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WINGS TO YOUR THOUGHTS.....

Application of Gesture Recognition in Virtual Touch in Virtual Environments

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Abstract: *This paper is based on Sixth Sense recognition of the objects around us, displaying the information automatically and letting you access that information the way you want it to be, in the most easiest way as possible. It clearly shows that it has the potential of becoming the ultimate transparent user interface for accessing information about everything around us. Hand gestures is the motion of human hands and arms which are used as a means to express or emphasize an idea to convey and manipulate command for controlling an action. A better interaction in virtual environments requires a natural and suitable device. Hand Gesture concept in human-computer interfacing context has become popular in recent years. It can also be used to develop such an interaction device. Human hand gestures are a set of movements of the hand and arm which range from the simple action of pointing at something to the complex ones used to communicate with other people. Understanding and interpreting these movements requires modeling them in both spatial and temporal domains. Static configuration of human hand which is called hand posture, its Dynamic activities are vital for human-compute interaction. Although these systems are more expensive, they can provide it in a better ways to handle oclusions and can lead to more accurate hand tracking systems for advance tasks such as virtual object manipulation. A higher level of functionality can be achieved by developing a generic set of hand postures/gestures and interpreting them symbolically after acquisition.*

Keywords: *Gestures technique, digital information, virtual object, interfacing context, communication, configuration.*

1. INTRODUCTION

When we encounter something, someone or some place, we use our five sensory organs which include eye, ear, nose, tongue, mind and body. This application uses the software as well as the system hardware such as camera (most important part of the application). "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 the six senses [1]. Our ordinary computers will soon be able to sense the Difference in feelings that are accumulated in the surroundings and these are all gift of Sixth Sense

Technology newly introduced. Gesture device is a wearable gesture based device that comprises of both physical world with digital information and let people use natural hand gestures to interact with the given information about digital Information and human robots, but only at the time when one computer and other digital devices enhance people's enjoyment of world[2]. We can use our devices (computers, mobile phones, tablets, etc.) to go into the internet and get information that we want. With Sixth Sense Technology we can use internet as a means to interact with our world! Sixth Sense will allow us to interact with the world like never before.

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY

WINGS TO YOUR THOUGHTS.....

It's also very interesting to work but also to play with this application [3].

1.1 Hand Gesture Techniques

Dynamic, non-contact Hand Gestures are used, and are being researched, for a wide range of applications. From a selective literature review the following applications have been found remote crane control; aircraft traffic control human computer Interaction; virtual environments; remote robot manipulation; wearable human computer interface; home appliance control, TV control, music; room lighting, hearing aids, weather forecasting, presentations, mobile phone, translation, jukebox and 3D Kiosk. The two common factors which is present in all the above given applications the use of dynamic and non-contact hand gestures [4].

1.2 Hand Gesture Techniques [5, 6]

- (1) multimodal and uni-modal gesture interfaces
- (2) contact and non-contact hand gestures
- (3) dynamic and static hand gestures
- (4) gesture driver interaction
- (5) visual reminders
- (6) gesture location
- (7) system feedback
- (8) intrusive and non-intrusive hand gesture
- (9) vision-based or sensor-based technologies
- (10) sensor-based technologies
- (11) application domain secondary control tasks

2. PREVIOUS RESEARCHES

A literature review of current research investigating shows that, the use of hand gestures for vehicle secondary controls was carried out and was briefly summarized in the following section. This technique was used by various researchers. Previous research does not focus on understanding driver behavior or the limitations of hand gestures. An examination of the visual-demand, cognitive human factors and perceptual motivations for the use of hand gestures in automotive environments were also missing from the literature. Recent research has also neglected to examine the role of hand gestures for specific interaction tasks common to Most automotive environments such as interior lighting, interior

closures, outside vehicle applications, context sensitive applications and many more. Instead, research has most frequently focused on the variety of hardware solutions available for implementing gesture-based interaction. As a result, the automotive human machine interface design community lacks a framework for hand gesture interaction that could be used to help the identification of appropriate and effective hand gestures and task-based applications. The literature review and the resulting analysis leads to the proposed classification of research. The categories used to organize and classify previous research [7]. Each of these categories will now be discussed. The primary goal of the author's research into hand gesture recognition for automotive human vehicle interaction is to identify and evaluate possible applications and driver safety benefits. Most researches focused on developing gesture interfaces for menu based secondary control systems since these potentially offers the most safety benefits. It is likely that these menu based gesture recognition systems will be used as a supplementary method of user to control the driver, just as voice and steering wheel controls are developed. Researches done by the author has identified that the approach to map hand gestures is a selective theme or function appears to offer the best way forward since mapping to a device or immiteting each individual control type has serious limitations. Selective mapping to theme or function reveals a number of interesting possibilities Because one handed gestures used in human-human conversations are limited in number, the author does not believe that either mapping differs from hand gestures to a complete in-vehicle device such as a radio, or mapping each different type of in-vehicle control type is feasible [8]. The use of selective mapping to theme and function appears to offer more realistic practical possibilities and potentially greater Safety benefits.

2.1 PURPOSE OR RESEARCH

Research and Application Challenges

The purpose of this research is to develop a system which can be used for speechless people. The proposed system will takes the input from the hand movements of the speechless people and will use

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY

WINGS TO YOUR THOUGHTS.....

their hand moments to communicate with other peoples. The highlighting goals of this research are:-

1) To develop such a system, that will allow speechless people to use their hand sign language to interact with others.

2) A system which allows its users who are speechless to communicate with other people without typing the text from the mobile device.

3. EXPERIMENT DESIGN SPECIFICATION

The proposed system is based on the research, discussed so far here we will firstly capture the hand sign/movement of the speechless people using the webcam. This can be done by doing programming in asp.net with vc++ and open cv which can be embedded easily in asp.net with vc++. To capture the hand sign of dumb people cv Capture From Cam function will be used in our programming language environment (which is asp.net with vc++ and opencv). Now after capturing the hand sign of the dumb people next step is to do the image preprocessing. The preprocessing of image includes the conversion of color space and image resolution [9]. The conversion of color space is performed right after video is captured by the webcam. Under this step we convert the color space RGB to HSV. To convert RGB to HSV cvCvtColor function is used which has three arguments first one is the source image second one is the destination image and the third argument is to define the pattern in which we have to change the video in this case this will be CV_BGR2HSV. Now after getting the video in the HSV it is very essential to define the skin color range according to the HSV video. For defining the skin color range the cvScalar function of opencv is used which has 4 arguments which will define the color value in integer number [10]. Now after defining the skin color range now in the video the part of the video which comes in the skin color range replace it with white pixels and replace the rest of the image with black pixels this is shown in figure 3. Then after preprocessing the next step is segmentation. In this step the area of interest from the video gets separated from the rest of the video in this we want only the hand as the area of interest in

the video so we draw a rectangle in the area of the hand by using the cvRectangle function of opencv [11]. After the image is being segmented then The proposed system use the image morphology algorithm to omit the noise from the image that results after segmentation .The noise means that while defining the skin color range of the system it may involves the background color that lies in the skin color range so the process of making this pixel black one is known as the omitting noise from the image. To find center of the captured gesture of the hand is needed to find out how many fingers are open or close using convex hull algorithm. The software engineering process can be viewed as spiral. Initially, system engineering defines the role of software and leads to software requirement analysis where the information domain, functions, behavior, performance, constraints and validation criteria for software are established. Moving inward along the spiral, we come to design and finally to coding. To develop computer software we spiral it in a long streamlines that decrease the level of abstraction on each turn [12].

A strategy for software testing may also be viewed in the context of the spiral. Unit testing begins at the vertex of the spiral and is focused on each unit of the software as implemented in source code. Testing progresses by moving outward along the spiral to integrate testing, where the focus is on the design and the making of the software architecture. Taking another turn on outward on the spiral we encounter validation against the software that has been constructed. Finally we arrive at system testing, where the software and other system elements are tested as a single unit [13]. The Sixth Sense prototype implements several applications that demonstrate the usefulness, viability and flexibility of the system.

The Sixth Sense device has a huge number of applications. The following are few of the applications Sense of Technology.

- (1) Check the time
- (2) Moving cursor
- (3) Drawing application
- (4) Zooming features
- (5) Take pictures

4. IMPLEMENTATION AND

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WINGS TO YOUR THOUGHTS.....

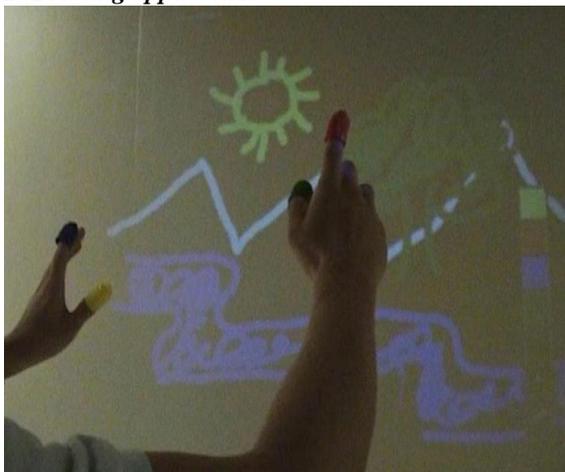
RESULT

1. Check the time



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 on the display.

2. Drawing application



The drawing application lets the user draw on display by tracking the fingertip movements of the user's index finger.

3. Zooming features



Zoom in and Zoom out the user can zoom in or zoom out using intuitive hand movements.

4. Take pictures



If we fashion our index fingers and thumbs into a square (the typical "framing" gesture), the system will snap a photo as much as we desire of.

5. CONCLUSION

The key here is that Sixth Sense recognizes the movement of the user's fingers. Display work as virtual display. Now it may change the way we interact with the real world and truly gives complete awareness to everyone. The key task here is that Sixth Sense recognizes the objects around you, displaying information automatically and letting you access the way you want it, in the simplest possible way. Clearly, this has the potential of becoming the ultimate "transparent" user interface for accessing information about everything around us. They can get rid of the colored finger caps and it ever goes beyond the initial development phase. But as we know, it

INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY

WINGS TO YOUR THOUGHTS.....

may change the way we interact with the real world and truly gives everyone complete awareness of the environment around us [1, 2]. This research includes activation of interior lighting by hand proximity, interior closures such as window control, exterior closures such as boot opening and driver identification by gesture for security and convenience features. Numerous techniques for non-contact hand gesture recognition are being developed and although most have technical issues, it is expected these challenges will be overcome within the next decade. The rate of introduction of any automotive gesture recognition system is more likely to be dictated by the rate of user acceptability and not the timing of technical issue resolution [14]. For some applications hand gesture recognition offers the possibility of substantial safety benefits, for other applications gesture recognition potentially offers increased ease of use, and perhaps even increases emotional pleasure while carrying out certain tasks such as opening or closing the driver's window. However, conflicting data on user acceptability for using hand gestures remains a challenge.

6. ADVANTAGES

[1] Sixth Sense is user friendly interface which integrates digital information into physical world and its objects, it stresses in making the entire world available in your computer [15].

[2] Sixth Sense does not change human habits but causes computer and other machines to adapt according to human needs.

[3] It uses hand gestures to interact with digital information.

[4] It supports multi-touch and multi-user interaction.

[5] Data access directly from machine in real time

[6] It is an open source and cost effective and we can mind map the idea anywhere.

[7] It is gesture-controlled wearable computing device that feeds our relevant information and into a computer display [16].

[8] The device could be used by anyone without even a basic knowledge of a keyboard or mouse.

[9] There is no need to carry a camera anymore, while going to holidays also doesn't require camera,

now onwards it will be easy for us to click photographs we can click photographs by merely using our fingers.

6. APPLICATION AREA OF GESTURE RECOGNITION

- 1) Sign language recognition.
- 2) For socially assistive robotics.
- 3) Directional indication through pointing.
- 4) Control through facial gestures.
- 5) Alternative computer interfaces.
- 6) Immersive game technology.
- 7) Virtual controllers.
- 8) Affective computing.
- 9) Remote control.

FUTURE WORK

Future research by the author will involve detailed studies to investigate potential increased safety and ease of use benefits together with user acceptability for a wide range of non-contact hand gesture human vehicle interaction applications.

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INTERNATIONAL JOURNAL FOR ADVANCE RESEARCH IN ENGINEERING AND TECHNOLOGY

WINGS TO YOUR THOUGHTS.....

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