International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056
Volume: 03 Issue: 03 | Mar-2016 www.irjet.net p-ISSN: 2395-0072

Sixth Sense Technology

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Abstract - *Sixth Sense technology is an interface of wearable gestures which upgrade the physical world and the digital world, bringing intangible, digital datas out into the tangible world, and make us to interact with this data through natural hand gestures. The advent of this technology over the last few decade has established a new dimension in the field of Human computer Interaction (HCI) Using gesture recognition, augmented reality, computer vision and radio frequency identification. Sixth Sense technology is implemented in WUW (wear your world)*

Key Words:-**Sixth sense, WUW, Gesture Recognition, Computer Vision, Augmented Reality, Voice Recognition..**

1.INTRODUCTION

We use our five natural senses i.e. feeling, seeing, tasting, smelling and hearing. But unfortunately the most useful information that can help us make the right decision is not naturally achieved with our five senses, namely the data, information and knowledge that mankind has accumulated about everything and which is easily available in all websites online.

Even though the computer and other computing devices allows us to carry computers in our pockets, that always allow us to keep continually connected to the digital world, There is no link between our digital devices and our interactions with the physical world .Information is always transferred traditionally through paper or digitally on a screen. Sixth sense technology frees the data from that limitation and seamlessly integrates information & reality.

WUW was developed by Pranav Mistry, a Ph. D student at Fluid Interfaces Group at the MIT Media Lab The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system. The key here is that Sixth Sense recognizes the objects around you, shows information automatically and letting you access it in any simplest way you want. The device assist us in making right decisions by providing the relevant information. The technology used here is mainly based on hand gesture recognition, image capturing, processing, and manipulation,. The software of the technology uses the video stream, which is captured by the camera, and also tracks the location of the tips of the fingers to recognize the gestures. Gesture offers several advantages when compared with traditional human computer interaction system It offers touch less system therefore it is particularly helpful for physically challenged person, elder users as well as in health care system while maintaining the sterility.

1.1 Litreature Review

A quite number of researches have been done by different researchers on the field of Human Computer Interaction(HCI) and its application in virtual environment. Using video devices for HCI. researchers have tried detecting the virtual object to control system environment. Detecting, tracking and of various natural gestures can be done using a Web camera. To achieve those gestures we used various image features and gesture Templates. Cootes et al [7] used Active Shape Models (ASM) to track deformable objects. M. Isard et al introduced random sampling filters [8] to address the need of represent multiple hypotheses while tracking. G. Kitagawa [9] applied Condensation algorithm in factored sampling to solve the problem of visual tracking in clutter. Hojoon Park [10] used index finger for cursor movement and angle between index finger and thumb for clicking events. Robertson et al [13], used another method to click. They used the motion of the thumb (from a 'thumbs-up' position to a fist) to mark a clicking event thumb. Movement of the hand while making a special hand sign moved the mouse pointer.

2. COMPONENTS

The components are camera, projector, mirror, mobile component and coloured markers.

2.1 Camera

Camera is the main digital eye of this project. It mainly captures the image that the user is looking at. Camera recognizes the gesture and tracks it using computer based technique. It functions when the user performs a 'framing' gesture, it took a photo of the scene from the front.

Fig -1:Image of a Camera

2.2 Projector

The ultimate output is seen in the projector. The projector views the visual informations allowing the user to make the wall, surfaces and other objects as an interface. It also augments related information from the internet and the physical objects the user interacting with by projecting just-in-time. The main function is to projects graphical user interface of the selected application onto walls or surfaces in front.

Fig -2: A Prototype Projector

2.3 Computing Device

Here we use a laptop or a smartphone where connection can be wireless or wired. It is a web enabled device that processes the video data, using vision algorithms to identify the object.

2.4 Mirror

Mirror reflects image on to the desired surface. It helps to overcome the limitation of the limited projection space of the projector. The user can change the position of projection by changing the gradient of mirror.

2.5 Colour Marker

Colour marker is worn at the tip of the usersfinger. The webcam recognize gestures when the user's finger is marked with red,yellow green and blue tapes.

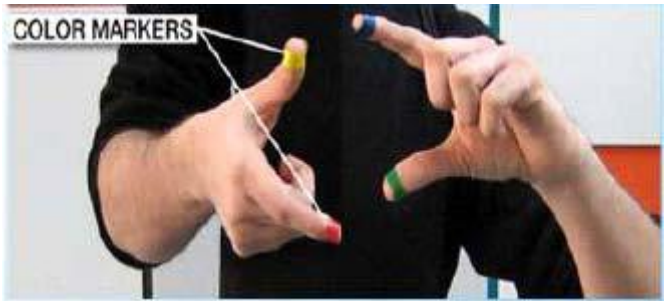

Fig -3: Colour bands on fingertips

3. APPLICATIONS

The Numerous applications on sixth sense technology already have taken place. Some of the applications are given bellow:

3.1 Washing Machine

Latest technology in washing machine gives more optimization of resources and also increased saving in terms of energy, water and time.

3.2 Virtual Map

One can use his/her index fingers and thumbs to navigate the map, for example, to zoom in and out and do other controls.

Fig -4: virtual map

3.3 VR glasses or contact lens

On top of your retinas a pair of contact lenses with built-in LED arrays to display images this type of technology has huge implications for the medical community with real-time

speech translations for the hearing impaired or vital sign monitoring like glucose levels for diabetics.

Fig -5 A virtual glass

3.4 GPS Technology

The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) which gives reliable location and time information of the device wherever on the earth is using GPS satellite. By capturing the signals from three or more satellites GPS receivers are able to use the mathematical principle of trilateration to pinpoint your location. GPS receivers are able to convert location, speed, and time information into a useful display format by the use of data stored in the memory.

Fig -6 GPS Technology

4. SOFTWARE USED & METHODOLOGY ADAPTED

To develop an application based on sixth sense technology one can use
1) Language: Java, C #, C++, OpenCV, JavaCV.
2) Image processing Software: MatLab, Mathematica, Cylab

4.1 Initialization

Different gestures are captured, enhanced, features are extracted and finally a gesture template or cluster model is created using different algorithm.

Acquisition: It is a real time approach where frames are captured using webcam or from a video input.

Segmentation

Each of the frames is processed separately and image is smoothed, skin pixels are labeled, noise is removed and small gaps are filled.using filters. By segmentation algoritnm all the features of picture is extracted from it and stored in data base.

Pattern Recognisation

The users gesture is captured and features are extracted which is compared to the stored hand gesture using comparision algorithm like Hausdorff matching, Euclidean distance, hidden Markova model, Bag of Words, Hamming Distance, correlation based approach etc.

Excecution

Finally, the system carries out the corresponding action according to the recognized gesture.

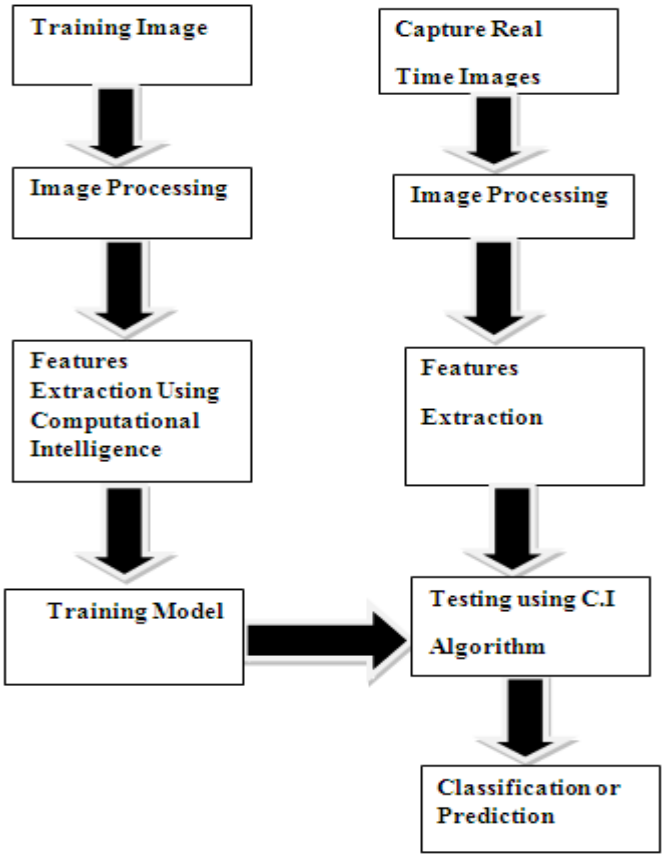

Fig -7 A complete methodology of adopted for sixth sense technology.

5. CONCLUSIONS

Some of the directions for the future research work in the field to users, evaluators and vendors can be using economical image acquisition device we can capture low quality and degraded images that makes our environment more robust. How to overcome different lighting condition that is,day light and artificial light which has a great impact in this area. It also improve Machine learning & Intelligence for gesture recognition through comparative studies. Sixth Sence Technology will definitely revolutionize our world.

ACKNOWLEDGEMENT

We would also like to express our appreciation and gratitude to METS college authority for helping us to develop this paper.

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