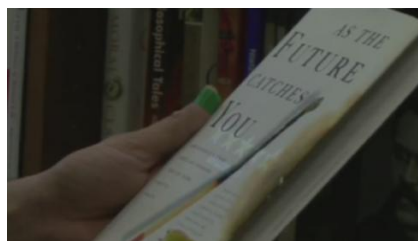

Figure 4.8 : Get book information

4.9 Get flight updates: Flight's current status can be check by just holding flight ticket in hand. In figure 4.9 showing that a person holds flight ticket in their hand and sixth sense showing flight delayed by 15 minutes.

Figure 4.9 flight updates on flight ticket

4.10 Feed information on people: Feed information on person in front of user. In figure 4.10 shows that Pranav Mystry meets a student of MIT Media Lab and the information is projecting on students T-shirt.

Figure: 4.10 Feed information on people

4.11 Take pictures: Take a picture by making photo frame by fingers as shown in figure 4.11.
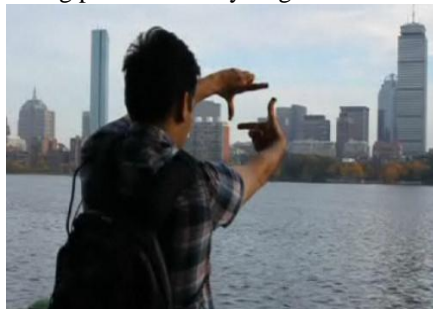

Figure 4.11: Take Picture by making frame

4.12 Surfing Internet on plain paper or any surface: Surf internet on any surface as showing in the figure 4.12 a person surfing internet on paper.
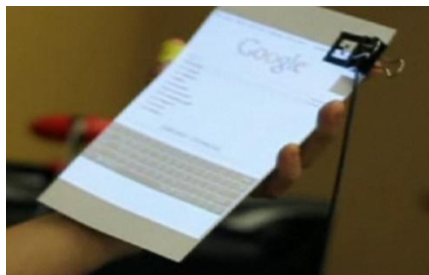

Figure 4.12 Surfing Internet on plain paper or any surface

4.13 Playing motion games over the paper: We can also play motion games on plain piece of paper as showing in figure 4.13.

Figure-4.13 Playing motion games over the paper

V. FUTURE SCOPE

I.   It will be an open source product so user can modify it according to their needs.
II. It can be used in automated manufacturing factories and made control easy over the machinery.
III. It can give information about new person to whom we meeting first time.
IV. This technology can be used as a replacement of the 5th senses for handicapped people.
V.   Sixth sense is developed to seamlessly integrate information into reality. The future may depend upon this sixth sense.
VI. May be within this 2020, the proliferation and the use of this technology is immense.
VII. This technology enables one to account, compute and browse data on any piece of paper we can find around.

VI. FUTURE ENHANCEMENTS

We can add a new feature in sixth sense device to stop some of the applications to be used in some places for security reasons with the help of augmented reality.

For example we can stop using of camera feature to take snaps in Court areas, in banks, in parliament or in any sensitive places for threats.

VII. CONCLUSION

The sixth sense technology using gesture movement and speech integrated circuits are emerging innovative ideas. We have a seamless access to data or information that may exist in real world environment to help us make decisions. 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. It has been classified under the category wearable computing device. Clearly, this has the potential of becoming the ultimate "transparent" user interface for accessing information about everything around us. In future it will be available for all type of smart phones, tablets and laptops and will become a part of our life.

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