Sixth Sense Technology & Its Applications

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Abstract- In this paper we worked on a new type of technology which is going to be soon launched in the market .Its name is the sixth sense technology. It's a wearable interface that augments the physical world around us with the digital information. It's just born concept which allows user to connect with the internet seamlessly. Without use of keyboard, mouse we can see videos access, change, move data simply.

Index Terms- speech IC, projector, mobile device

I. INTRODUCTION

This technology is a revolutionary way to interface the physical world with digital information. Modern technologies include the touch screen techniques which is used widely and it makes ease of operation and saves utilisation time. 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. But the bottle necks of this method such as position of camera, for capturing gestures interprets the accuracy in the projected output, lead to use of commands instead of hand gestures. The position of camera is a major constraint in the image capturing and projected output efficiency and accuracy. Therefore the actions which we regularly perform in our daily life, are converted to commands and are trained to a speech IC .They are stored as a database in the integrated circuit and corresponding actions are performed when the speech is recognised from the user.

It's a hi-tech device seamlessly integrate Analog information with our everyday physical world. The voice is directly performed into operation within fractions of seconds, and the action is projected on the surface. It's a portable device and eases the operation which we regularly perform. Basically the sixth sense technology concept involves the use of hand gestures .the finger tip will contain coloured markers and hence gestures performed will be captured by the camera. Then it's given to the mobile device for the corresponding action to be performed. The action is projected on the surface through the projector. Software algorithms and computer vision technologies will be used to enable the action from the mobile device for the corresponding gesture captured in the camera. This gesture based technology is used for variety of applications like performing basic actions, locating points in the map, watching video in newspaper, dialling number in hand etc. The slight modification of this method lead to the use of commands that is analog information into real world. The analog data is converted into digital and performed as action, as all times the hand gestures cannot be used.

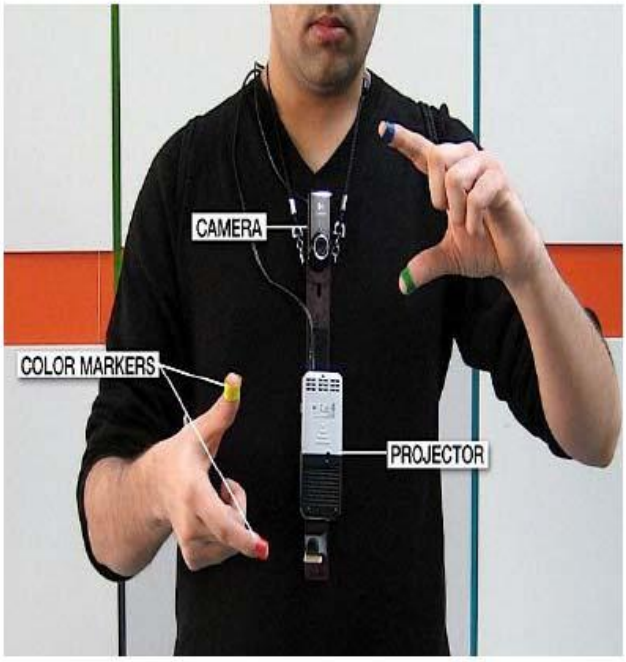

Fig1: **Representation Of Gesture Based Design**

This was how the wearable device is fit to the human body .Here colour markers are used in the finger tips .In our technology we use commands for performing the same operations. Many high technology speech integrated circuits evolved which makes our operation enhanced with more advanced features.

To ensure accurate gesture recognition and an intuitive interface a number of constraints are applied. A region in the front of the projection screen is defined as the active zone and the gestures are ignored, if the gestures are performed out of this area. Gestures are also defined by a set start posture, end posture and dynamic motion between the start and end postures. Perhaps the use of gestures is most powerful when combined with other input modalities, especially voice. Allowing combined voice and gestural input has several tangible advantages. The first is purely practical-ease of expression .Ease corresponds to the efficiency with which commands can be remembered and expressiveness, size of command vocabulary.

II. DESIGN AND WORKING

The sixth sense device comprises of

1. Wearable projector
2. Mobile device

3. Speech IC
4. Mirror

The sixth sense device is a mini projector coupled with a speech IC and a cellphone, which acts as a computer and our connection to the cloud, all the information stored on the web. The components are controlled by or communicated with a mobile computing device carried in the user's pocket. The hardware components are coupled in a pendant like mobile wearable device .both the speech IC and the projector are connected to the mobile computing device in the user's pocket. The projector, projects the visual information enabling surfaces, walls and physical objects around the user to be used as interfaces. While the speech IC stores commands which were trained by the user and executes the corresponding action through the projector, enabling the actions from the mobile device.

A remote computer can also be connected which gathers data from user ,processes it, searches the web for relevant execution of the command and returns the result in real time to the user. The speech IC is trained with regularly used operating data and thus it acts as a database for storing all such commands.

There evolved many speech integrated circuits with fabulous technical aspects to be embedded for vast kind of applications. There are three ways for speech recognition and language understanding. 1. Multipurpose processors intended for embedded applications. 2. Customised integrated circuits for speech recognition and language undererstanding.3.implementing speech recognition and language understanding as part of larger integrated circuit in the device.

Some integrated circuits can be used for less than 15 words, which have a menu based type of interaction whereas other ASIC integrated circuits can be used for hundreds of words which posses natural language understanding. The IC will be trained with a sophisticated neural network to recognise the commands and activate it correspondingly. The speech IC is initially trained with the words or commands .The user gives the input as commands and when such analog speech is received to the IC ,the data is converted into digital and is sent to the mobile device .the mobile device activates the command and is given in turn to the projector. The projector output is seen on the screen through the mirror for accurate projection from the projector which is wearable in the body. For more advanced operations and for accessing net which is our future work, can be accessed from the remote computer simultaneously and projected as before.

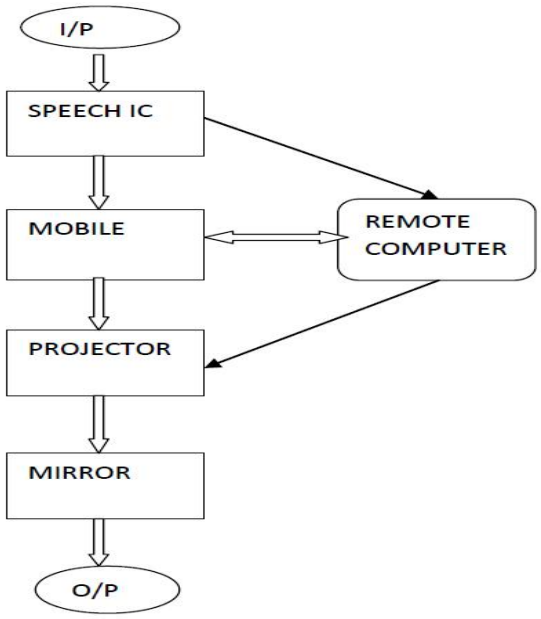

Fig 2: **Basic Design of Our Concept**

III. APPLICATIONS

The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system. The SixthSense device has a huge number of applications. You can use the Sixth Sense to project a keypad onto your hand, then use that virtual keypad to make a call. Calling a number also will not be a great task with the introduction of Sixth Sense Technology. No mobile device will be required, just type in the number with your palm acting as the virtual keypad. The keys will come up on the fingers. The fingers of the other hand will then be used to key in the number and call. The sixth sense also implements map which lets the user display the map on any physical surface and find his destination and he can use his thumbs and index fingers to navigate the map, for example, to zoom in and out and do other controls. Sixth Sense all we have to do is draw a circle on our wrist with our index finger to get a virtual watch that gives us the correct time. The computer tracks the red marker cap or piece of tape, recognizes the gesture, and instructs the projector to flash the image of a watch onto his wrist. 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. Thus a piece of paper turns into a video display. The user can zoom in or zoom out using intuitive hand movements.The drawing application lets the user draw on any surface by tracking the fingertip movements of the user's index fingering formation Maes says Sixth Sense uses image recognition or marker technology to recognize products you pick up, then feeds you information on books. The system can project Amazon ratings on that book, as well as reviews and other relevant information Product information Maes says Sixth

Fig 3. Example Of Commonly Used Applications

Sense uses image recognition or marker technology to recognize products you pick up, then feeds you information on those products. For example, if you'retrying to shop "green" and are looking for paper towels with the least amount of bleach in them, the system will scan the product you pick up off the shelf and give you guidance on whether this product is a good choice for you. 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 .The system will recognize your boarding pass and let you know whether your flight is on time and if the gate has changed.

IV. THE INVENTOR

Pranav Mistry, 28 year old, of Indian origin is the mastermind behind the sixth sense technology. He invented ' Sixth Sense / WUW (Wear UR World) ' which is a wearable gestural , user friendly interface which links the physical world around us with digital information and uses hand gestures to interact with them .He is a PhD student at MIT and he won the 'Invention of the Year 2009 '- by Popular Science

V. CONCLUSION

The sixth sense technology using gesture movement and speech integrated circuits are emerging innovative ideas. We have a seamless access to data or information that may exist to help us make decisions. This provides access to relevant information about the things in the environment and enables the new interactions between the real world and the world of data. Although the miniaturisation of computing devices allows us to carry computers in our pockets, there had been no link between the digital devices we carry and our interactions with the physical world, and our speech in a efficient level .Sixth sense is developed to seamlessly integrate information into reality. The future may depend upon this sixth sense. May be within this 2020, the proliferation and the use of this technology is immense. Sufficient awareness of the sixth sense will lead to further development of any technology which aids for getting information and performing any type of action practically at any time, using simply the gestures and commands given .The advantage of this technology is portable, its connectedness between the world and the information as speech. Its cost effectiveness and data can accessed from the machine directly in real time. It can also be said as an open source technology. Within twenty years this technology will bring a drastic change in field of science and will create a revolutionary change among the mass. The device will soon be up for sale and will be available to the common public the device will cost around 350$ without the custom made PC. which aids for getting information and performing any type of action practically at any time, using simply the gestures and commands given.

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ACKNOWLEDGEMENT

I thank Mr.N.Kumaresan, lecturer, ECE department, for his valuable guidance and motivation for this work and also I thank my other department staff members for their credit in completion of this paper.

REFERENCES

[1] Alon,J.Athitsos,V.Quan,YuanSclaroff,S. Computer Science Dept., Boston Univ., Boston, MA, USA, A Unified Framework for Gesture Recognition and Spatiotemporal Gesture Segmentation, IEEE transactions on Pattern Analysis and Machine Intelligence, Volume: 31, Issue:9 pp 1685 - 1699 ., Sept. 2009

[2] Mu-Chun SuInst. of Computer Science & Inf. Eng., Nat. Central Univ., Chung-Li A fuzzy rule-based approach to spatio-temporal hand gesture recognition,Systems, Man, and Cybernetics, Part C: Applications and Reviews, IEEE Transactions on Volume: 30, Issue:2 pp276 – 281., May 2000

[3] Kirishima, T. Sato, K. Chihara, K.Dept. of Electr. Eng., Nara Nat. Coll.

of Technol., Japan Robotics, Gesture Spotting and Recognition for Human–Robot Interaction, IEEE Transactions on Volume: 23, Issue:2 pp256 – 270., April 2007

[4] Real-time gesture recognition by learning and selective control of visual interest points: Pattern Analysis and Machine Intelligence, IEEE Transactions on, Volume: 27 , Issue:3, pp351 – 364., March 2005

[5] Ozer, I.B. Tiehan Lu Wolf, W. Princeton Univ., NJ, USA Design of a real-time gesture recognition system: high performance through algorithms and software Signal Processing, IEEE Volume: 22, Issue:3, pp 57 – 64., May 2005

[6] Evans, J.R. Tjoland, W.A. Allred, L.G.Ogden Air Logistics Center, Hill AFB, UT Achieving a hands-free computer interface using voice recognition and speech synthesis [for Windows-based ATE] Aerospace and Electronic Systems, IEEE Volume: 15, Issue:1, pp 14-16., Jan 2000

[7] Kaynak, M.N. Qi Zhi Cheok, A.D. Sengupta, K. Zhang Jian Ko Chi Chung Dept. of Electr. Eng., Arizona State Univ., Tempe, AZ, USA Analysis of lip geometric features for audio-visual speech recognition Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions on Volume: 34, Issue: 4, pp-564 – 570., July 2004

Gomez, A.M. Peinado, A.M. Sanchez, V. Rubio, A.J.dept. eoria de la Senal, Granada Univ Recognition of coded speech transmitted over wireless channels Wireless Communications, IEEE Transactions on Volume: 5, Issue: 9, pp-2555 – 2562., September 2006

[8] Pelaez-Moreno, C. Gallardo-Antolin, A. Diaz-de-Maria, F. Dept. de Tecnologias de las Comunicaciones, Univ. Carlos III de Madrid, Recognizing voice over IP: a robust front -end for speech recognition on the world wide webMultimedia, IEEE Transactions on Volume: 3, Issue:2, pp-209 – 218., Jun 2001

[9] http://boingboing.net/2009/11/12/sixthsense-technology.html

[10] http://theviewspaper.net/sixth-sense-technology-will-revolutionise-the world/

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