Sixth Sense Technology

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Abstract-- Sixth **Sense is a wearable gestural interface that enhances the physical world around us with digital information and lets us use natural hand gestures to interact with that information. It is a pendant like device that consist two main components; a data projector and a camera. This technology enables the user to connect with the internet persistently. The device works on the principles of gestural recognition and image processing. The name Sixth Sense was given to this technology in light of a wearable device and the digital information could act in augmentation to the five traditional senses (vision, touch, smell, hearing and taste)**

Keywords-- gestures Camera, projector, mirror, microphone, color markers.

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 utilization 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 recognized from the user. It's a hi-tech device seamlessly integrate Analog information with our every day 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 colored 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 news paper, dialing number in hand etc. The slight modification of this method leads 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.
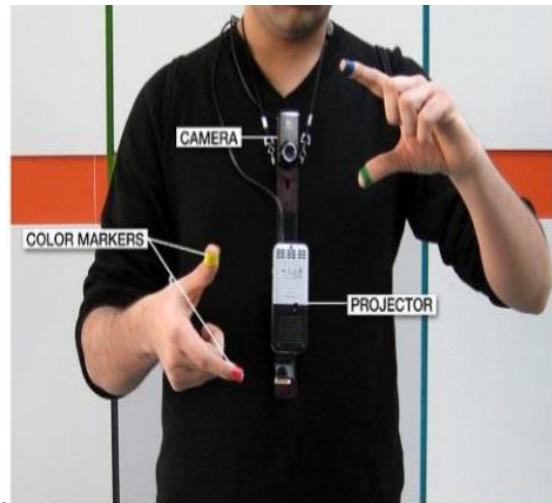

Fig1: Representation of Gesture Based Design (a)

II. COMPONENTS OF DEVICE

A. Camera: It captures the image of the object in view and track the user's hand gesture. The camera recognizes individuals, images, pictures, gestures that user makes with his hand. The camera then sends this data to a smart phone for processing. Basically the camera forms a digital eye, which connects to the world of digital information.

B. Colerd Marker: There are color markers placed at the tip of users finger. Marking the user's fingers with red, yellow green and blue colored tape helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as a interaction instruction for the projected application interfaces.

C. Microsoft-Enabled Marker: The Sixth Sense device consists of a laptop which process the data send by the camera. The laptop interprets the hand gestures with help of the colored markers placed at the fingertips. Dev-C++ was the programmer used for all codes made. Min GW was the compiler used. Open CV libraries were used which contained all functions sufficient to make our project.

D. Projector: The information that is interpreted through the smart phone can be projected into any surface. The projector projects the visual information enabling surfaces and physical objects to be used as interfaces. The projector itself consists of a battery which have 3 hours of battery life .A tiny LED projector displays the data sent from the smart phone on any surface in view- object, wall or person.

Fig2: The original device (b)

III. MOTIVATION AND BACKGROUND

Previously many technologies evolved such as augmented reality which is to add information and meaning to real object or place. Unlike virtual reality, augmented reality does not create a simulation of reality instead it takes a real object or space as the foundation and incorporates technologies that add contextual data to deepen a person understanding of the subject. It's a term for live direct or indirect view of a physical real world environment whose elements are augmented by virtual computer generated imagery. Gesture recognition is a term with a goal of interpreting human gestures through mathematical gestures and mathematical algorithms. Computer vision is the science and technology of machines that is concerned with the theory behind artificial systems that extract information from the images. As a technological discipline, computer vision seeks to apply its theories and models to the construction of computer vision systems. The examples include the controlling processes, detecting events, organizing information, modeling objects or environments and interaction. Recently speech integrated circuits evolved which is used widely in car automation and home appliances. It eases the operation and saves the utilization time of the manual operations performed by the human's every day. The speech recognition process is performed by a software component known as speech recognition engine. The primary function of this is to process the spoken input and translate it into text which the application understands. The application then can do one of the two things,

1   The application can interpret the result of the recognition as a command, in this case application is a command and control application.
2   If the application handles the recognized text as simply text, then it's considered as dictation application. When the user says something, it is known as utterance. An utterance is a stream of speech between two periods of silence. The speech IC can be used for all sorts of data, statistical models, and algorithms to convert spoken input into text.

IV. 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.
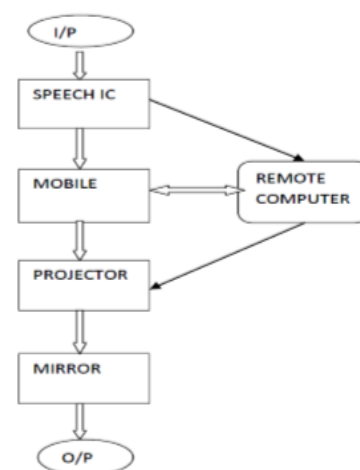

Fig3: Basic design of our concept(c)

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.

V.   APPLICATIONS

The basic operations such as enabling clock, inbox, browsing, searching gallery, calendar, seeing contact list etc are performed regularly in the mobile every time. These operations can be can be accessed on the screen.

Fig4: Example of commonly used application (d)

This figure depicts that when clock command is given it's activated in our wrist.

Fig 5: Wrist Watch Illusion   (e)

TABLE1: ANALYSIS OF TWO METHODS

FEATURES	DIRECT MANIPULATION	NATURAL LANGUAGE
STRENGTHS	1.Intuitive 2.Consistent look feel 3 Options apparent 4. Fail safe 5.Direct engagement with object	1.Intuitive 2. Description 3. Context 4.Asynchronous
WEAKNESSES	1.Description 2. Anaphor a 3.Operation on sets 4.Delayed action difficult	

This tabulation clearly defines the boon and bane of both the gestural use and voice mode of technology in our sixth sense concept. Both techniques have their own strengths depending upon the kind of applications we use.

VI.   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 miniaturization 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.

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