NEW HORIZON
COLLEGE OF ENGINEERING

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GESTURE CONTROLLING COMPUTER USING ULTRASONIC SENSOR

A MINI PROJECT

REPORT

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CERTIFICATE

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The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide HOD ECE

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Abstract

Nowadays gesture controlled systems such as Xbox are getting very famous.HP released a laptop –'envy 17' which makes use of a special technique that allows one to gesture control the system applications.This technique is called Leap motion which enables us to control certain functions on our Laptop by simply waving our hand in front of it.There is also a device called leap motion controller which can be plugged into your system and enables gesture controlling, but these laptops and devices are priced very high.So in this project we try to build our own cheaper version of Gesture control Laptop by combining the power of Arduino and Python.We will use two Ultrasonic sensors to determine the position of our hand and control an application based on the position.Arduino is used for connecting the sensor and laptop while python is used to develop the gesture control.

The older Xbox versions used Kinect gestures to gesture control certain commands but was later removed as it had little uses in gaming areas that weighed over the cost of producing such a system.Leap motion controller by 'Ultraleap' allows us to use gesture control in most laptops but is too costly.HP released a laptop with inbuilt leap motion sensor but it is only one such laptop and its price exceeds its uses.There are however few cheaper versions of gesture sensors and distance sensors but those are not optimised and requires harder set-ups to work efficiently.In order to reduce the cost a simple ultrasonic distance measuring sensor is used to recognise the gestures.The ultrasonic sensor will be connected to the laptop with the help of Arduino Uno microcontroller using a USB cable and programmed accordingly to read the data from the sensor.A serial communication is to be established with the Arduino and certain keyboard actions.For this we use python after installing the PyAutoGUI module.When certain actions are done in front of the sensor the respective keyboard actions are triggered.

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CHAPTER 1- INTRODUCTION

In order to control pc using ultrasonic sensors, this technique is called Leap motion which enables us to control certain functions on our computer/Laptop by simply waving our hand in front of it. It is very cool and fun to do it, but these laptops are really priced very high. So in this work let us try building our own Gesture Control Laptop/Computer by combining the power of Arduino and Python. We will use two Ultrasonic sensors to determine the position of our hand and control a media player based on the position. We have used this for demonstration, but once we have understood the work, we can do anything by just changing few lines of code and control our favourite application in our favourite way. The concept behind this work is very simple. We will place two Ultrasonic sensors on top of our monitor and will read the distance between the monitor and our hand using Arduino, based on this value of distance we will perform certain actions. To perform actions on our computer we use Python Pyautogui library. The commands from Arduino are sent to the computer through serial port. This data will be then read by python which is running on the computer and based on the read data an action will be performed. The incoming time-domain signals are buffered, and Fourier transform is applied on them. The Arduino can be connected to the PC/Laptop for powering the module and also for serial communication. The result of this operation is magnitude vectors that are spread equally over the spectral width. After each FFT vector is computed, it is further processed to determine the bandwidth of the signals, speed of gestures and motion detection. The detected motions are then converted to pc commands.

These days motion controlled frameworks such as Xbox are getting exceptionally famous.HP discharged a tablet –'envy 17' which makes utilize of a extraordinary method that permits one to motion control the framework applications.This strategy is called Jump movement which

empowers us to control certain capacities on our Tablet by basically waving our hand before it.There is additionally a gadget called jump movement controller which can be stopped into your framework and empowers motion controlling, but these portable workstations and gadgets are estimated exceptionally high.So in this extend we attempt to construct our possess cheaper form of Motion control Tablet by combining the control of Arduino and Python.We will utilize two Ultrasonic sensors to decide the position of our hand and control an application based on the position.Arduino is utilized for interfacing the sensor and tablet whereas python is utilized to create the motion control.

The more seasoned Xbox forms utilized Kinect signals to motion control certain commands but was afterward evacuated because it had small employments in gaming zones that weighed over the taken a toll of creating such a system.Leap movement controller by 'Ultraleap' permits us to utilize motion control in most portable workstations but is as well costly.HP discharged a portable workstation with inbuilt jump movement sensor but it is as it were one such portable workstation and its cost surpasses its uses.There are be that as it may few cheaper adaptations of motion sensors and separate sensors but those are not upgraded and requires harder set-ups to work efficiently.In arrange to diminish the fetched a straightforward ultrasonic separate measuring sensor is utilized to perceive the gestures.The ultrasonic sensor will be associated to the portable workstation with the assistance of Arduino Uno microcontroller employing a USB cable and modified in like manner to studied the information from the sensor.A serial communication is to be set up with the Arduino and certain console actions.For this we utilize python after introducing the PyAutoGUI.

Chapter 2- Literature review

2.1 Smart Home Automation

(by VS Gunge, PS Yalagi 2016)

The technology development is paving way for the automation to be made to the existing machines leading to the new technology called Internet of Things. Things get connected with each other over Internet that reduces human workload. The home is built with electrical devices for comfortable living style. But, the devices are operated manually in the home. The devices are in running state even users left the home with unaware of the electrical devices status. Hence, users should come back to the home to stop the devices. It leads to wastage of human energy, electrical energy and devices life time. This paper is proposed to implement the smart home automation that controls the devices such as fan, lamp and motor from remote location over the network. The experiments have been conducted to implement the automation using Arduino Uno controller that interfaces Ethernet shield and operates the devices using web, android applications through smart phone, laptop. This research work is proposed to reduce human workload and reduce the electricity consumption.

2.2 Computer vision based mouse control

(by Faiz Khan, Basit Halim, Asifur Rahman 2020)

There have been a lot of developments towards the Humans Computers Interaction (HCI). Many modules have been developed to help the physical world interact with the digital world. Here, the proposed paper serves to be a new approach for controlling mouse movement using Colored object and marker motion tracking. The project mainly aims at mouse cursor movements and click events based on the object detection and marker identification. The software is developed in Python Language and OpenCV and PyAutoGUI for mouse functions. We have used colored object to perform actions such as movement of mouse and click events. This method mainly focuses on the use of a Web Camera to develop a virtual human computer interaction device in a cost effective manner.

2.3 Accurate ranging of multiple objects using ultrasonic sensor

(by Koenraad Audenaert, Herbert Peremans, Y Kawahara, Jan Van Campenhout 1992)

The authors propose a measurement setup consisting of a number of ultrasonic sensors used in parallel to perform triangulation measurements. The sensor system is based on two ideas. The first idea was to

use signal processing techniques borrowed from existing radar and sonar systems. This allows the accurate determination of the position of multiple objects. Processing data in real time demands a fairly powerful processing system. The second idea was to assign a microprocessor to each transducer. To support the use of multiple sensors in the final measurement setup, transputers were used as processing elements as they offer easy scalability because of their serial links. This sensor measured the distance to multiple objects very accurately and with a resolution of 2 cm. It is shown that these techniques could be implemented in a cost-effective manner

Chapter 3 - Existing System

3.1 Gesture Control system (By Panu Korpipaa, Juha Kela, Jani Mantyjarvi, Heikki Keranen, Tapani Rantakokko, Esko Juhani Malm, Sanna Kallio, Jussi Holopainen, Jari Kangas, Samuli Silanto)

A control scheme focused on the use of gestures and the working of mobile terminals in particular. The gesture control device is equipped with a general-purpose interface to control its application commands . A training programme includes the processing software of the gesture signals, qualified free-form gestures made by the user stored in the gesture library, and a recognising programme .Therefore, gestures can be used as commands to control any application that is configured or programmed to receive the command. In different models of mobile terminals, one and the same application functions without matching, and in a certain mobile terminal, all applications that use the specified interface commands can be executed. The programme may be a game or an operation that is included in the basic mobile terminal implementation.The innovation relates to a control system centred on the use and functioning of gestures, especially in mobile terminals. The innovation also refers to a handheld terminal composed of gesture control device applications.A gesture control system means a system by which the management of an application, which can be experienced through the senses, takes place at least in part by means of hand gestures. The control system consists of motion sensors, which travel along with the hand of an individual using the software, as well as converters and processing programmes for motion sensor generated signals.The hand movements, or gestures, are then recognised on the basis of, for example, accelerations that occur in the movements. For example, a game loaded into a mobile terminal or the control programme of an external electromechanical system might be an application controlled by gestures. The "application" means both an observable process and a programme that specifically realises the process in this definition and the statements.The goal of the innovation is to reduce these prior art-related drawbacks and to expand the implementation environment of gesture control systems to mobile terminals. An invention-based device is a gesture control system consisting of a sensor unit with motion sensors to be held in the hand of a user, a sensor data processing software and an interface programme between that processing software and a controllable application, the processing software. This interface software consists of a trainer to create gesture models and a recognizer to recognise gestures during the application's use, forming a

general purpose interface to get the application's specified commands and provide the application with specified responses. According to the invention, a mobile terminal contains a control system to handle an application running through movements in the mobile terminal, a control system with data processing software obtained from motion sensors

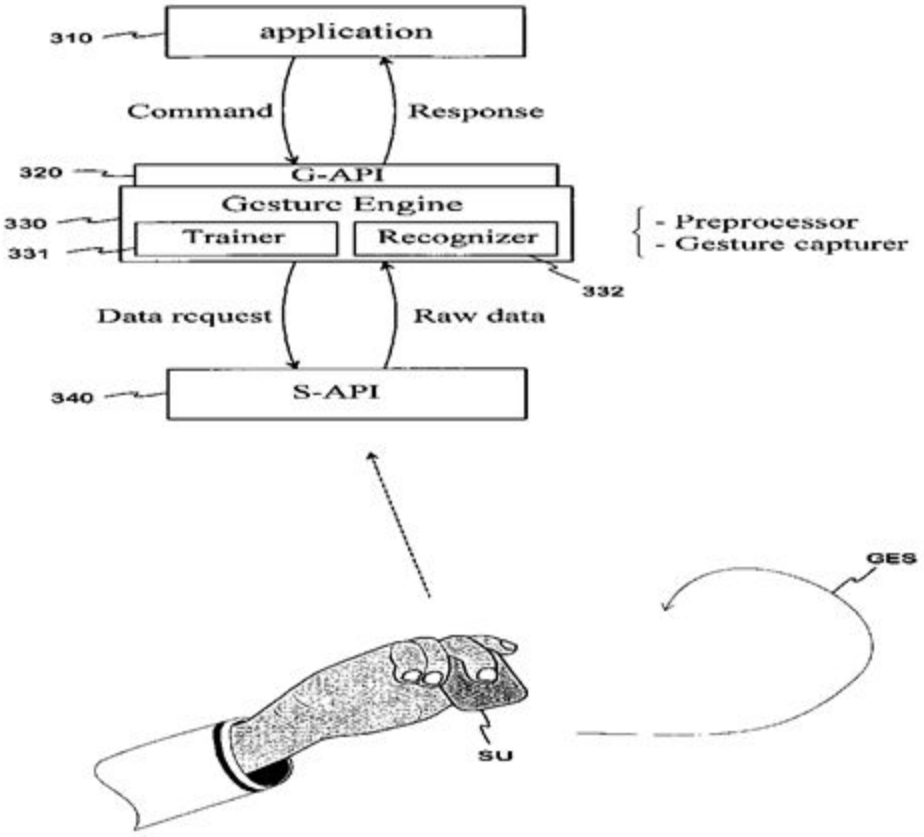

fig 3.1.1

3.2 **Gesture recognition system** (By Nobuo Higaki, Yuichi Yoshida, Kikuo Fujimura)

A scheme for identifying movements produced by a moving subject is given by the present invention. The device consists of a sound detector for sound detection, one or more image sensors for the capture of an image of a moving subject, a human recognizer for the recognition of a human being from the image captured by one or more image sensors, and a gesture recognizer for the recognition of a human being's gesture, triggered when the human voice is detected by the sound detector.

The device requires a hand recognizer for the identification of a human hand in a desired embodiment. The gesture recognizer accepts a human gesture based on the hand movement defined by the hand recognizer. In addition, the device can include a voice recognizer that recognises the human voice and decides words from the sound detector's human voice input. The gesture recognizer

is triggered when one of a multitude of predetermined keywords such as "hello!" , "goodbye" and "move" is recognised by the voice recognizer.The latest invention concerns a computer system for the recognition of human gestures, specifically a system for the recognition of gestures adapted for integration into a bipedal robot. A computer given on the back of the robot controls the movement of the legs, thighs, and the trunk of the robot so that it follows target ZMP (Zero Moment Point) at which point a horizontal moment that is produced by the ground reaction force is zero. The robot is supposed to understand a human being's gestures so that a person can give the robot instructions by gesture. More generally, without dramatically raising the workload of the computer system, it is required that human movements be recognised by a computer system as input to the computer system.A scheme for identifying movements produced by a moving subject is given by the present invention. The device consists of a sound detector for detecting sound, one or more image sensors for capturing an image of the moving subject, a human recognizer for recognising a human being from the image captured by one or more image sensors, and a gesture recognizer for recognising a gesture of human being captured by the sound detector when the human voice is detected. The device requires a hand recognizer for the identification of a human hand in a desired embodiment. The gesture recognizer accepts a human gesture based on the hand movement defined by the hand recognizer. In addition, the device can include a voice recognizer that recognises the human voice and decides words from the sound detector's human voice input. The gesture recognizer is triggered when one of a multitude of predetermined keywords such as "hello!" ,"goodbye" and "move" is recognised by the voice recognizer. In a chosen embodiment, by deciding the portion that displays a significant difference of positions in a set of images collected by the image sensors, the hand recognizer recognises a hand.

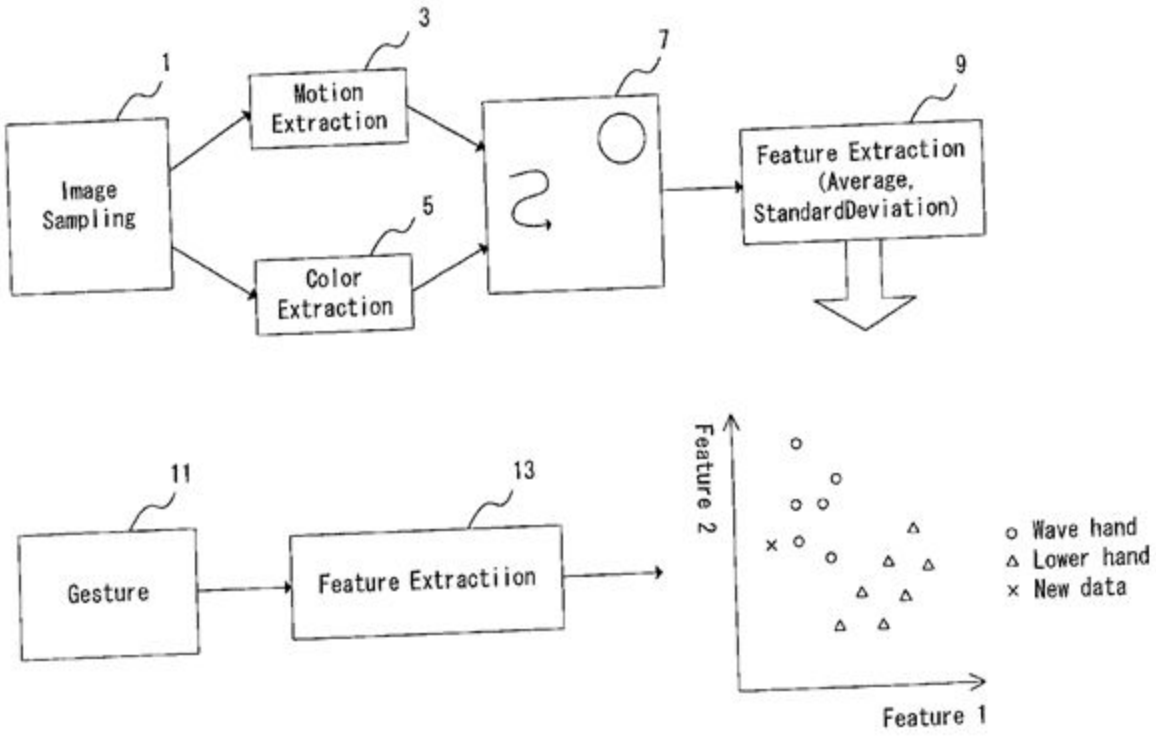

fig 3.2.1

3.3 Apparatus and method for controlling an electronic device with user action

(By Hisashi kazama, kazunori Onoguchi, Mayummi Yuaza, Kazuhiro Fukai)

An input unit for a device's power. The input unit first decides if the computer is being actively controlled by a customer. The input unit then decides if the user is performing an act that corresponds to a command if such a detection is made. A user observing the device, approaching the device, facing the device, or speaking can imply user attention. Touch, gesture, voice, or line of sight may indicate an input order.The present invention is concerned with an input apparatus and a system. The new innovation, in particular, enables a user to simply control home and office equipment via visual line input or gesture input.An input system using the visual line, tone, or gesture of the user enables the user to simply operate electronic home equipment. This type of input apparatus will be used at home and in the workplace in the near future. The input indication in this type of input apparatus is a simple user behaviour.For example, the visual line of the user can monitor the computer's display scroll or shift the cursor automatically to the location the user is viewing on the display.A computer can monitor the area observed by the user (or watching point), some cameras use a user's watching point for control. A user watches a selected feature icon in the viewfinder in an apparatus for selecting

operational features through a visual line to turn the selected feature on and off. A camera focuses on the point where the user watches.The aim of the present invention is to provide the user with an input device and a method to simply specify the equipment to be enabled and to input an indication signal by means of a simple user action.According to the present invention, an input apparatus for the detection of the user's behaviour and for the output of the operation corresponding to the action is given, consisting of: attention degree detection means for the detection of the user's attention status for the operation object in accordance with the user's first action; action indication detection means for the detection of the user's action indication for the operation object in accordance with the user's first action; In the case of detecting the user's attention status, operation output means the output operation corresponding to the action indication.

3.4 **Gesture-based computer interface** (By Senthil kumar, Jakub Segen)

A framework and method for manipulating virtual objects in a virtual environment, for drawing curves and ribbons in a virtual environment, and for selecting and executing commands using intuitive hand movements and motions to create, erase, transfer, alter, and resize virtual objects in a virtual environment. A monitor for viewing the virtual world and a video gesture recognition subsystem are given for the device to recognise the movements and gestures of the hand of a user. The framework allows the user, by presenting unique predefined hand gestures and/or hand motions to the video gesture recognition subsystem, to control virtual objects, draw free-form curves and ribbons and to invoke different command sets and commands in the virtual setting.This invention relates to a system and apparatus *for using hand movements to input commands to a device. More precisely, the present innovation relates to a computer interface based on video in which the hand gestures and hand movements of a user are used to manipulate virtual objects, to select different commands, and in a virtual computer environment to draw three-dimensional curves and surfaces.*For inputting commands to a computer, different forms of computer control and interface devices exist. For example, such devices may take the form of a computer mouse, joystick or trackball, in which a user manipulates the interface device to perform a specific operation, such as selecting a particular entry from an options menu, performing a "click" or "point" function, etc.The present innovation provides a device and method for manipulating virtual objects in a virtual environment, drawing curves and ribbons in a virtual environment, and selecting and executing commands to use intuitive hand movements and motions to create, erase, transfer, modify, and resize virtual objects in a virtual environment. The system includes a control unit to control the system's operation, a display to display a user's virtual environment, and a video gesture recognition ('VGR') subsystem to recognise and interpret the user's hand movements and gestures within an identification zone controlled by the VGR subsystem.In one of several different selectable modes of service, the imaginative scheme runs. By presenting an activation gesture to the VGR subsystem, the user

may select a specific mode for the device to cause the control unit to display a main menu with multiple menu commands corresponding to different system modes. In order to recognise a specific desired command from the main menu, the user will then present a selection gesture and then repeat the activation gesture to trigger the control unit to execute the selected command. A gripper mode, a drawing mode, an object mode, a view mode and a transparent mode are the modes of operation.

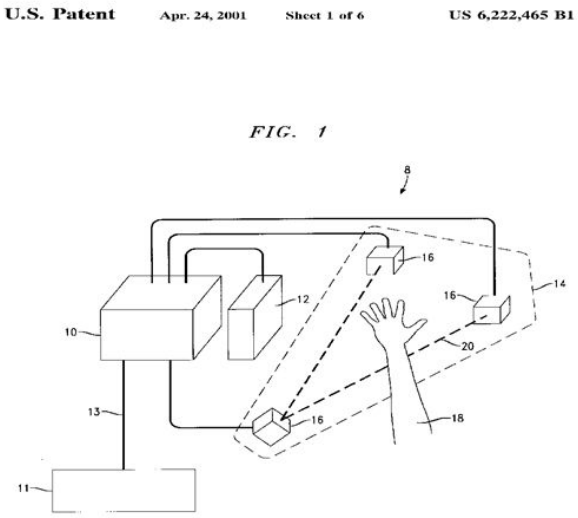

fig 3.4.1

Chapter 4 – Proposed System

In order to reduce the cost a simple ultrasonic distance measuring sensor is used to recognise the gestures.The ultrasonic sensor will be connected to the laptop with the help of Arduino Uno microcontroller using a USB cable and programmed accordingly to read the data from the sensor.A serial communication is to be established with the Arduino and certain keyboard actions.For this we use python after installing the PyAutoGUI module.When certain actions are done in front of the sensor the respective keyboard actions are triggered.

4.1 Block Diagram

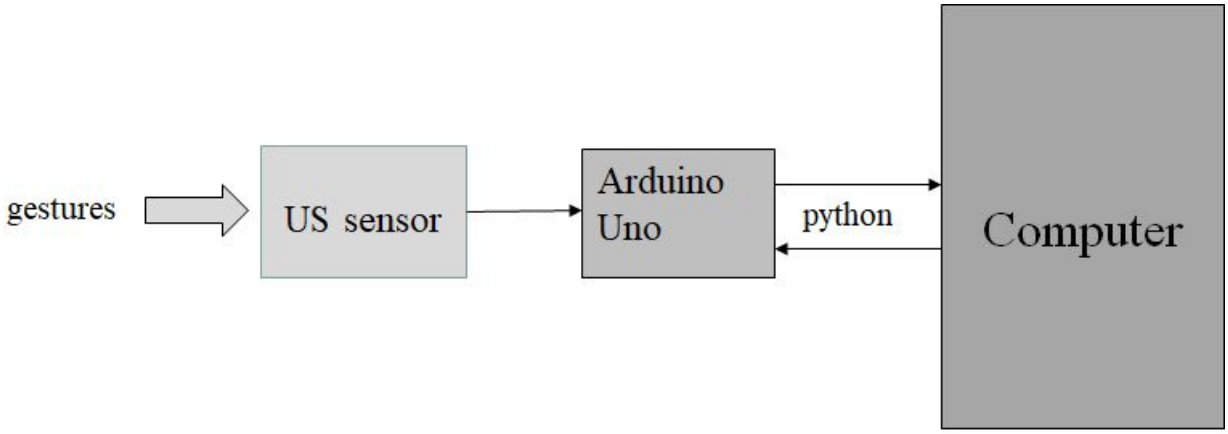

Figure 4.1: *Block Diagram of the proposed system*

4.2-Circuit diagram

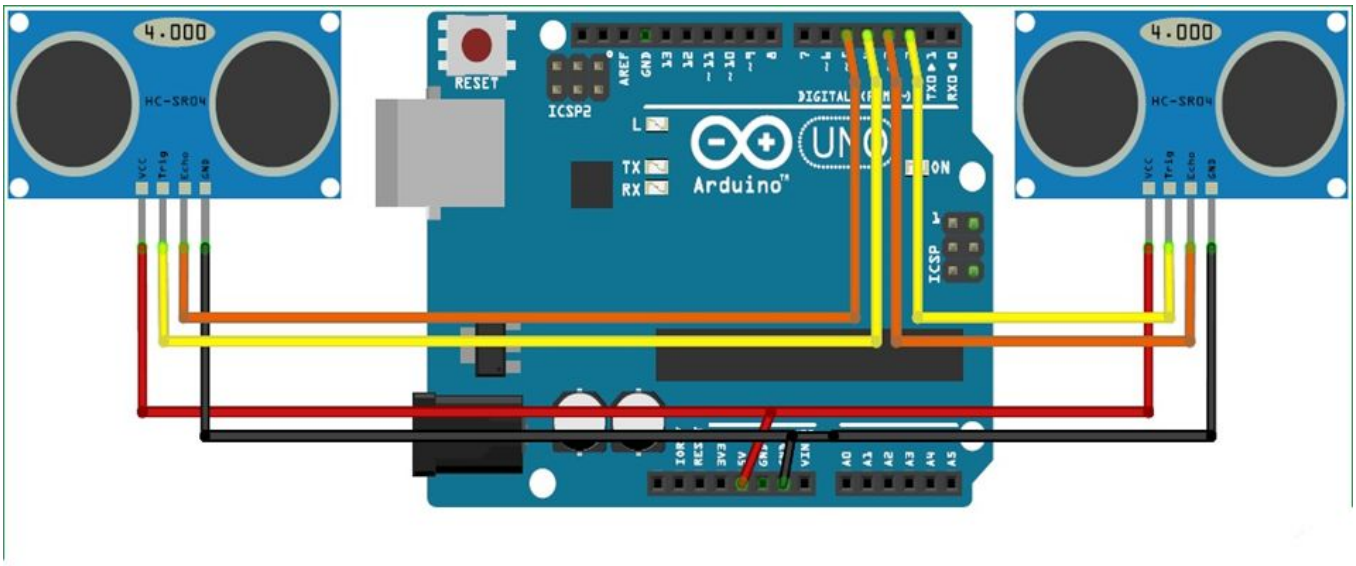

Figure 4.2: *Circuit Diagram of the proposed system*

4.3-Algorithm

4.3.1-Arduino

Declare variables //const int t1 = 4;//
configure pin modes //pinMode(var, ip/op); //
take inputs
calculate distance //d= time*0.034/2;//
conditional statements for each sensor
//if (dist>x)
{Serial.println("action1");
delay (500);}//

4.3.2-Python

Import the library functions-serial,time,pyautogui
connect serial port using serial
create an infinite loop
read incoming serial data
using hotkeys/typewrite assign keyboard keys for various conditions

Chapter 5 – Hardware and software specifications

5.1- Hardware specifications:

1. Arduino Uno MicroController
2. Ultrasonic distance sensor module HC-SR04

5.1.1 Arduino Uno Microcontroller

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

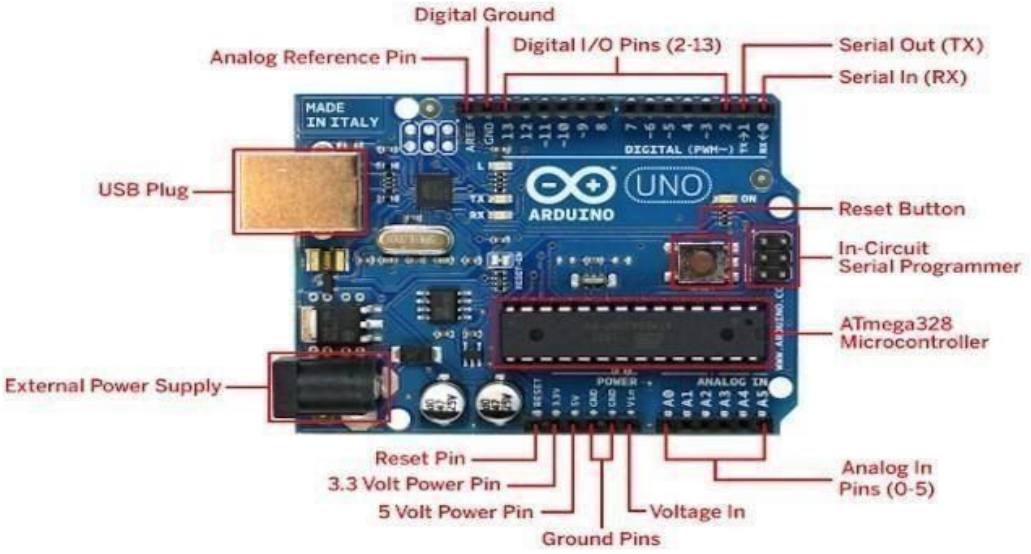

Figure 5.1: *Arduino Board*

Starting clockwise from the top center:

1. Analog Reference pin
2. Digital Ground
3. Digital Pins 2-13

4. Digital Pins 0-1/Serial In/Out - TX/RX (dark green) - These pins cannot be used for digital i/o (digitalRead and digitalWrite) if you are also using serial communication
   (e.g. Serial.begin).

5. Reset Button - S1

6. In-circuit Serial Programmer

7. Analog In Pins 0-5

8. Power and Ground Pins

9. External Power Supply In (9-12VDC) - X1

10. Toggles External Power and USB Power (place jumper on two pins closest to desired supply) -

    SV1

11. USB (used for uploading sketches to the board and for serial communication between the board and the computer; can be used to power the board)

5.1.2 Ultrasonic distance sensor module HC-SR04

HC-SR04 Ultrasonic (US) sensor is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground individually. This sensor may be an exceptionally well known sensor utilized in numerous applications where measuring distance or detecting objects are required. The module has two eyes like ventures within the front which shapes the Ultrasonic transmitter and receiver. The sensor works with the basic school equation that

Distance = Speed × Time

The Ultrasonic transmitter transmits an ultrasonic wave, this wave voyages in discuss and when it gets protested by any fabric it gets reflected back toward the sensor this reflected wave is watched by the Ultrasonic receiver module

Pin description

1. Vcc-The Vcc pin powers the sensor, typically with +5V
2. Trigger-It is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.

3. Echo-It is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.
4. Ground- It is connected to the ground.

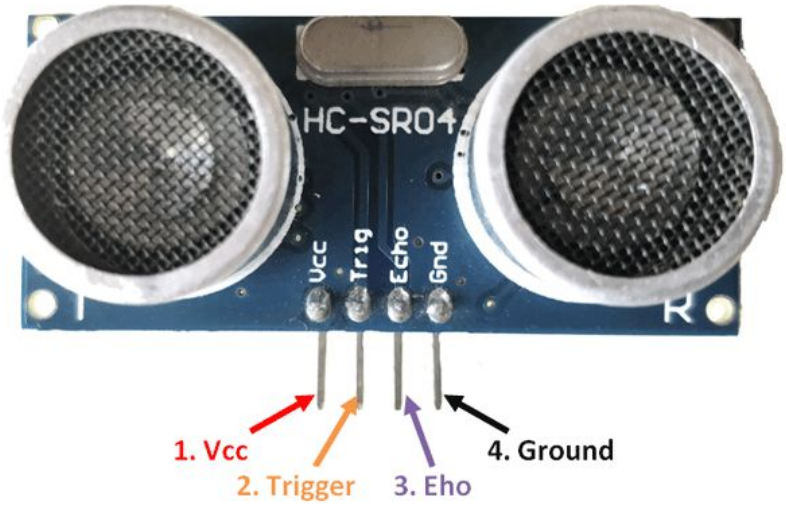

fig5.2

6.2-SOFTWARE REQUIREMENT:

1. ARDUINO IDE- An integrated development environment designed for Arduino based projects.
2. Python 3.0 + PyAutoGUI : The latest version of python software used for coding in the python language along with a downloadable module which is used for automation programming.

Chapter 6 : Results and discussion

6.1 Results:

1. The code was compiled and updated into the Arduino without any error.
2. The sensors detect the hand placed in front of it and the given commands were executed.
3. We could easily control simple computer applications using the sensors.

6.2 Discussion:

1. We can control simple applications using the sensor depending on the code.
2. The complexity can be increased by using different conditions.
3. The sensor is fragile hence a casing is required.

Chapter 8 –Advantages and applications

In this undertaking, we have actualized Arduino based Hand Gesture Control of Your Computer, where not many hand signals made before the PC will play out specific errands in the PC without utilizing mouse or console.Such Gesture based Control of Computers is as of now present and an organization called Leap Motion has been executing such innovation in PCs. This sort of hand motion control of PCs can be utilized for VR (Virtual Reality), AR (Augmented Reality), 3D Design, Reading Sign Language, and so on.With the advancement of innovation and the improved execution of cell phones, a lot of uses dependent on cell phones are arising progressively. In particular, the hand motion acknowledgment frameworks dependent on ultrasonic sign of cell phone draw in more consideration because of their great execution, low arrangement cost, and no-nosy work design. As of late, numerous human hand motion acknowledgement frameworks dependent on ultrasonic sign of cell phones have been proposed, carrying us with normal and novel techniques for HCI.

In this segment, we focus on the dynamic sonar framework dependent on cell phones. A cell phone can be treated as a functioning sonar framework since it imparts and gets ultrasonic signs. The got signal is changed by hand development and can be misused to perceive hand motion or direction. We first survey the cutting edge. utilizations of hand motion acknowledgment dependent on ultrasonic sign of cell phone. At that point, we partition them into two gatherings: dynamic signal acknowledgment and hand following. The dynamic motion acknowledgment frameworks recognize explicit hand stances, for example, flick, push, and pull, and so forth We present these frameworks from preprocessing strategies, test situations, perceived practices, members, tests, acknowledgment techniques, their discoveries, and execution. The hand global positioning frameworks allude to hand direction following, for example, composing letters and drawing circles or square shapes, and so forth We dissect these frameworks in a few perspectives, including preprocessing strategies, test situations, perceived practices, members, tests, execution, measurement, moving reach, and the distance among speaker and mouthpiece. It is a lot less expensive compared with some other signal control devices. It is anything but difficult to make and program as per our needs. The ultrasonic sensor gives exact assurance of motions.

It can be used for simple presentation controls in colleges or offices where you don't have to go towards the system every time to change a slide. Another application would be for patients bedridden and facing difficulties to reach the system to control it from a distance.

Chapter 9 – Conclusion And Future Scope

9.1 Conclusion

The fundamental target of the investigation was effectively accomplished. All the individual modules like Heartbeat identification module, fall discovery module and so forth and remote review module gave out the proposed outcomes. The structured framework modules can additionally be enhanced and created to a last single circuit. Increasingly significant actuality that surfaced during venture configuration is that all the circuit segments utilized in the remote wellbeing discovery framework are accessible without any problem. With the advancement in the coordinated circuit industry, Micro Electro Mechanical Systems (MEMs) and microcontrollers have gotten reasonable, have sped up, scaled down and force productive. This has prompted expanded advancement of inserted frameworks that the human services masters are receiving. These inserted frameworks have likewise been received in the Smartphone innovation. Also, with expanded web entrance in most creating nations through cell phones, and with utilization of Internet of things (IoT) will get received at a quicker rate. The Remote Health Care framework uses these ideas to think of a framework for better personal satisfaction for individuals in the public eye.

From a designing point of view, the venture has seen ideas procured through the software engineering and inserted study period being essentially applied. The Electric circuit examination information was utilized during plan and manufacture of the individual modules. Electromagnetic fields examination utilized in the remote transmission among microcontrollers and Software programming utilized during programming of the microcontrollers to think of a last completed circuit framework.

9.2 Future Scope

a) Physiological information assortment

1. Home Ultrasound

2. Brain sign checking

b) Remote survey of information

1. Issues related with having information on the web. Handle Distributed forswearing of administration. DDOS, and Data protection/security particularly of clinical frameworks.

c) IoT based Remote Patient Monitoring System can be improved to recognize and gather information of a few oddities for observing reason, for example, home ultrasound, Brain signal checking, Tumor discovery and so on.

d) More inquire about on issues related with having information on the web, information security as IoT is overseen and run by different advances and various merchants are associated with it. Security calculations and certain safety measures by the clients will help stay away from any security related dangers in IoT organize.

e) The interface can be intended to control which sensors can be utilized by customers as per their necessities.

f) Web UI can be improved to play out a few exercises which incorporate controlling the equipment, ongoing diagrams, history and investigation charts to watch abnormalities and so forth.

References

[1] "Arduino Architecture" https://www.engineersgarage.com/what-is-gsm-gprs-module [Oct. 1, 2017]

[2] "Systems design" https://en.wikipedia.org/wiki/Systems_design [Oct. 15, 2017]

[3] "UML - Standard Diagrams"

https://www.tutorialspoint.com/uml/uml_standard_diagrams.htm [Oct. 18, 2017]

[4] "The Internet of Things in healthcare: an overview" https://scholar.google.com/citations?user=Y4opLB8AAAAJ&hl=en [Sept. 7, 2017]

[5] "Envisioning inclusive futures: technology-based assistive sensory and action substitution" https://www.infona.pl/resource/bwmeta1.element.elsevier-3d45bfdd-fe55-359f-84e4-674a21cae024 [Sept 4, 2017]

[6] "A multiple communication standards compatible IoT system for medical usage" http://ieeexplore.ieee.org/document/6577775/?reload=true [Sept 5, 2017]

[7] "Ubiquitous data accessing method in IoT-based information system for emergency medical services" https://www.deepdyve.com/lp/institute-of-electrical-and-electronics-engineers/ubiquitousdataaccessingmethod-in-iot-based-information-system-for-YCZzyY5W9g [Sept 6, 2017]

[8] "Implementation of a medical support system considering P2P and IoT technologies" https://www.computer.org/csdl/proceedings/cisis/2014/4325/00/4325a101-abs.html [Sept 7, 2017]

[9] "Acquisition and management of biomedical data using Internet of Things concepts" http://ieeexplore.ieee.org/document/7050625/ [Sept 10, 2017]