INTRODUCTION

Information is traditionally confined to paper or digitally to a screen. Even though computing devices allows us to carry computers in our pockets that connects to the digital world continuously, BUT is no link between our digital devices and our interactions with the physical world.

SIXTH SENSE TECHNOLOGY

OR

WEAR YOUR WORLD(WUW)

It is a device that gathers data on the environment around the user, searches for information using the Internet as a data store, aggregates the results, and presents it back to the user via a display.

'Sixth Sense' is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. By using a camera and a tiny projector mounted in a pendant like wearable device, 'Sixth Sense' sees what you see and visually augments any surfaces or objects we are interacting with.

• Hereby Physical world is painted with the digital information.
• You can carry your digital world with you wherever you go.

• We can start with any wall or any surface as an interface even your palm.

It projects information onto surfaces, walls, and physical objects around us, and lets us interact with the projected information through natural hand gestures, arm movements, or our interaction with the object itself. 'Sixth Sense' attempts to free information from its confines by seamlessly integrating it with reality, and thus making the entire world your computer.

What the researchers have done is combine a number of standard gadgets including a webcam, projector, and mobile phone, to form a brand new interaction experience.

DEVELOPER OF SIXTH SENSE TECHNOLOGY

PRANAV MISTRY, A RESEARCH ASSISTANT AND A PHD CANDIDATE AT MIT MEDIA LAB IS THE INVENTOR OF SIXTH SENSE TECHNOLOGY. SIXTH SENSE HAS BEEN AWARDED 2009 INVENTION AWARD BY POPULAR SCIENCE.
INTEGRATING INFORMATION WITH THE REAL WORLD

We've 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 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.

The Sixth Sense prototype is comprised 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. The projector projects visual information enabling surfaces, walls and physical objects around us to be used as interfaces; while the camera recognizes and tracks user's hand gestures and physical objects using computer-vision based techniques. The software program processes the video stream data captured by the camera and tracks the locations of the colored markers (visual tracking fiducially) at the tip of the user’s fingers using simple computer-vision techniques. The movements and arrangements of these fiducials are interpreted into gestures that act as interaction instructions for the projected application interfaces. The maximum number of tracked fingers is only constrained by the number of unique fiducials, thus Sixth Sense also supports multi-touch and multi-user interaction.

The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system. The map application lets the user navigate a map displayed on a nearby surface using hand gestures, similar to gestures supported by Multi-Touch based systems, letting the user zoom in, zoom out or pan using intuitive hand movements.
The drawing application lets the user draw on any surface by tracking the fingertip movements of the user's index finger. Sixth Sense also recognizes user's freehand gestures (postures). For example, the Sixth Sense system implements a gestural camera that takes photos of the scene the user is looking at by detecting the 'framing' gesture. The user can stop by any surface or wall and flick through the photos taken. 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. 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. The gesture of drawing a circle on the user's wrist projects an analog watch.
6th Sense allows to access information as though we always have a PC in front of you, but controlled by hand gestures.

Prototype consists of combining a number of standard gadgets including a webcam, projector, and mobile phone, to form a brand new interaction experience. In its current form the battery-powered projector is attached to a hat, the webcam is hung around the neck (or also positioned on a hat), and the mobile phone provides the connection to the Internet.

The wearer uses hand gestures combined with the gadgets to perform actions.
1. Camera
2. Coloured caps
3. Projector
4. Mirror
5. Smartphone

*-pocket-projector*
• Projects visual information to interfaces like wall, physical objects. The projector projects visual information enabling surfaces and physical objects to be used as interfaces.

• It displays data sent from the smart phone on any surface in view—object, wall, or person.

A Camera

Tracks user hand gestures

Also called as digital eye as it analyses the digital pixels. It captures the object in view and tracks the gestures.
**Colored Markers**

These are placed at the tip of the user’s fingers. It interprets the Movements of fiducials into gestures. It helps the webcam to recognize the gestures. The movements and arrangements of these markers are interpreted into gestures.
**SMART PHONE**

- It is a web enabled smart phone in the user’s pocket processes the video data.
- Other software searches the web through the phone and interprets the hand gestures.

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**WORKING**
It combines a number of standard gadgets including a webcam, projector, and mobile phone, to form a brand new interaction experience. In its current form the battery-powered projector is attached to a hat, the webcam is hung around the neck (or also positioned on a hat), and the mobile phone provides the connection to the Internet.

The device recognizes the movements of the user's hands via the webcam (and color-coded finger-gloves worn on index finger and thumb,) enabling gesture-commands like the classic "frame" gesture which makes the device snap a photo.
The wearer uses hand gestures combined with the gadgets to perform actions. So, for example, we could make a circle over the wrist with the fingers of one hand. WUW would recognize this action and project a clock face on to their wrist. Make a picture frame with both our hands and WUW will take a picture as if it was a camera. Stand near a wall and we can get a projected desktop allowing you to open applications view the pictures you've taken, or surf the ‘Net. Sixth Sense analyses what the user sees and visually augments surfaces or physical objects the user is interacting with. The user interacts with the projected information through natural hand gestures, arm movements, or interaction with the object itself. The camera recognizes objects around a person instantly, with the micro-projector overlaying the information on any surface, including the object itself or hand.
Also can access or manipulate the information using fingers. WUW projects information onto surfaces, walls, and physical objects around us.

“The software program processes the video stream data captured by the camera and tracks the locations of the colored markers [that we wear on your fingers] using simple computer-vision techniques”

**APPLICATIONS**

- **Phone Call:** We can call to a friend by typing the numbers on our hand only. It displays the keypad of the phone over the palm and the keys appears on the four fingers.
• **Moving pictures in the Newspaper as in the movie Harry Patter, is a reality with it.** It searches the most appropriate video from the web by seeing the headlines or the caption of the News report and hence we can watch related videos on the newspaper articles we are reading. A newspaper would prompt the device to search for relevant news video clips.

• **Check the brand of the Product:** It helps to choose the best brand product from the supermarket. We can get product information by using image recognition technology.
• **Read Books easily:** Check out the ratings of the Book you are going to buy, it checks the ratings from the internet. And another amazing thing is that it reads the book for us.

![Book image]

• **Check your Flight Status:** You can check the status of the flight while you are on Taxi. Just place the ticket in front of the projector and it checks its status from the internet.

![Flight ticket image]

By using sixth sense technology the user can convert any thing as a surface. (wall, hand, newspaper).

If we using sixth sense technology it will give us information about the thing we are looking.
An unrecognized person might prompt the display to show their contact details, and so forth.

**Research:**

- Sixth Sense will give new meaning to “looking something up.” Since we are essentially talking about the internet, students will be given the opportunity to portably research the world.

- They can all go on a virtual field trip and project the images on their own desks, for example.
COST & AVAILABILITY

- The current prototype system costs approximate $350 to build. The interesting thing here is that Sixth Sense can never really be more expensive than its individual components.

- Sixth Sense hardware and software at present works with smartphones.

- The software’s source code will be available on an open-source model.

Anticipated Time Frame: The MIT students already have a patent on Sixth Sense. Still it is unclear as to when this device might actually become available for general purchasing.

Microsoft Surface does currently exist (which is similar in theory). But Microsoft’s product is not portable like Sixth Sense.
FUTURE WITH WUW:

Decoupling you from carrying multiple gadgets and making the interface just your hands will offer a new level of freedom when it comes to accessing information. You will no longer have to find a PC to surf the ‘Net. If you want to take a picture there is no more pulling a camera out of your pocket, turning it on, and waiting for it to be ready – you just picture frame what you want with your hands and its done.

- Integrating information to everyday objects will not only help us to get rid of the digital device, but will also help us in some way to stay human, to be more connected to our physical world.

- IT WILL NOT END UP IN MAKING US MACHINES SITTING IN FRONT OF OTHER MACHINES!!

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