

# Human Computer Interaction Based Control Over Home Appliances

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**Abstract:** With the recent advancement in science and technology, various techniques like voice controlled, android controlled, GSM controlled, Zigbee controlled are used to control home appliances. This paper applies the virtual reality projection technology to control and automate home appliance. Virtual Reality is a technique that uses motion sensor to control the home appliance with the aid of computer simulation that simulates physical presence of the object in the real or imaginary world. The operation performed using virtual reality illustrates the action of real-world environments using special stereoscopic displays on the computer screen. The environment is controlled and regulated using additional sensory information captured from the devices. The information emphasizes an action with real sound through speakers or headsets targeted towards witnesses. A projection device is an input device whereby the image of a virtual key can be projected onto the surface. It involves laser, an interference, the diffraction light intensity records and an illumination of the recording. Light is traced wherever needed and then key is pressed and the image is captured by wireless digital camera. Image is processed using MATLAB to perform a corresponding task.

**Index Terms:** Cloud computing, Data security, User behavior, Decoy technology, Fingerprint authentication, Face recognition.

## I. INTRODUCTION

Mostly the image processing techniques mainly deals with the image or video in 2D and then required image can be selected and processed by applying standard signal processing techniques. Computer graphics is also related to image processing. In that the images are being captured by cameras from natural scenes. Computer vision then tries to convert the physical contents of an image or a continuous group of images. board can be placed on a wall or floor stand. This can be used for any other settings. The projector and camera can be displayed on any setting.

## II. INTERACTIVE SYSTEM

An interactive whiteboard is a board which will be connected to the required computer for displaying the contents [1]. A projector will be displayed on the computer desktop and that will be placed on the board where the users control the computer by the devices like pen, finger, stylus, or other device. This



Fig.1 Projection and touch action on virtual image.

## III. OPERATION

An interactive whiteboard (IWB) device will act as an interface between the computer and USB cable and if necessary that can also be connected to the Bluetooth or a 2.4 GHz wireless. Nowadays it is also available in WEP and WPA/PSK security. When we install a driver on the computer then the whiteboard display will be treated like the mouse for the communication purposes. Then the projector is used to view the computer's video as an output through which the images can be viewed.

A pointer can be used by the user for checking the clarity of the obtained image. Once the pointer is used then it can directly communicate with the board itself and operation can be done like an ordinary mouse. The input is given in the form of text then the on screen keyboard or the handwriting can be implemented.

Thus, an IWB is capable of emulating the basic features of an interactive mouse and also effective keyboard. Software that provides tools and features specifically designed where supplied by most of the IWBs to increase interaction opportunities which generally let creates the environment like the normal and traditional classrooms. The virtual options like virtual flipcharts, protractor and rulers can be facilitated with the available setting option.

## IV. EXISTING SYSTEM

In the existing system we are using depth/multiple cameras [3]. The camera which is must be capable to obtain the accurate position between the finger and the projected surface. Due to the problems based on the screen size in the

**Revised Manuscript Received on December 22, 2018.**

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devices like mobile phones, laptops [6] can be overcome by the use of Pico projector. With the improvement in projection technology, a way to display the digital contents on everyday surfaces is easy and joyful with the embedded cameras in the mobile devices. Meanwhile, the other interactions like touch, gesture etc. on the projected display is thought to be alluring. So the next option which is to be noted is whether the touch is done over the projected item is effective.

The projector and a camera make up a three dimensional measurement system. In this field the concept of structured light will achieve the process to reconstruct the three dimensional view of an image. This can be done by analyzing the feedback image which is related to patterns that are projected on the object and this plays as a promising techniques. Due to this methodology the three dimensional image reconstruction's computational complexity will be high, and that in turn will greatly influence on the real-time capability of the system.

Thus a new method is proposed in which the technique of button distortions is developed and that detect the finger touch action on the screen [4] which serves as an advantage for this system. Here the input given to the system is skin (finger). For example, if a button is clicked by the finger, then the button shape will be changed in the camera's image plane (CIP). Furthermore, we explore the model of the button's deformation caused by the finger touch action, shows that there is a positive relation between the button's distortion and the finger height on the projected surface. The touch information from the finger [5] which is provided as input to this system, can be extracted from the button's distortion effect. We focus mainly on detecting the deformation of the buttons to determine the touch action on the projected surface [1].



Fig.5 Hardware implementation.

**SOFTWARE DESCRIPTION**

In this paper, MATLAB software is used. In this method to acquire an image from camera, the snapshot function is used. After acquiring the image to display the image on the MATLAB desktop show function is used and the colour image is converted into gray level image for levelling the uneven sections in the image like shadows. Followed by image subtraction, colour threshold detection technique is used to process a particular

Color in the image. The virtual image can be projected

wherever it is required [2] such as walls, tables, hands, etc.

Finally touch detection operation is performed on the place where the image is projected and it is found by using bounding area detection and number detection techniques.

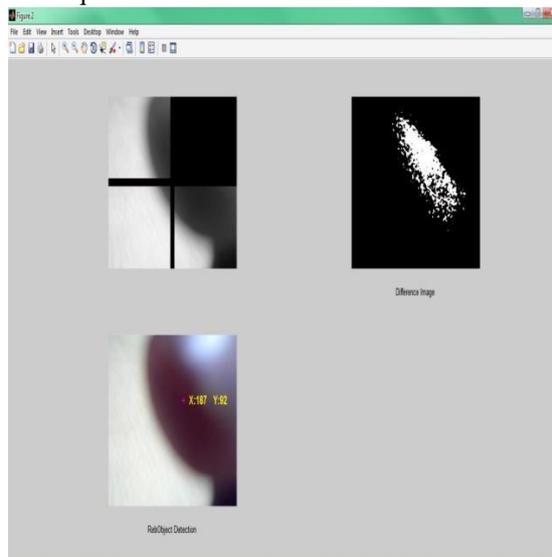


Fig.7 Coding displayed based on touch recognition.

**RESULT**

In this paper, we have obtained the virtual image using the projector-camera system. It is observed that the performance, reality and operations of the proposed method is better than that of existing method. The proposed system runs in real time and it can also generate higher quality results than previous existing finger touch detection method. Therefore these results clearly suggest that this virtual reality technique can be applied to operate all the home appliances.

**V. CONCLUSION**

Thus the virtual detection method was applied to control the home appliances using projectors and cameras. This method overcomes the drawbacks of bare finger touch detection method which is used only to operate mobile phones and laptops. This method of virtual projection will be veritably useful for the handicaps and the aged people to operate on all the devices in the home by staying in the same place. This method can be implemented in hospitals which will be very useful for the patients to operate the devices required without the help of others and industries, factories, apartments and so on.

In the future, this virtual projection method can be implemented everywhere to operate or handle all the devices.

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