



# Sixth Sense Technology using gesturecontrol

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**Abstract:** Sixth Sense Technology is based on a system consisting a projector which is coupled with a camera and a computer is produced on this paper. Sixth Sense Technology consists a Web-Camera which continuously tracks the hand gestures and produces live output. The camera recognizes the hand gestures instantly and operates the function which is set for that particular gesture. The information is projected onto any surface, including the object or the hand. It can also use its fingers to obtain and manipulate data. It captures a photo by simply making a hand gesture with fingers, in this case a rectangle, indicating the frame of image that you wish to capture, and the system captures the shot—which may then be organised with others using one's hands in the air. The recorded snapshot is subsequently saved in the computing device's memory, where it can be retrieved for modification. Advanced image viewing, which includes zooming in and out, can also be done from anywhere. The goal of this initiative is to bridge the gap between the digital and physical worlds. This is accomplished by creating a system that continuously monitors one's actions and, when a gesture is detected, performs it as a function specific to that gesture. For eg. Capturing an image, sliding and zooming in-out etc. The camera helps in recognizing the gestures, capturing images and projector projects the image on the surface. By this you are carrying a digital world with you and can capture images anytime anywhere you want by just doing simple gestures.

## I. INTRODUCTION

Human growth, which allows individuals to sense the world around them, is the result of evolution. When people encounter anything, they use their five sense receptors (eye, ear, nose, tongue, and body) to receive information about the environment. This information aids in making judgments and choosing the best course of action. Rather, as study shows, the most important information that can help us make the best decision is not normally detectable with our five sense organs; however, digital data, information, and knowledge can help us make the best decision. and knowledge that humans have become accustomed to is becoming increasingly available on the internet. Although computer and processor size reductions allow humans to comfortably port gadgets. There is no connection between our digital machines, keeping us connected to the digital world, moreover, the real environment we interact with. There are two ways to get information: on paper and on a computer screen. Sixth Sense connects the digital and physical worlds, allowing humans to engage with information via natural hand gestures. The 'Sixth Sense' project brings digital information into the physical world, allowing humans to interact with it without the use of hardware compact computers.

"Sixth Sense Technology" is the most recent concept to emerge in our technological era.

Thanks to the "Sixth Sense Technology" developed in this era, ordinary computers will soon be able to compute the many sentiments gathered in the surroundings. Sixth Sense is a wearable, portable "hand-gesture based" device that bridges the gap between the physical and digital worlds by allowing users to interact with digital data via hand gestures. Pranav Mistry is a PhD student at the Massachusetts Institute of Technology's Medical School created it

## II. LITERATURE REVIEW

Extra Sensory Perception, or ESP, is the scientific (or non-scientific) designation for the sixth sense. It entails receiving information that cannot be obtained by any of the five senses. The goal of Sixth Sense technology is to integrate online knowledge and science into daily living. It effectively gives humans an additional sensory receptor: a sixth sense, by extending the use of digital information beyond our five senses for decision-making.

### Initial Sixth Sense Prototype:



Maes and his MIT team of seven graduate students investigated how a person may be more productive with the world around them and access the information it provides without having to remove a complicated piece of technology (mobile phone). They started with a bracelet that read a Radio Frequency Identification (RFID) tag to figure out things like which book a user had at which retailer.

They also included a ring with infrared sensors that used a beacon to communicate with supermarket smart shelves to deliver product information. The ring would change colour from red to green as we selected a packet of macaroni, indicating if the food was organic or devoid of peanut remnants — or any other criteria/condition we programme into the system.

They aimed to make real-time information more useful to humans with the least amount of work possible. The wristband was an innovative and imaginative module, but they still had to look at the information collected from the band on their phones. That's when they came up with the idea of taking internet data and displaying it on a nearby physical surface. Anyone wearing the wristband could pick up a copy, by projecting reviews onto a store surface or running a keyword search through the book using digitised pages on Amazon or Google, you can see reviews right away. They started by mounting a larger projector on a helmet. However, this proved complicated and inefficient since, depending on the angle at which the projector was adjusted. If someone was projecting data onto a wall and then turned to talk to another person, the outcome would be projected on their face/body.

### Present Prototype

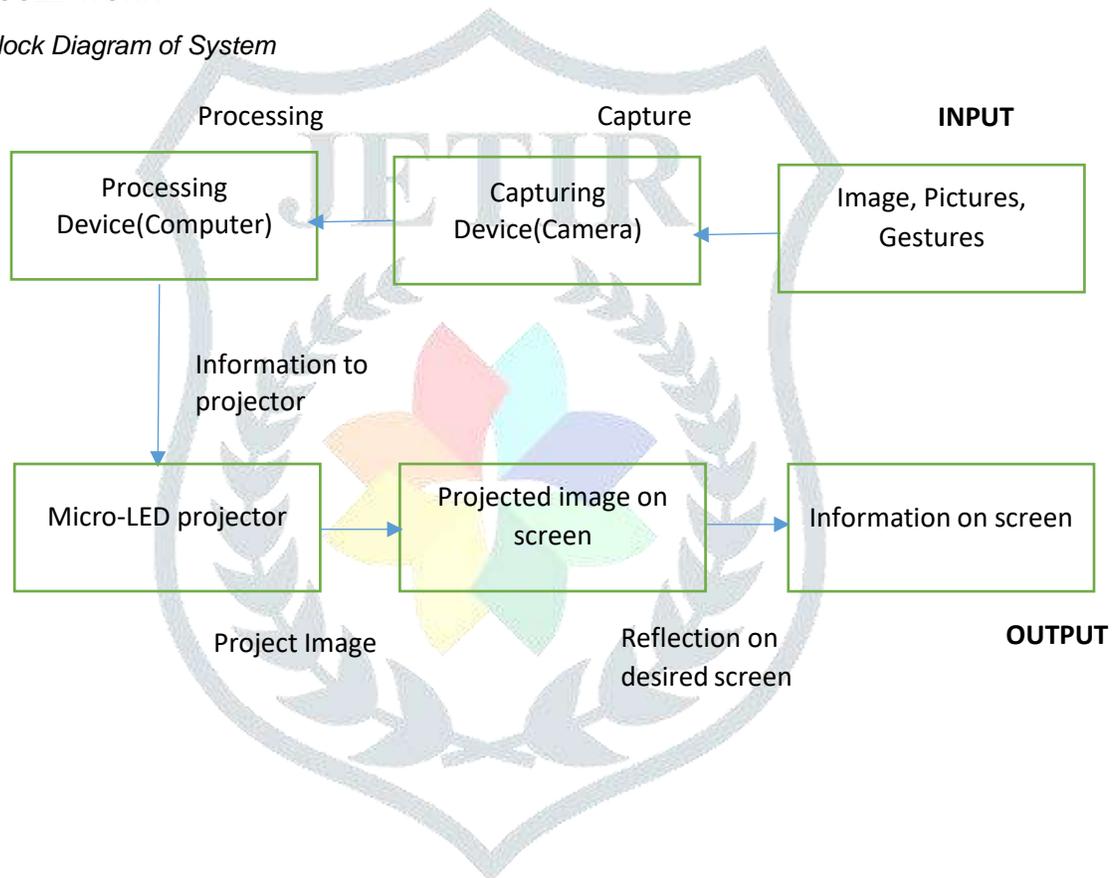


Fig. 2: Present Device

They've now shifted to a smaller projector and developed a pendant module that can be worn around the neck. A little pocket projector, a mirror, and a camera make up the Sixth Sense prototype. The hardware is combined in a pendant-like module that is portable and flexible in wearing. Both the camera and the projector are connected to a mobile via software. It works because the gadget connected to it is worn around the user's neck, and the device is controlled by the projector attached to the pendant-like module. Throughout this training, you will transform into a portable computer, with your fingertips acting as a mouse and keyboard through gestures. The module consisted of a standard webcam, a battery-powered 3M projector, and an attached mirror. They were all linked to a smartphone with an internet connection. The prototype enables the user to display digital data from his phone onto any real-world surface, such as a wall or a person, for less than \$350 in total. Pranav Mistry wore the gadget around his neck and coloured marker caps on four of his fingers (red, blue, green, and yellow) to let the camera discern the four fingers and recognise his hand gestures as recognisable geometric shapes using software he wrote.

### III. PROPOSED WORK

#### A. Block Diagram of System



## B. System components

The hardware components are coupled in a wearable module.

- **Camera:** A camera uses computer vision algorithms to capture and recognise an object in view, as well as track and analyse the user's hand gestures. It transfers physical data and information to a computer (mobile device). The camera records and monitors what the user can see with his own eyes. It also monitors the user's movements using the coloured markers (red, blue, green, and yellow) on both hands, which are recognized by geometric gestures.
- **Projector:** Interaction and sharing are made possible by using a projector. The project itself includes a battery with a 3 hour battery life. To be utilised as interfaces. The projector displays visual information on physical surfaces, walls, and other objects in our environment. We want this digital data to collate with the physical world in a meaningful way. The data would appear to be a component of the object. A mini projector projects data from a smart phone onto any surface, including an item, a wall, or a person.
- **Computer:** After interpreting the gesture from the user's hand, it is used as a processing/computing device to accomplish the dedicated functions.
- **Coloured markers:** It's right on the operator's fingertips. The webcam recognises particular geometric patterns that can be communicated to the computing device for processing when Red, yellow, green, and blue tape are used to mark the user's fingertips. The orientation and configurations of these creators are turned into diagrams that serve as instructions for specialised programmes.

## C. Results

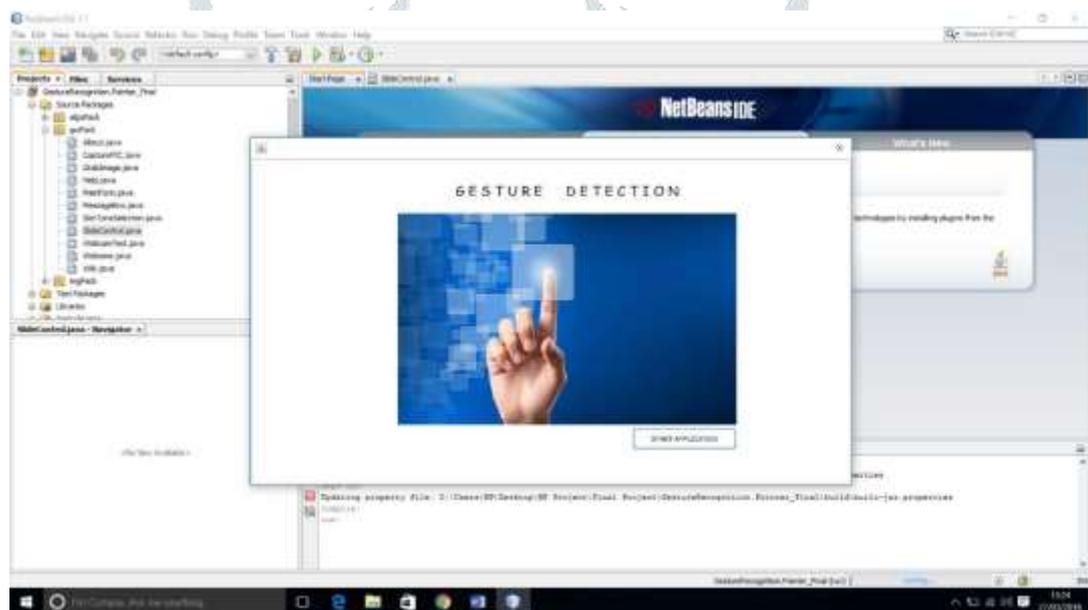


Fig. 3 Form of application on JDK NetBeans IDE 7.1

The above Fig. 3 shows a Graphical User Interface representation of the application form developed on JDK NetBeans 7.1. A mouse click on “START APPLICATION” tab would run GUI application.

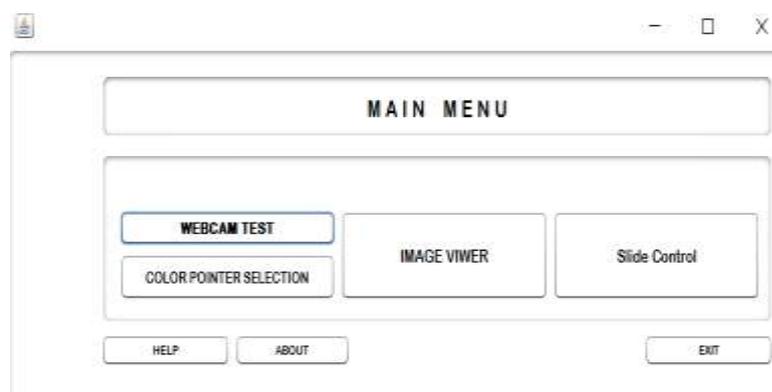


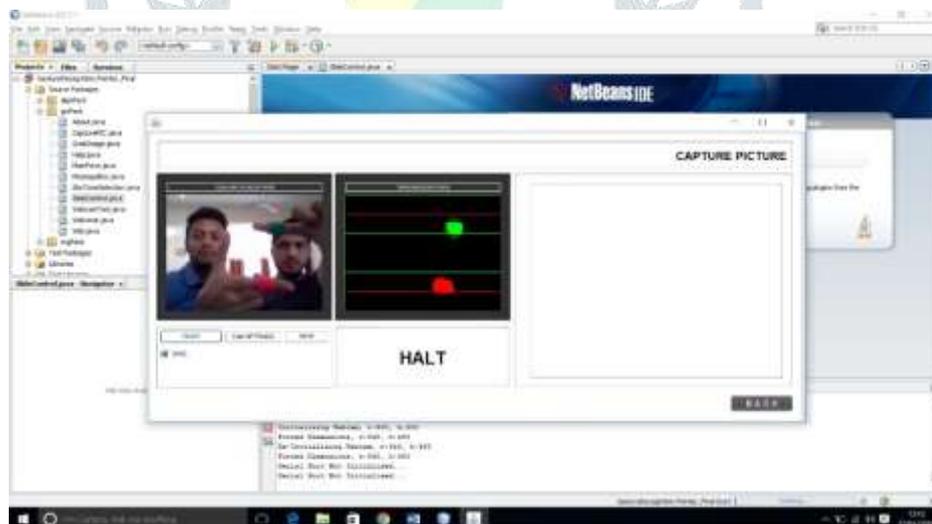
Fig. 4 Opened Application on JDK NetBeans IDE 7.1

Fig. 4 shows the opened application created on NetBeans. It comprises of tabs such as “WEBCAM TEST”, “COLOR POINTER SELECTION”, “IMAGE VIEWER” and “SLIDE CONTROL”. WEBCAM TEST- It is used for the testing purpose of web camera connected via USB or the in-built camera of the laptop. COLOUR POINTER SELECTION- The whole idea of Sixth Sense Technology is based on gesture recognition with the help of colour markers. This tab allows us to chose the kind of pointers that we want our camera to detect, the kind of colours that need to be updated as precedent and use them to access applications. IMAGE VIEWER –This is used to view the captured images after performing a valid gesture which would be detected by the algorithm. The detected gesture would capture image via web-camera and display the real-time captured image on the image viewer. SLIDE CONTROL- It is used for performing zoom-in, zoom-out and sliding operations, each of which, would be displayed on the application.



**Fig. 5 Colour tone selection (Red and Green pointer identification)**

Fig.5 shows that RED and GREEN colour pointers placed on the fingers. Right-most window shows detected colour pointers via Web-Camera.



**Fig. 6 Application I: Hand gesture for Image capturing**

Fig.6 depicts the hand gesture that is used for Image capturing. The right-most window shows 2 lines on the y axis which uses already set co-ordinates in the algorithm. The green pointer needs to be placed exactly between the RED and GREEN line. Same is for the RED pointer detection. A window has been used to display the text image that will displayed in accordance with the application. “HALT” messages denotes that the run-time application is on hold until the detection of the colour pointers used. The updated colour pointers are then placed between the co-ordinate-y-axis lines for desired real-time image capturing.



Fig. 7 Final Captured image

Fig.7 shows the Final captured image after colour pointer detection.

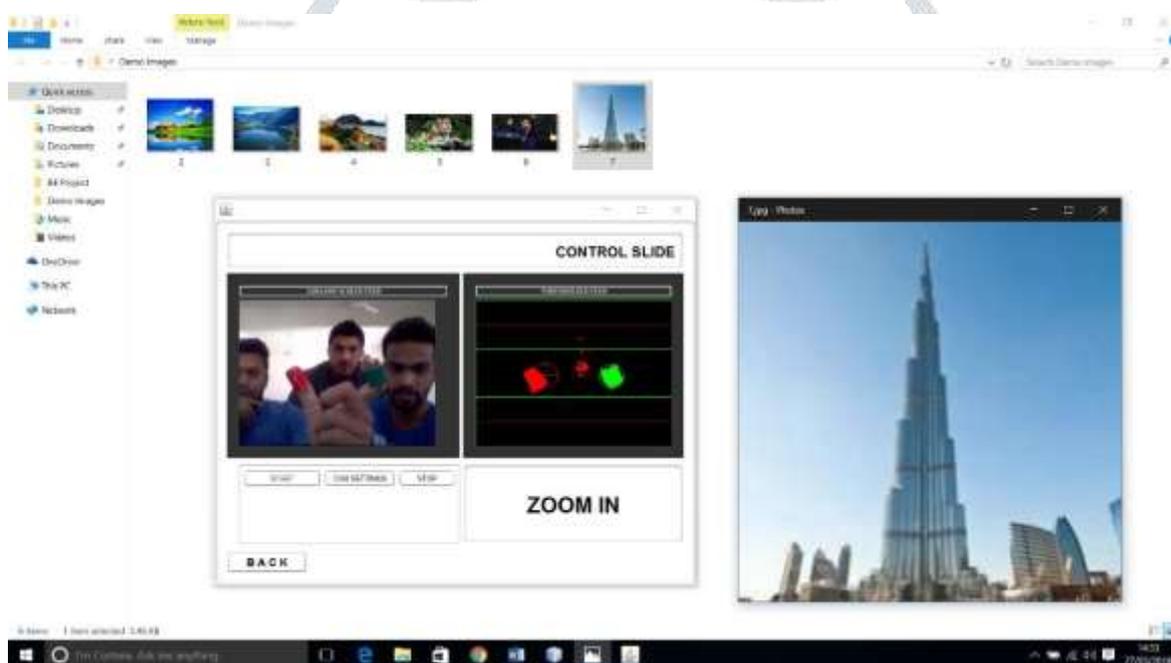


Fig. 8 Application III : Image Zoom in

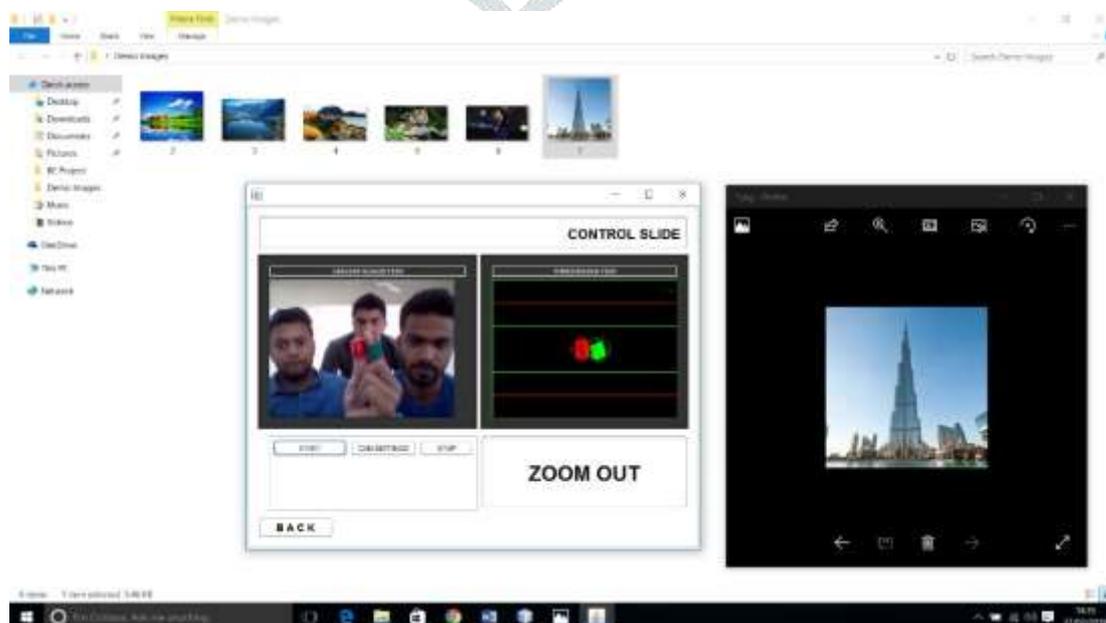


Fig. 9 Image Zoom out

Fig. 8 and Fig. 9 shows the demonstration of the 3<sup>rd</sup> application which is Zoom-in and Zoom-out operation. When the colour pointers are kept away from each other, Zoom-in operation is performed on the image opened in the Image Viewer as shown in Fig. 4.12. When the colour pointers are kept close to each other, Zoom-out operation is performed.

#### IV. CONCLUSION

Sixth Sense Technology recognises the items in our environment and allows us to interact with the information in any way we need without the usage of microelectronic devices. Instead, we utilise simple hand movements to communicate with the information. With the identification of coloured markers (Red, Green, Blue, Yellow) placed on four fingers of our hand, our system allowed us to recognise simple hand gestures. By feeding the camera with a gamut of gestures, For eg. Rectangle shape gesture indicated to the camera to capture an image. The use of doubleline tracing in forward and reverse directions allowed us to perform several applications like Image sliding on the currently open Photo Viewer application, Zooming in of the image to view the enlarged one and lastly, Zooming out of the image to view it's mere counterpart. After capturing the images they were further directed to be stored on the hard drive of the computer with the 'Save' feature allowing it to do so right after the action. This technology gave us the ability to engage with the digital world with only simple hand movements.

#### V. ACKNOWLEDGEMENT

Firstly, I would like to thank the principal of PICT, for providing the healthiest work environment which was beneficial towards the fulfilment of our project. I would like to thank my project coordinator Dr. R. C. Jaiswal, Department of Electronics and Telecommunication, for all of your assistance and support. I appreciate all of my college's staff members and friends' cooperation.

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