Home Appliance Control in Virtual Reality by using Leapmotion

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***Abstract*-The term Leap motion module is basedon creating the tricks of magic. Nowadaysgames are the main function of virtual reality (VR).We proposed aLeap Motion somatosensory controlled switches for controllinga home appliances. Instead of switches we implemented a relay which is an electrically operated switch. When the input of sensing hands controls the Leap Motion somatosensory module the programming language sent the instruction codes to the pic controller which gave the signal to the relay switches. Therefore, a four-channel Leap Motion somatosensory controlled switching module has been implemented. For testing the module, the bulbs have been connected with the switching module. Consequently, the "ON" or "OFF" of LCD modules can be displayed by touching the virtual buttons on the screen.**

Keywords- Leap motion, Somatosensory, Bulbs, Relay, Fan, Pic, Virtual Reality.

I. INTRODUCTION

Leap motion is developed by MICHAEL DUCHWALD and DAVIDHOLZ. Leap motion control is based on the idea of magic. In a popular cars likeBMW's 7 series will feature gesture recognition to allow drivers to control its infotainment system with simple hand movements[1] .The Leap motion controller can be used to create a virtual touch surface in the air. By touching the space you can create virtual touch even on your screen. Leap motion is step forward it to thecomputer interaction. It is new idea of communication. It mainly used for disabled persons to control the home appliances. Consequently, it is very interest that a man can rules an appliances without any wearable devices or by touch the Switches in the modern life.Games are the main function of virtual reality (VR). This allows players to interact with games using motion and colour detection as well as sound through its built-in microphone array.Touch less user interface is a type of technology in relation to gesture control

II. METHOD

II.EXISTING SYSTEM:

User can control the electronic visual display through a touchscreen.A user can give inputthrough simple or multi-touch gestures by touching the screen with a special stylus one or more fingers. It enables the user to interact directly with what is displayed, rather than using a mouse, touchpad. Exact communication among users. Touchscreens are common in devices such as game consoles, personal computers. Demerits of a touchscreen is exactness, display screen will stained, when touch the screen with wet finger it will sense an electric shock. Kinect which is a motion sensing input device developed by Microsoft in the year 2010.Users can interact with Xbox without touching. It can control through a gesture and spoken commands. Some demerits of Kinect:- requires an additional power supply, lethargic feedback, does not recognize a body gesture and not follow a spoken command frequently.

III.PROPOSED SYSTEM:

Leap motion is the most affordable new mechanism. It is a sensing device joined with a computer via USB port. It can recognize a tiny movements also. It is 200 times more sensitive than existing technologies. Leap motion can rule a computer through a gesture by using fingers or pen. It has a powerful reorganization.It is more accurate than mouse and reliable as a keyboard. Leap motion can control a 3-D actions by using a finger and hand.

Figure 1. Leap motion device

Your interaction space is split into two zones. The HOVER zone and the TOUCH zone. TheHOVER zone is used for aiming and the touch zone is used for creating touchevent on the screen.Leapmotion somatosensory, sensor module is composed by 2 cameras to analyse, capture and detect the distance and position of human fingers. The capturing and detecting range of somatosensory sensor is adapted in leap motion that varies between 25-600mm.

Figure 2. Leap motion teardown

The Leap Motion Controller's range is limited to roughly 2 feet (60 cm) above the device.The co-ordinate system is the X, Y, Z system in traditional form. The unit of this sensors detecting position is represented in millimetres.

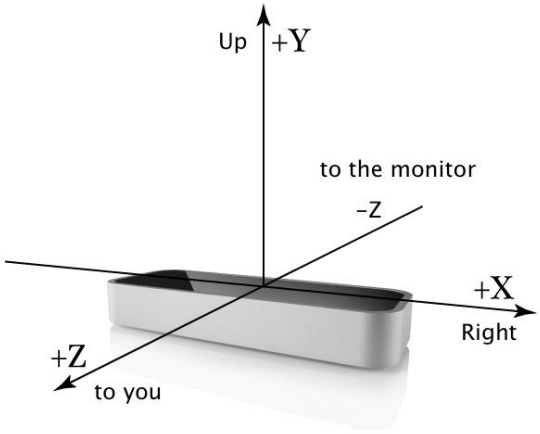

Figure 3. Coordinate system

Range is limited by LED light propagation through space, since it becomes much harder to interfere your hand's position in 3D beyond a certain distance. LED light intensity is ultimately limited by the maximum current that can be drawn over the USB connection. At this point, the device's USB controller reads the sensor data into its own local memory and performs any necessary resolution adjustments. This data is then streamed via USB to the Leap Motion tracking software.The data takes the form of a grayscale stereo image of the near-infrared light spectrum, separated into the left andright cameras. Typically, the only objects you will see are those directly illuminated by the Leap Motion Controller's LEDs. However, incandescent light bulbs, halogens, and daylight will also light up the scene in infrared. You might also notice thatcertain things, like cotton shirts, can appear white even though they are dark in the visible spectrum.The signal fromsomatosensory sensoradapted inleap motion was acquisitioned by programing language "C" in PIC controller. The PIC microcontroller PIC16F877A, which is one of the renowned microcontrollers. PIC controller is used here because flash memory technology is used. There are totally 40 pins and then 33 pins for input and output. It has many applications in digital electronic circuits.The signal of Leap Motion somatosensory sensor is received by the programming "PROCESSING" which has developed refinement software within the visual arts and visual literacy within technology. The device we used to capture gesture is leap motion.We are able to utilize the vector (including speed, position and so on) acquired by leap motion to do further visualization process. Working on the visualization of vectors captured by leap. Take gesture as input, and the whole working process is based on the transition from gesture to physical visualization. It is accomplished step by step, as the work flow chart shows in fig 4.

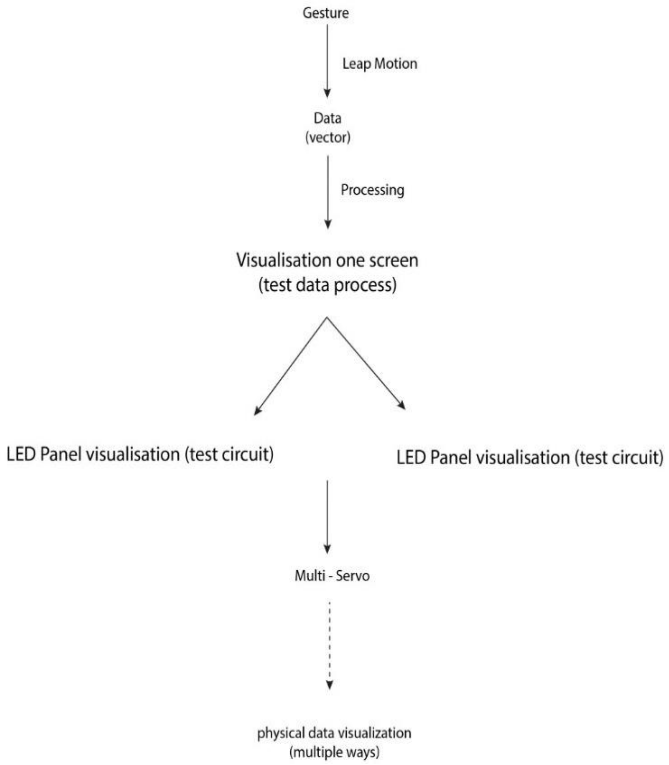

Figure 4.Work flow

The LED can be used to physically display the visual data from processor.This process is the way to turn data acquired by leap motion into physical movement. It is also the bridge of digital signal to physical actions.In order to convert the rotation of servo or motor, we have designed the physical installation of pulling balls by motor.The PIC16F877A is operating the main controller of this system. The frequency of crystal oscillator is 6 MHz .The bulbs is controlled depended on the "Open" or "Short" of the relays. The "Open" or "Short" of the relay were ruled the current flow (ON or OFF) of the input and output of the photo-isolated IC. In these module relayis operating the development board. It has 2 channel relay

switches that can be controlled by the inputs of standard logic level of the relay module.

V. RESULTS

The employment of the Home appliance Control in virtual reality by using leap motion in Fig.5. A Bulb and an electrical fan were controlled by the leap motion somatosensory controlled switches. The relay module is operated as electrical controlled switches which receives a signal from PIC16F877A that received the instructions were controlled by using leap motion somatosensory. The Bulb was employed to prove that this system can control other AC electrical appliances, if the users need to increase the operations of the AC electrical appliances.

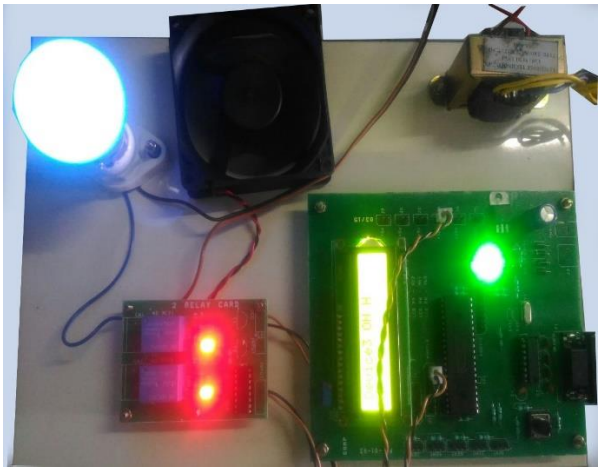

Figure.5.Home appliance Control in virtual reality by using leap motion

IV. DISCUSSIONS

The module supports the probability of the games that can be enlarged to the real-time applications.The light beams, water beams, and audio signals can be transmitted by the control of this module in VR. Therefore, the games will be more attractive than the actions of the game devices only in the VR. The mechanism is mainly used for disabled persons to control the light bulb, fan andother electrical appliances.The non-touch VR switches avert to the chances of infections which cause from the hands' touches of the switches in some places like hospitals, surgery operating room.The price of this system will be decreased bylots of production.The trend of using the somatosensory sensors havebeenpredicted to be famous in the forthcoming. Therefore, the modelmodule is a basic trail of the forthcoming evolutions.

VI. CONCLUSIONS

Leap motion somatosensory controlled switches was implemented to disabled persons to control the light bulb, fan and other electrical appliances. The employment of the bulbs control in VR by using leap motion somatosensory controlled switches in Fig.5. AHome appliance Control in virtual reality by using leap motion. The relay module was operated as an electrical controlled switches which received the signal from PIC16F877A that received the instructions thatwere controlled by using leap motion somatosensory.The module supports the probability of the games that can be enlarged to the real-time applications.The light beams, water beams, and audio signals can be transmitted by the control of this module in VR. Therefore, the games will be more attractive than theactions of the game devices in the VR.

VII. REFERENCES

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