

Chapter 1

INTRODUCTION

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 which includes eye, ear, nose, tongue mind and body 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. SixthSense bridges this gap, bringing intangible, digital information out into the tangible world, and allowing us to interact with this information via natural hand gestures. 'SixthSense' frees information from its confines by seamlessly integrating it with reality, and thus making the entire world your computer.

"Sixth Sense Technology", it is the newest jargon that has proclaimed its presence in the technical arena. This technology has emerged, which has its relation to the power of these six senses. Our ordinary computers will soon be able to sense the different feelings accumulated in the surroundings and it is all a gift of the "Sixth Sense Technology" newly introduced.

SixthSense is a wearable "gesture based" device that augments the physical world with digital information and lets people use natural hand gestures to interact with that information. It was developed by Pranav Mistry, a PhD student in the Fluid Interfaces Group at the MIT Media Lab. A grad student with the Fluid Interfaces Group at MIT, he caused a storm with his creation of SixthSense. He says that the movies "Robocop" and "Minority Report" gave him the inspiration to create his view of a world not dominated by computers, digital information and human robots, but one where computers and other digital devices enhance people's enjoyment of the physical world.

3.1.4 Mobile Component



Figure 3.4: Smartphone

The mobile devices like Smartphone in our pockets transmit and receive voice and data anywhere and to anyone via the mobile internet. An accompanying Smartphone runs the SixthSense software, and handles the connection to the internet. A Web-enabled smart phone in the user's pocket processes the video data. Other software searches the Web and interprets the hand gestures.

3.1.5 Color Markers



Figure 3.5: Color Markers

It is at the tip of the user's fingers. Marking the user's fingers with red, yellow, green, and blue tape helps the webcam recognize gestures. The movements and arrangements of these markers are interpreted into gestures that act as interaction instructions for the projected application interfaces.

The Recognition Algorithms

The computer vision system for tracking and recognizing the hand postures that control the menus is based on a combination of multi-scale color feature detection, view based hierarchical hand models and particle filtering. The hand postures or states are represented in terms of hierarchies of multi-scale color image features at different scales, with qualitative inter-relations in terms of scale, position and orientation. In each image, detection of multiscale color features is performed. The hand postures are then simultaneously detected and tracked using particle filtering, with an extension of layered sampling referred to as hierarchical layered sampling. To improve the performance of the system, a prior on skin color is included in the particle filtering.

4.4 Technologies that uses Sixth Sense as Platform

SixthSense technology takes a different approach to computing and tries to make the digital aspect of our lives more intuitive, interactive and, above all, more natural. When you bring in connectivity, you can get instant, relevant visual information projected on any object you pick up or interact with. So, pick up a box of cereal and your device will project whether it suits your preferences. Some of the technologies that uses this are Radio Frequency Identification, gesture gaming, washing machine.

4.4.1 Radio Frequency Identification

SixthSense is a platform for Radio Frequency Identification based enterprise intelligence that combines Radio Frequency Identification events with information from other enterprise systems and sensors to automatically make inferences about people, objects, workspaces, and their interactions.

Radio Frequency Identification is basically an electronic tagging technology that allows the detection and tracking of tags and consequently the objects that they are affixed to. This ability to do remote detection and tracking coupled with the low cost of passive tags has led to the widespread adoption of RFID in supply chains worldwide.

Pranav Mistry, a researcher at the media lab of the Massachusetts Institute Technology, has developed a 'sixth sense' device – a gadget worn on the wrist that can function as a 'touch screen' device for many modern applications. The gadget is capable of selecting a product

5.9 Take pictures



Figure 5.9: Take Pictures

If we fashion our index fingers and thumbs into a square (the typical "framing" gesture), the system will snap a photo. After taking the desired number of photos, we can project them onto a surface, and use gestures to sort through the photos, and organize and resize them.

5.10 Get flight updates

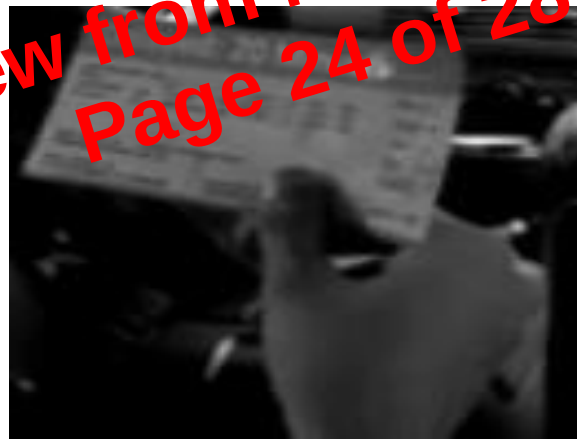


Figure 5.10: Flight updates

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