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CONTROLLING MEDIA PLAYER USING ULTRASONIC SENSORS

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***Abstract*—In recent days the automation in the domain of robotics motivates the researchers to develop more flexible and simple operable machines. The aim of this project is to build a machine which can control laptop using ultrasonic sensors. In this we are using Arduino to interact between ultrasonic senor and laptop. In this system, a Human Machine Interface (HMI) system plays key role in exchanging the data between computer and human. The current design mainly involved with HMI system that is able to control the system applications such as volume offsetting, scroll vertical and horizontal, tab shifting etc., without using any mouse, keyboard, or joystick. The need for hardware components such as the keyboard and mouse can be drastically reduced with this hand gesture technique. Ultrasonic sensors use ultrasonic sound waves to measure the distance between a target item and then transform the reflected sound into an electrical signal. The main goal of the paper is to use Arduino and Ultrasonic sensors, as well as various Python packages, to enhance the precision and speed of the computer interface.**

***Index Terms*—Ultrasonic sensors , Arduino, Human Machine Interface(HMI) , Python**

I. INTRODUCTION

In day-to-day life, the human can interact with any real time object with five senses they are sight, hearing, smell, taste and touch. Since long time, the gesture recognition is one of the critical sections to sense in the physical world. Similarly, the communication between machines also was challenging tasks, which overcome with certain specified machine understandable languages. However, in recent days the Human Machine Interaction(HMI) is one of the biggest challenges in the field of automation.

There are several ways to face the HMI challenge. In the present work, hand gestures focused to control the system operations. There are many existing methods present to operate the system applications virtually. Speech recognition is one of the methods effectively used along with microphone and Arduino microcontroller to control the computer application. The traditional methods mouse, keypad, joystick, mic, accelerometer, and touch panel can also be used to control various computer applications. There are major demerits with existing techniques such as, the disable persons find it difficult to operate Human Computer operating systems. The existing systems limit the users to single point of place. Gadgets like keyboard and mouse need some supporting platform to place them and to interface with the computer. The complexity of traditional system design is difficult. The cost complexity of advanced gesture detection systems with camera is high. These problems can overcome with simple ultrasonic sensors in the existing controlling system. Therefore, instead of using keyboard, joystick, and mouse an ultrasonic sensor interfaced in the present work to control the computer applications.

In this project, a method based on sensor-based distance measurement and subsequent performance of a specific function is presented. According to client input, the solution is to use position of the hand to manage laptop apps. For speedy operation, a sensor device is mounted on a computer at the top of the screen, as shown in figure 1. A lot of functionality, including video control, music player, gaming, manipulating the features of a PDF reader, etc. uses real- time human computer interactions.

A physical device that tracks and recognises the body language or movements is always necessary for a gesture controller resolution so that the computer can interpret them. The distance of the hand can be determined using an ultrasonic sensor, which serves as an input. Depending on the hand's distance, a specific function is carried out. The solution is completed using Arduino and Python libraries.

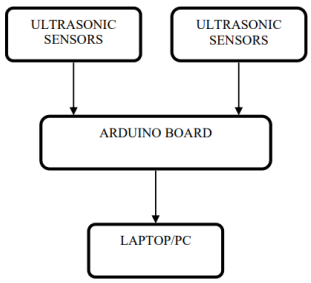

Fig. 1. Block diagram of ultrasonic based control system

The motion of the hand sensed with ultrasonic sensor HC-SR04 in the present work to execute the computer applications such as volume change, scroll up/down during a website and tab change and window change. The main advantage of ultrasonic sensor is there will be no sound noise interference present in voice based controlled systems. No external hardware is required to read and control some external peripherals. In this system, ultrasonic sensor directly interfaced with the computer. This methodology provides more flexibility and easy operation; even a nonprofessional can operate the HMI system. The traditional techniques can face problem to access the robot from hazardous places like fire extinguish robots.

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The laptop can be easily operated from small distances and up to the range of pre-programmed distances.

II. LITERATURE REVIEW

Sarita K. (2020) uses an approach that successfully trial the working of hand motion sensing system using sensors i.e., Ultrasonic sensors and finger contact sensors and implementing it to Arduino kits in wireless mode using radio frequency. This method presents one of the interpretations among various others, for operating a computer using hand motions. It is one of the simplest ways of interface between human beings and computers. It is a cost effective and resourceful model which is only based on Arduino UNO ARDUINO and python programming with wired ultrasonic sensor. In this technique ultrasonic sensors are used to sense hand motion gesture or of position of arm and conferring to situation action is accomplished on computer. It was observed that the performance of the system improved as the data set for training was improved. The python IDE allows a continuous incorporation with which it can be matched with most of the electronic devices, can be used for wide kinds of applications from medical care to leisure, exact sensing of various gestures etc

Ayushi B. (2020) presents a method based on determining distance by the sensor and therefore a particular function is executed. Some recognition means of the gestures are projected and then actions are recognized utilizing sensors. In order to control pc utilizing ultrasonic sensors, this technique named Leap motion is executed which facilitates us to control certain functions on our computer/Laptop by simply gesturing our hand in front of it. in view of this work, we will place two Ultrasonic sensors in addition to our monitor and will state the distance between the monitor and our hand utilizing Arduino, established this importance of distance we will execute certain actions. To complete actions on our computer we use the Python PyAutoGui library. The commands from Arduino are shipped to the computer through the sequential port. This data will be then read by python which is running on the computer and founded on the read data an operation will be performed. The incoming time-domain signals are buffered, and Fourier transform is used on them. The Arduino maybe connected to the PC/Laptop for powering the module and again for serial communication. The result concerning this operation is magnitude vectors that are spread equally over the spectral width. After each FFT vector is computed, it is further treated to decide the bandwidth of the signals, speed of gestures and motion discovery. The detected motions are then reformed to pc

commands. This object presents one of the effortless approaches of interaction between human and computer. It is an economical model which is only founded on Arduino UNO and ultrasonic sensors. The python IDE acknowledges a coherent integration with Arduino UNO in order to obtain diverse processing and regulating methods for establishing new gesture control solutions

Sung Ho C. (2021) reviewed a number of the studies associated with Hand Gesture Recognition applications using radars. Presently, the researchers depend closely on commercially available radars made with the aid of using tech corporations such as Novelda and Texas Instrument. With those structures being on chips, interest has been shifted to develop the motion detection and recognition algorithms. In current years, interest is transferring from signal-processing-based HGR algorithms to deep-learningbased algorithms. Although radar sensors provide numerous benefits over the other HGR sensors (i.e., wearable sensors and cameras), the adoption of radar-based HGR in our day by day lives are nonetheless lagging in the back of those competing technologies. This labeled the radars used for HGR as pulsed and continuous-wave radars, and both the hardware and the algorithmic information of every category is supplied in detail. Towards the end, advanced gadgets and applications based on motionrecognition through radar are discussed.

Abdelkader Bellbarbi (2014) have explored the method of Recognition of hand motions, and they have tried to present a method for the same based on the detection of colour markers. The main colours of the markers used are Red, Blue, Yellow and Green. These markers are attached on both the hands and then the various motions are tried such as Zoom, Move, Draw and Write on Virtual Keyboard. This enforced system provides a lot of versatile, natural and intuitive interaction prospects, associated additionally offers an economic and sensible means of interaction.

S. Lian, W. Hu and K. Wang, ”Automatic user state recognition for hand motion based low-cost television control system. This paper proposes an automatic user state recognition scheme to recognize the TV user’s state and activate the camera-based motion recognition module only when the user is trying to control the TV. Specifically, the user’s behaviour active or not is detected by low-cost sensors, the user’s gaze watching TV or not is tracked by the face-based view detection, and the user’s state is then decided according to a finite-state machine composed of four states: Absent, Other Action, Controlling, and Watching. The prototypes based on an ultrasonic distance sensor array, a red-green-blue (RGB) camera, and a

depth camera are implemented and tested. The results show that the proposed scheme can effectively reduce the power consumption or computational cost of the original hand motion based control schemes.

X. Gao, L. Shi and Q. Wang, ”The design of robotic wheelchair control system based on hand motion control for the disabled. This paper designed a control system for robotic wheelchair for the aged and the disabled, which consisted of two main parts: motion interaction and intelligent wheelchair. This design used the Kinect camera to develop the problem of hand motion segmentation and motion tracking.

Oudah, M.; Al-Naji, A.; Chahl, J. Hand motion based computer control Based on Computer Vision: A Review of Techniques. Hand motions are a type of nonverbal communication that can be employed in a variety of contexts, including medical applications, human-computer interface (HCI), robot control, and communication between deaf-mute individuals.

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Many diverse methodologies have been used in research publications based on hand motions, including computer vision and instrumented sensor technology.

Z. Meng, J. -S. Pan, K. -K. Tseng and W. Zheng, "Dominant Points Based Hand Finger Counting for Recognition under Skin Color Extraction in Hand Motion Control System. In this study, a novel method for recognising hand motions is proposed. This method counts the fingers on the hand using dominating spots under the extraction of skin tone. In order to obtain the hand motion contour, skin colour detection is employed as a preprocessing segmentation. In this hand motion control system, counting hand fingers is done using a dominating points- based technique following hand segmentation.

EXISTINGS METHODS

There are several techniques to control a computer utilising hand motion approach. Each method has its advantages and disadvantages. Let's look into different methods in brief. Numbered (ordered):

1) Controlling computer using color bands
   While using colour bands users use red, blue and green bands and put them to their fingers. So, while using this technique kinect sensor projects an infrared pattern of 307,200 dots in a 640 × 480 mesh and receives reflected pattern CMOS monochrome sensor. This structured light application permits the machine to estimate the intensity of every point using triangulation. Moreover, an RGB camera provides synchronised colour information for each point.
2) Controlling computer web cameras
   Using web camera technology, we need a projector which projects the display on a clear wall or any other plain surface. User can interact with the projected screen using his fingertips which are tracked in the air by the camera using 'camshaft' tracker. A related study of distinct methods of hand motion detection has been made. Here an efficient technique is employed to identify the hand motions which are transformed into relevant actions.
3) Controlling computer using IR sensors
   When we are working with IR sensors the user is equipped with a glove which was fitted with IR sensors that acts as a bridge between user and computer. The gloves are used to recognize the hand motions of the disabled people and convert those motions into meaningful messages in real time. With the amount of bend made by the fingers continuous data stream is obtained as output from Infrared (IR) sensor. IR sensors change the output voltage depending on the strength of the received signal. Change in bend is converted to change in the electrical voltage by IR sensors. The output from IR sensors is processed by a microcontroller and a corresponding message is displayed.
4) Limitations in existing system
   - Controlling the computer with hand motions using projectors is only used for gamming applications and this will not sense the objects exactly when the lighting was demonstrate that the fast and portable hand motion computers.
   - While controlling the system with hand motions using IR sensors, it is difficult to always bend the fingers and is expensive to buy IR sensors and also these sensors will not work in lighting.

So, we demonstrate the easy and cost-effective motion controlling of computer by using ultrasonic sensors instead of using IR sensors, color bands, web cameras, projectors. As ultrasonic sensors are portable to move, cost effective and easy to operate we implemented the project by using ultrasonic sensors. Hence it is easily affordable by anyone and also easy to operate with the hand just by waving in front of the sensors.

PROPOSED WORK

This project work introduces a technique based on determining distance by the sensor and accordingly a particular function is performed. Some recognition methods of the motions are proposed and then actions are recognized using sensor. We set up few mainstream methods based on the action recognition by the sensors. The sensor device is attached on computer at head of the screen, for quick operation. In this field much research work has been done but that work is related to hand recognition, real time finger recognition and recognition of alphabet characters. Real time human computer interactions using hand motion are also used for much functionality such as video control, music player, gaming, controlling the functions of PDF reader etc. All these interactions have real time motion recognition techniques. A motion controller resolution always requires a physical device which follows and recognizes the body languages or movements, so that the computer can clarify them. By using ultrasonic sensor, the distance of hand can be found which acts as an input. According to the distance of hand, particular function is performed.

III. METHODOLOGY

We have selected the hardware as well as software for this particular process due to the following reasons:-Flexibility is one of the main advantages of software system .hardware and the laptop is easily programmable using computer software. In aurdino based hand motion control laptop is an application that is related to physically demanding. To reduce the use of the keyboard hand motion technique gets used. They can work without taking keyboard actions or any physical touch. It is a mechatronic system that senses hand motions and places at desired actions. For detection of an object, infrared sensors are used which detect the presence of an object as the transmitter to the receiver path for an infrared sensor is interrupted by the placed object. As soon as hardware senses the presence of hand motion, it moves towards the actions, and finally place it on destination.

The circuit diagram of Arduino and the setup is quite simple.The trigger and echo pins of the first ultrasonic sensor are connected to two pins of Arduino board. For second ultrasonic

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sensor, the trigger pin and echo pin are also connected to two different pins. The ground pin is connected to the first GND pin, while VCC is connected to the Arduino- Uno board's 5V power pin for the left sensor. The trigger pin is then connected to pin 2 on the Arduino board, and the echo pin is lastly connected to pin 3. The VCC pin is connected to the 3.3V power pin for the right sensor, while the ground pin is connected to the second GND pin. Last but not least, we wire up the echo pin to pin 5 and the trigger pin to pin 4 on the Arduino board.

The Ultrasonic calculate the distance between the hand moments and the sensor and using the following information, the laptop/computer performs the task/operations. The information of distance from Arduino is collected by Python program. PyAutoGUI, a special library converts the data into keyboard click actions

HARDWARE COMPONENTS

Components Required

- Ultrasonic Sensors x 2
- Arduino UNO x 1
- USB Cable (for Arduino)
- Few Jumper Wires
- A Laptop with internet connection

Ultrasonic Sensors

In the real world, the ultrasonic sensors are used for interacting with robots, computers and other devices. This sensor senses the proximity and detects levels with high reliability as shown in figure 3.2.1. The ultrasonic sensor measures the distance to a particular object with the help of ultrasonic sound waves. Ultrasonic sensors make use transducer to send and receive ultrasonic pulses. High frequency sound waves reflect from boundaries to produce distinct echo patterns. Ultrasonic sensors work by emitting sound waves at a particular frequency. The transducer of the sensor acts as a microphone to receive and transmit the ultrasonic sound. The sensors determine the distance to a targeted object. The distance is determined by calculating time lapses between the sending and receiving of the ultrasonic pulse. It sends a 40KHz ultrasonic pulse that travels through the air. If there is an obstacle or an object, it will bounce back the signal towards the sensor. based on the time taken by the waves to travel and the speed of sound, the distance is computed.

Distance = (Speed of the waves × Time taken to travel)/2

The calculated distance is divided because the waves are first transmitted by the transmitter and then received by receiver

Arduino Uno

Arduino boards are based on microcontrollers, which are small programmable devices that can interact with various sensors, actuators, and other electronic components. The Arduino ecosystem offers a wide range of board models with different specifications and capabilities to suit different project requirements. These boards are equipped with digital and analog input/output pins that can be easily programmed to read sensor data or control actuators.

The Arduino Integrated Development Environment (IDE) provides a user-friendly interface for writing and uploading code to the Arduino board.Arduino board is powered by using a USB Cable from computer, etc. One of the key advantages of the Arduino platform is its extensive library support. Libraries are pre-written code modules that provide ready- to-use functions and algorithms, simplifying the development process. Figure shows the Arduino Uno board. There are specific dedicated pins such as

- Ground (GND) connection
- 3.3V and 5V Power Supply
- Analog Pins (A0 to A5)
- Digital Pins (Pin Number: 0 to 13)
- PWM Pin (Pin Number: 8)
- AREF (Pin Number: 9)
- Another point I want to make

Arduino Board has 14 input/output pins. Language used for programming the Arduino board could be C/C++. Arduino board also consists of Reset Button, that temporarily connects the reset pin to the ground and restart the code that is loaded on Arduino Board. Power LED Indicator is also integrated on the Arduino board. This LED will turn on whenever we plug the Arduino into a power source. TX and RX LED's are used during serial communication. TX and RX Pin are used for transmitting and receiving of data. The main IC on the board belongs to the AT Mega family, 328 AT Mega IC.

IV. IMPLEMENTATION

The current overall design is classified into parts. One is hardware and the second one is software. The hardware section contains Laptop, Arduino Uno Microcontroller, and an Ultrasonic senor. Similarly, in the software section Arduino IDE and Python IDE with PyAutoGUI module are used to control the data communication. The basic working of detecting hand motions is depending on the ultrasound sensors as shown in figure 4. At a specified distance of hand, the sensor will detect the hand and allows to functions as per the user requirement. At the specified distance, the motion of the hands will recognize by the webcam inbuilt in the laptop. The position of the hand will converted into respective keywords. The respective keywords decoded from the position of the hand will sent to windows.

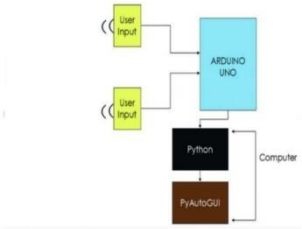

Fig. 2. Working of proposed system

At the background, the python script used to process the keywords. Based on these keywords the corresponding virtual functions of hot keys will implement in the operating system.

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Then the activation of the virtual function further activates the applications such as media player, browser, etc. From the above figure 4, it is observed that two ultrasonic sensors are interfaced with the Arduino Uno board GPIO pins. The Arduino board connected with the

Laptop through USB port. The ultrasonic sensors have two sensors, one is acts as a transmitter and the second one is a receiver. The transmitter emits ultrasonic waves and travels until it bombards with the user hands. When the ultrasonic waves hit a surface of user hand and the reflected waves travelled back and received by the receiver part of the sensor. The time gap between transmission and receiving calculated to measure the distance of hand in front of the laptop.

The operating system of the computer is not able to recognize the commands produced by the Arduino. Therefore, a background program is written in python to detect the Arduino codes and produces the respective virtual hotkeys to run the applications. Python programming decode the virtual keystrokes and respective hotkeys pre-programmed to execute the computer applications.. The reliability and response time do optimized with multiple sensor nodes. When multiple sensors are interfaced with the microcontroller then there exists an array of parameters with which multiple number of motions can be recognised. The processor may not be ready to receive multiple parameters at a time. In that case a digital pipeline can propose to synchronize the speed between sensor node and processor.

V. WORKING PRINCIPLE

This is based on specifying position of the hand from the ultrasonic sensor. For processing the raw data, a microcontroller is essential, for that we use Arduino UNO board. Via USB connection the micro-controller transfers the processed and calculated distance value which is provided by the sensor. The data which is sent by the sensor is processed in the software in PC where all the calculations are performed and the data is matched with the predefined conditions. In this model two ultrasonic sensors are used to detect position of the hand and are connected to the Arduino board. As we know ultrasonic sensor continuously emits sound and it gets reflected back from user's hand, as shown in the figure 5. The distance between the sounds is sent and detection of reflected back sound wave is calculated by the micro-controller.

FLOWCHART

The process outlined above is intended to be used for the entire procedure, which also involves text-to-sign language translation. This is a recurring procedure that continues until we manually stop it. Figure 5.1 explains the working of the hand motion based computer control

VI. RESULT ANALYSIS

6.1 INPUT This step is the first and most important step which includes the process of providing hand motions to the receiver. The receiver here refers to the two Ultrasonic sensors attached on the top of the screen side by side. There are various

Fig. 3. Work flow process

instructions which can be provided for the automation. Some of them can be as follows:

- Instruction 1: By keeping both the hands at a distance away and in front of the sensor, the video can be played/paused.
- Instruction 2: Video can be forwarded one step by keeping the hand at a particular far distance from the right sensor.
- Instruction 3: Video can be rewind one step by keeping the hand at a particular far distance from the left sensor.
- Instruction 4: Video can be fast-forwarded by moving the hand from a particular near distance towards the right sensor and vice versa can cause rewind of the video.
- Instruction 5: Volume can be raised by moving the hand from a particular near distance toward the left sensor and vice versa can cause a reduction in the volume of the video.

The following table 6.1 displays the hotkeys and their corresponding functions that are executed in the current project

Hotkeys	Functions
Space * 0.2	Play / Pause
Ctrl + left	Rewind
Ctrl + right	Forward
Ctrl + down	Volume up
Ctrl + up	Volume down
Ctrl + X	Next

PyAutoGUI Function and Output

The input to the Python program is collected through the pySerial and specific operation is performed. These operations can be controlling the keyboard, mouse cursor, etc., with the help of PyAutoGUI module. According to the specified operation given as input by Arduino through pySerial, particular hotkeys combination of a keyboard can also be automated. The

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output can be obtained on a real-time basis on the computer screen.

The outputs can be as following:

- Play/pause the video
- Change in volume
- Video forward
- Video rewind

OUTPUT AND RESULT

Forward, backward, volume up, volume down, next video, previous video, and finally play/pause are fundamental activities for most video players such as Windows media player, VLC, and others. The same kind of functionalities are used to control any audio players and also this can be used to control YouTube opened on a web browser

1) Implementation of Forward Operation:

Here in the below figure 6.2(a) the forward operation for a video will be performed, whenever the object is placed in front of right sensor and in the range specified in the Arduino programming the forward operation for the video will be performed. Here in the below figure the numbers which are appearing on the bottom of the screen represent the time of forwarding the video. The next video operation is also similar to this but the range is little different.

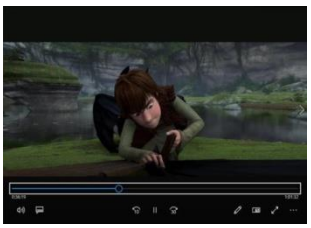

Fig. 4. Forwarding the video using hand gesture

2) Implementation of Backward Operation:

Here in the below figure the backward operation for a video will be performed, whenever the object is placed in front of left sensor and in the range specified in the Arduino programming the backward operation for the video will be performed. Here in the below figure the numbers which are appearing on the bottom of the screen represent the time of the video. The previous video operation is also similar to this but the range is little different.

Fig. 5. Rewinding the video using hand gesture

3) Implementation of Volume Up Operation:

Here in the below figure the volume up operation for a video will be performed, whenever the object is placed in front of right sensor and in the specified range of Arduino programming the volume up operation for the video will be performed. Here in the below figure the numbers which are appearing on the bottom of the screen represent the time of the video.

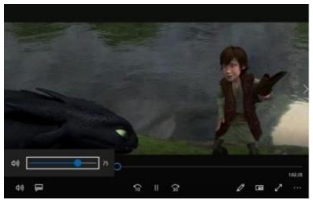

Fig. 6. Increasing volume of video using hand gesture

4) Implementation of Volume Down Operation:

Here in the below figure the volume down operation for a video will be performed, whenever the object is placed in front of left sensor and in the specified range of Arduino programming the volume down operation for the video will be performed. Here in the below figure the numbers which are appearing on the bottom of the screen represent the time of the video

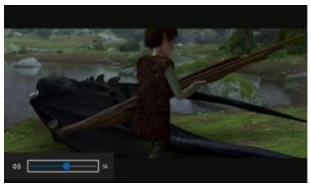

Fig. 7. Decreasing volume of video using hand gesture

5) Implementation of Play/Pause Operation:

Here in the below figure the play/pause operation for a video will be performed, whenever the object is placed in front of both sensors and in the specified range of Arduino programming the volume down operation for the video will be performed. Here in the below figure, you can clearly observe that the video is paused. Similarly, to play the video we keep object in front of both the sensors in specified range

Fig. 8. Pausing of video using hand gesture

Immersive gaming technology: Hand motion may be used to control interactions with the gaming console and give a more interactive and immersive experience. Control through facial motions: This technology can be used for applications with even more precision like recognizing face motion. This will be helpful in situations when users cannot use other input

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interfaces like mouse or keyboard or even hand motions. This would be additionally helpful in applications like mood sensing. Alternative computer interfaces: Strong motion recognition can be used to accomplish common tasks performed traditionally with the current input devices such as mouse or keyboard. Motions, along with other methodologies like speech recognition can be made to control the electronic appliances and gadgets completely or with little need to type or touch.

Remote control: By using motion recognition, it is possible to use hand alone as a remote control for various devices. The signal must not only indicate the desired response, but also which device to be controlled. Home Appliances control: It is possible to extend the motion recognition technology to control the household appliances

CONCLUSION

In the present work an efficient hand motion based computer control using ultrasonic sensors is designed with the help of Arduino microcontroller ATMEGA32. The position of the hand is recognised effectively with ultrasonic sensors and the respective hotkeys activated to implement the computer applications such as scroll, volume adjustment, window change, stop, and tab changes in the browser. It is proved that no additional hardware is required to detect position of the hand and proved that simple inexpensive ultrasonic sensors can be used to find different ranges to recognize position of the hand.

This project presents one of the best solutions among others, for operating a computer using hand motions. It is one of the easiest ways of interaction between humans and computers. It is a cost-effective model which is only based on Arduino UNO and ultrasonic sensor. The python IDE allows seamless integration with Arduino UNO to achieve different processing and controlling methods for creating new motion control solutions. Using this method, we can perform almost any basic functions and also keyboard shortcuts easily and efficiently. We may use this process to develop our own code for whatever operation we want to execute.

The gadget can be used more safely and quickly by employing appropriate gestures, like hand swipes or using a finger as a virtual mouse. We have demonstrated how we can use an Arduino and ultrasonic sensors to play more compact games with hand gestures. Here, sensors are used to gauge the separation between our hand and the sensors. With the aid of the Arduino IDE, we can programme the Arduino board to carry out a number of tasks based on that distance. Hand gestures can be utilised to control the keyboard using the Python library pyautogui. In the future, we plan to use high-performance and high-quality sensors to play big games using the same strategy.

FUTURE SCOPE

We aimed to provide motions for practically all areas of Human Computer Interactions in this project, including system functionality, application activation, and access to famous websites. We'd like to increase the precision even more in the future, and add additional motions so that we may implement more functionalities.

Finally, we want to broaden our domain scenarios and include our tracking system into a range of hardware, such as digital television and mobile devices. We also want to make this process accessible to a wider group of people, including handicapped people.

Using this people can handle applications from a distance without even touching it. But there are many applications which cannot be controlled using hand motions as an input. This technique can be very helpful for physically challenged people because they can figure out the motion according to their need. The present system which we have designed although seems to be user friendly.

This technology is useful in processing information from human beings that is not conveyed through speech or other methods. It is useful in following areas: Immersive gaming technology: Hand motion may be used to control interactions with the gaming console and give a more interactive and immersive experience.

Control through facial motions: This technology can be used for applications with even more precision like recognizing face motion. This will be helpful in situations when users cannot use other input interfaces like mouse or keyboard or even hand motions. This would be additionally helpful in applications like mood sensing.

Alternative computer interfaces: Strong motion recognition can be used to accomplish common tasks performed traditionally with the current input devices such as mouse or keyboard. Motions, along with other methodologies like speech recognition can be made to control the electronic appliances and gadgets completely or with little need to type or touch.

Remote control: By using motion recognition, it is possible to use hand alone as a remote control for various devices. The signal must not only indicate the desired response, but also which device to be controlled.

Home Appliances control: It is possible to extend the motion recognition technology to control the household appliances

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