Sixth Sense Technology

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Abstract: *Sixth Sense is a wearable gesture interface that augment the physical world with digital world around us it comprise of hardware components connected wirelessly to the computing device it uses enabling surfaces, walls and physical object as interface. Sixth sense free the information from confine surface. Thus making entire world your computer integrating information into our daily life not only reduce gap between physical and digital world. But also help us to take right decision and improve our power of knowledge. Goal is to bring part of the physical world to digital world. In this paper we explained about Sixth sense device its working, component, history, generation of idea, current state, future vision, application, advantages, and introduction to new concept Sixth Sense glass.*

Keywords: Augmented, Gesture, Sixth sense mobile.

1. Introduction

- Sixth sense technology bridges the breach between real world and digital world physical object became part of this technology.
- Sixth sense work is a adornment like mobile wearable gestures
- Camera, mirror, projector connected wirelessly to a Bluetooth smart phone that can slip comfortably in your pocket.
- Camera recognizes individual images, pictures and gestures one make with their hand.
- Information sent to smart phone for processing.
- The projector faces downward and project the output image on the mirror so that we can adjust the focus and project on the desired surface.
- Thus freed from its confines and placed in physical world.

2. History of Sixth Sense

Idea behind this marvelous technology was started late in 1990's by Steve Mann at MIT who actually proposed first wearable computer. First proposed head worn projector and camera in 1994, then he developed it and proposed neck worn projector and camera during 1998 and further in the future developed by Pranav Mistry who is a PhD student in the Fluid Interfaces Group at MIT Media Lab. We can consider Steve Mann as the "father of emergence Sixth Sense" technology. The first archetype of the sixth sense was very much bigger and was not working properly to use daily so they came out with a modified neck worn type which was like a pendant.

In the first article by Arjun KR says that they started working with a big projector mounted on a helmet but that proved cumbersome if someone was projecting data onto a wall and then turned to speak with a friend then data will project on friend's face thus mistry switched up with a smaller projector and created the pendant prototype to be worn around the neck. The archetype was built from an ordinary webcam and a battery-powered 3M projector, with an attached mirror and all connected to an internet-enabled mobile phone here.

Figure 1: Finger-pointing gesture

Figure 2: Front-view shows cameras attached to head-mounted display
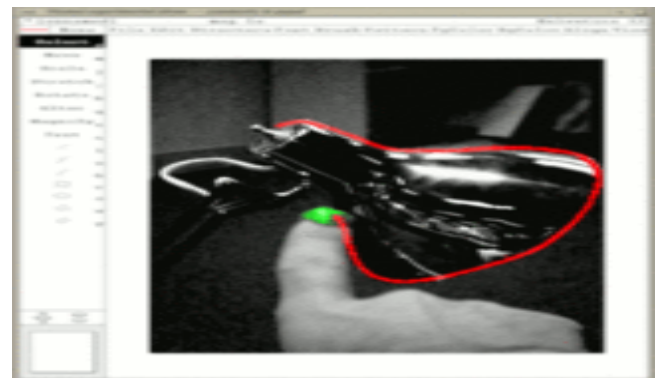
Figure 3: Finger-pointing gesture to outline and select a physical object

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Figure 4: Steve Mann wearing a camera projector dome in 1998

3. Related Work

[1] Presents implementation of 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. General idea about the sixth sense technology is discussed in [2]. [3] Focuses on various applications of six sense technology in educational purpose and how a practical classroom, can be conducted anywhere, anytime with the help of six sense technology which will help us to create more stimulating learning environment. In [4] description about the history of sixth sense and the current trends of sixth sense used, hardware is mentioned. [5] Presents an implementation of computer mouse movement through finger by image grabbing using Sixth Sense Technology which gets processed in MATLAB without using gesture recognition.

4. Initial Idea of WuW

WuW (Wear your World) was the name first proposed for this by Pranav Mistry, Pattie Maes and Liyan Chang. Mistry tried up with simple computer mouse first he put two roller into one mouse and see if he could obtain data and guide movement of mouse when two rollers not worked properly he took 4 rollers. Four rollers gave him the idea that he could use same idea on fingers and that what he next moved on.

Figure 5: Mouse with two rollers

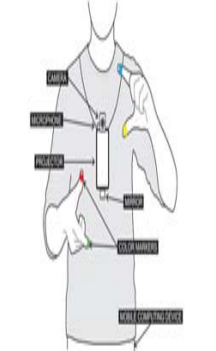**Figure 6**: 1st Hardware of Sixth Sense

Figure 7: 1st version of Sixth Sense

Figure 8: GUI Interface of Sixth Sense

5. Component Required For Sixth Sense

| A. CAMERA	
It is a digital eye of the system. It captures the scene the user is looking at Captures the hand movements and gestures. Take the photo of the scene when user makes framing gestures.	
B. PROJECTOR It augments the physical object, wall or any other thing. The user is interacting with by projecting digital information and uses as GUI. The projector used in framework runs on a rechargeable battery.	
C. MIRROR The mirror reverts the projection coming out from projector. And thus we can project anywhere in desired objects like wall. The user can manually tilt the mirror to change the location of the projection.	
D. MICROPHONE It is the optional component in sixth sense it uses when we use paper as an interface then we attach a microphone with paper it sense the sound signal of user touching the paper combining with tracking information. about the user fingers to computing device a touch interface is created.	
***E.* MOBILE COMPUTING DEVICE** It uses mobile computing device as a processing device in user's pocket. Microphone, Projector, Camera all are connected to this computing device using wired or wireless. The software program validate all the features of this system runs on this computing device. This computing device is connected to 3G network or wireless connection.	
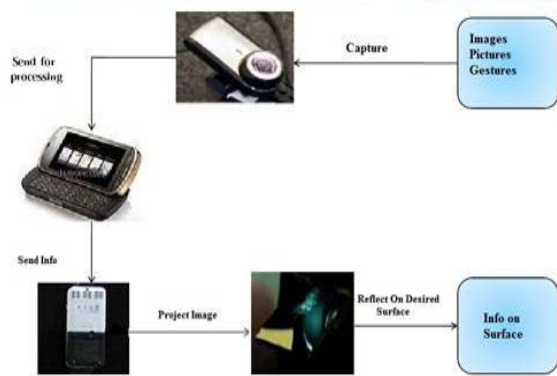
Figure 9: Detail Working of Sixth Sense

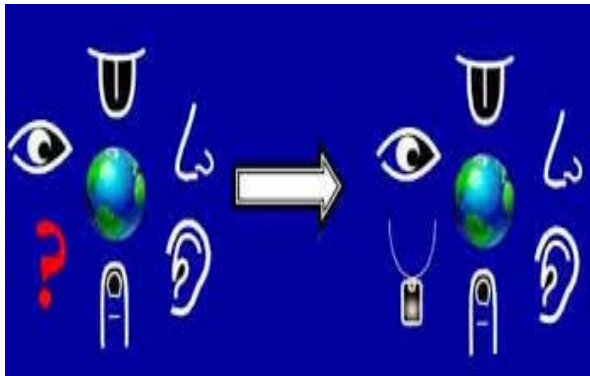## 6. Idea Behind Sixth Sense

Figure 10: Addition of one more sense

Five natural senses required to take information from the world and take decision and action. But five senses is not enough to give the write information ie: data. There is no relation between physical object and real world. Information is confined traditionally on paper or digit ably on a screen. Thus gap is bridged by sixth sense by bringing intangible digital information to tangible form.

7. Why Sixth Sense?

Human makes decision after sensing everything but information which is collected by human are insufficient to take right decision. But information which could help making a good decision is largely available on net. Information can be collected by mobile, computer etc. but it is restricted to interface or screen and no direct relation between tangible physical world and intangible digital world. Give freedom to interact with physical world by mere hand gesture. Most used in artificial intelligence this methodology can aid in synthesis of bots that will be able to interact with humans.
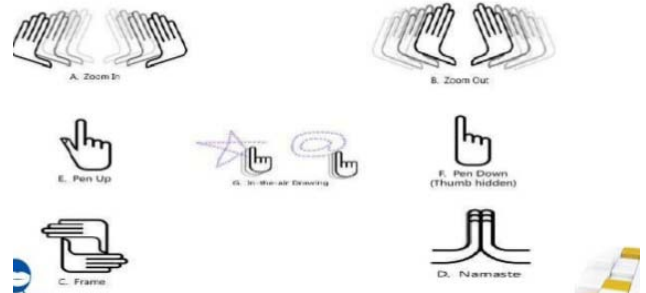

Figure 11: Some of the Recognized Gesture

8. Latest Technology

Currently in latest version of the interface. used laser projector with a laser diode inside which can project on any surface. Technically the interesting thing about laser projector is that is never goes out of focus. Since the application that have suggested in the interface requires user to wear projector on their body a laser projector become more advantage as it does not need to adjust focus .

9. How Actually Information Flows

Device is connected to cloud it has lot of search engine application program interface like Amazon, While it connects you to internet world, it still enables to access all dynamic information/data while you continue being in physical world.

10. Sixth Sense Current State

The idea which mistry came up was very unique and doesn't have any rivals in market it was firstly developed by Steve Mann but mistry took up this technology into different level and made a profitable innovation. There is no Competition but similar technology might create threat to mistry's sixth sense.

A. Augmented Reality
Augmented Reality is a term in which "a live direct or indirect view of a physical real-world environment whose element are augmented by virtual computer-generated sensory i/p such as sound and graphics. The main difference between the 6th sense and the augmented reality is that in augmented reality the user needs a device which he/she will put information by hand typing or touch screen. Unlike sixth sense allows user to apply the same situation with the help of his/her thoughts as he/she just think about it.

Similarities
1) Both in the process of being made and published to people use.
2) Both mix up the technology into every second of our lives.
3) Questioned by the authorities for privacy reasons.

Figure 12: Augmented reality in iPhone

Figure 13: The future of Social Networking

B. Gesture Recognition

"It's a subject in computer science with the main objective of interpreting human gesture via mathematical algorithm". Gesture detection can be well thought-out as the first technological innovation that understands the motions of humans and therefore it is somewhat similar to sixth sense. Gesture recognition is a computer interaction through the drawing symbols with a pointing device cursor which throws the keyboard and mouse into the trash. The main difference is that gesture recognition is being sold in various types in today's market which are mainly entertainment based. Sixth sense differs because it accesses the people in every single moment of the life.

Figure 14: Gesture Gaming

11. Sixth Sense-Impact on Business

If the technology enters the market with the promised quotes authorities are pretty sure that it will be a corner stone in 21st century. Cheaper then iPhone is because the component of system is very cheap as easy to find. And also pranav had promised that he will make device that will allow user to buy their own component so that user can make its own sixth sense and customise the cost. Rather than having only a commercial and profit purpose the device also has a very different vision in which it wants to help disable people add one more sense to themselves and make them live better in the community. Considering the prototypes to be the most expensive it is believed that the price will go much lower once it gets mass production.

12. Applications

Map function lets the user navigate a map displayed on a nearby surface using hand gestures. Zoom in; zoom out by user hand gesture The drawing applications let the user draw on any surface by tracking the finger tip movements. of the users index finger and lots more application like making a call, check schedules , stream video etc.

Figure 15: Sixth Sense newspaper

Figure 16: Drawing application of Sixth Sense

Figure 17: zoom out,zoom in

13. Advantages

- It is an open source.
- It is portable technology.
- It doesn't make human to understand computer knowledge but it causes machines and computer to adapt to human needs.
- It is cheap to built also connect real world and information.
- Can map the idea anywhere on physical objects.
- Can be used by anyone without even having any basic knowledge about keyboard and mouse.
- Open source code for everyone.

- Mind map idea anywhere user wants.
- Interface does not confines in mobile or PC display.
- It is cost effective only 300$.

14. New Concept Sixth Sense Glass

There are some loopholes in present sixth sense design and that is there is no privacy when you are browsing your data. In this concept we using laser filter glass has an interface between digital and real world this glass as gesture recognition infrared camera, infrared 3D laser projector and 2 lasers fitted at both the ends of the glass and also as a small display and normal projector at center. Concept of privacy is maintained..Display is made up of optical glass and inside have prism layer and a mini projector which will directly project on optical nerve of eye it seems that your eye is projecting information

It will also have microphone which is used for sound recording and browsing of data using voice this glass will connected with computing device with the help of Bluetooth and the glass will work on battery. Using this glass we can click photos ,can record video, browse data, check for direction, can send message verbally, dial a call by just uttering their name, send message if number are saved or else you can simply dial the number in air.

Since we are using Infrared projector the projected things can be seen only through laser filter glasses which will protect the privacy of the user. Also using normal projector this projector will project the information on surface which can be visible to other person. Using 3D infrared laser one can interact with 3D objects changes can be made it is just like a 3D workspace. Small display in front of the glass will display the photos; messages etc and user can interact with it. Laser will detect the gesture and accordingly pass the signal to computing devices.

There will be also a application in computing device if user in private browsing mode and if s/he wants to show what he is watching to anyone with the help of this application it can be done. Thus the augmented reality had gone in to a different dimension. It can also use as a night vision device and can be used by militaries. Also it can help the disable people. Thus not only economic but also it can be used for well being of humans.
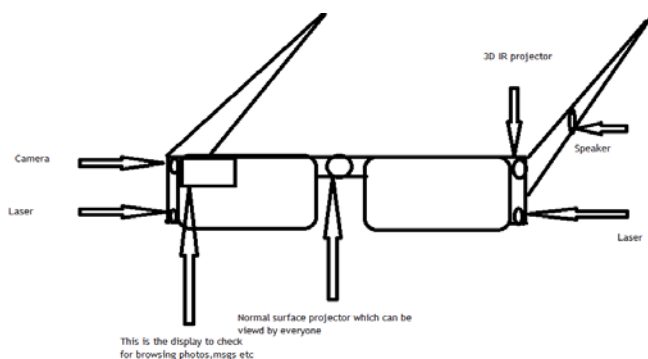
Figure 18: Rough hardware of Sixth Sense glass

15. Future of Sixth Sense

- To get rid of colour markers and hand use, easily used by voice recognition.
- Interactive advertisement.
- Sixth sense with holographic visualizes the better world.
- True 3D print media.
- 3D visualization and gesture tracking.
- Camera can act as a eye for blind people as an fifth sense for them.
- Useful for people who can't speak and can make possible to understand by others what he is try to say with his sign movement's recognition into text.
- It is almost like setting up a digital system into our body and making use of it.
- Sixth sense framework implements several applications that demonstrate usefulness, availability and flexibility of the system.

Figure 19: Future is here

16. Conclusion

Relate with the information via natural hand gestures and enables you the whole world at your fingertips-literally. Transparency between user boundary for accessing information about everything around us and this is classified under wearable computing. Recognize the object and give information about it and give freedom to access**.**

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