SIXTH SENSE TECHNOLOGY
Introduction

Sixth sense is a wearable gestural interface device that augments the physical world around us with digital information. It also explains how we can interact with our world of digital information using our natural gestures. 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. This technology comprises of a pocket projector, a mirror, a wearable camera, Smart mobile phone with internet connectivity and colored markers. It has wider applications in image capturing, drawing.

Requirements

The Sixth Sense prototype is comprised of a pocket projector, a mirror and a camera.

- Wearable Camera
- Pocket Projector
- Mirror
- Smart mobile phone with internet connectivity
- Colored marker
Wearable camera

- Camera captures an object in view and tracks the user’s hand gestures.
- It sends the data to the smart phone.
- It acts like a digital eye, connecting you to the world of digital information.

Projector

- The projector projects visual information.
- It enables surfaces, walls, and physical objects to be used as interfaces.
- Projector itself has a battery inside.
- It displays data sent from a smartphone on any surface in view.

Mirror

- The usage of the mirror is significant as the projector dangles pointing downwards from the neck.
- As the projector when hanged points downwards, mirror reflects the image.
**Smart phone**

- An internet enabled smart phone is necessary to process the data.
- As the smart phone is the open source, a program to process the data need to be developed.
- The software searches the web and interprets the hand gestures.
**Color markers**

- They are at the tips of the user’s fingers.
- They help the camera to recognize the hand gestures.
- The movements and arrangements of these markers are interpreted and they act as instructions for the projected application interfaces.
- The maximum number of tracked fingers is only constrained by the number of unique fiducials.

**Working**

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 fiducials) 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.

**Applications**
• **Art:** Drawing application lets the user to draw on any surface by tracking the finger tip movements of the user’s index finger.

• **Zooming:** Similar to the gestures supported by Multi-Touch based systems, letting the user zoom in, zoom out or pan using intuitive hand movements.

• **Call making and messaging:** One can use the sixth sense to project a keypad onto the hand, then use that virtual keypad to make a call. 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. Drawing a ‘@’ symbol lets the user check his mail.

• **As watch**
  The gesture of drawing a circle on the user’s wrist projects an analog watch.

• **Enhanced news reading**
  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.

• **Maps:**
  Drawing a magnifying glass symbol takes the user to the map. The map application lets the user navigate a map displayed on a nearby surface using hand gestures to zoom and plan.

• **Travel**
  The system will recognize your boarding pass and let you know whether your flight is on time and if the gate has changed.

• **Capturing**
  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 he/she has taken. He can use gestures to sort through photos, and organize and resize them.

• **Getting information:**
Sixth sense uses image recognition or marker technology to recognize products we pick up, and then feeds us information on those products.

**Advantages**

- It is Portable as it is a pendant like, wearable device.
- Sixth Sense supports multi-touch and multi-user interaction.
- It connects the real world and digital world.
- Cost effective
- Data access from machine directly in real time.
- Open source
- Viability and flexibility of the system

**Conclusion:** The potential of becoming the ultimate transparent user interface for accessing information about everything around us. It recognizes objects around us and displays information automatically and let us to access it any way you need.

**References:**

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