Smart Presentation Using Gesture Recognition

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Abstract—**This paper presents a smart presentation system using gesture recognition. There have been the increasing demands for a more active and interesting viewing experience, and interactive projection technology has been considered as a solution to this issue. An interactive projection system also helps people to produce more attractive artistic exhibits, such as interactive walls and floors. This product deals with the development of an interactive projection technology, which provides more active and interesting viewing experience by recognizing the user′s gesture in real-time. The presenter can perform by walking into the audience. Using this method, a few interactive applications are developed. The system also provides a means to control electronic devices using hand gestures. Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house. The detected and recognized hand gestures are used as the command signals for controlling devices. The product can be also used to display a text or an image. This can be used by disabled for displaying their needs. All what the user has to do is just to wear the product and show a pre-defined gesture. By using this single product it helps in presentation field, home automation, as well as an aid for the disabled. It's a great advance of technology.**

Index Terms—**ATMEGA 328, Python, Arduino, Gesture Recognition, Zigbee, Wireless transmission**
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I. INTRODUCTION

Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Gestures can originate from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from the face and hand gesture recognition. Many approaches have been made using cameras and computer vision algorithms to interpret sign language. However, the identification and recognition of posture, gait, and human behaviors is also the subject of gesture recognition techniques. There have been the increasing demands for a more active and interesting viewing experience, and interactive projection technology has been considered as a solution to this issue. For example, if you can flip pages with a gesture when you make a presentation, or write a sentence without any manual tools, if the appliances can control using the gesture, then the presentations can be more immersive and attractive to the audiences. An interactive projection system also helps people to produce more attractive artistic exhibits, such as interactive walls and floors. For example, images of the current fabrication process are processed to obtain binary images, from which various features and shapes can be analyzed for checking the current status.It deals with the development of an interactive projection technology, which provides more active and interesting viewing experience by recognizing the user′s gesture in real-time. The presenter can perform by walking into the audience. Using this method, a few interactive applications are developed. The system also provides a means to control electronic devices using hand gestures. Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house. The detected and recognized hand gestures are used as the command signals for controlling devices. The product can be also used to display a text or an image. This can be used by disabled for displaying their needs. All what the user has to do is just to wear the product and show a pre-defined gesture. By using this single product it helps in presentation field, home automation, as well as an aid for the disabled. It's a great advance of technology.The basic purpose of this system is to provide a means to control electronic devices (capable of infrared communication) using hand gestures. Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house, but this will be achieved through hand gestures instead of pushing buttons. Gestures can be recognized by using sensors, accelerometer etc. Accelerometer-based gesture recognition performs matching or modeling in time domain, there is no feature extraction stage. The detected and recognized hand gestures are used as the command signals for controlling devices, some user interface. Gesture recognition enables humans to interface with the machine (HMI) and interact naturally without any mechanical devices. Using the concept of gesture recognition, it is possible to point a finger at the computer screen so that the cursor will move accordingly. This could potentially make conventional input devices such as mouse, keyboards and even touch-screens redundant. Hand Gesture Based Remote is a device to replace all other remotes used in households and perform all their functions. Normally in homes, remotes are used for appliances like TV, CD player, Air Conditioner, DVD Player and Music System. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse.

II. CURRENT OPPORTUNITIES FOR GESTURE TECHNOLOGY

It's to find the place where gesture commands are captured as a command or users can get the feedback. There is a special interest for the place, or interface of gesture commands as we HCI is progressing rapidly in recent years. Gestural interfaces are electronic analogues to pencil and paper. Gestural interfaces have a number of potential advantages and couple of potential disadvantages. There are varieties of interfaces in the researches in the table like natural (using IR beam with black box),

large screen, PC/Laptop based, LED light, audio-visual, mobile handheld etc. From the study we can see the opportunities of implementing the technology in different areas. The list, but not last, can be following-

Entertainment

Gesture technology can provide more entertainment opportunity for any type of users. GestureTek many different ways of entertainment using gesture such as interactive advertisement, signage, movies, screens. Wii, Sony Eyetoy, Microsoft's X-box have demonstrated different entertainment opportunities such as playing music, personalized gaming etc.

Artificial Intelligence

People, devices and computation are going to integrate more with each other and will soon become part of our daily life. Using gesture based technology will play important part in this intelligent life. Gesture from any part of the body can provide the commands of communication or even to control the curtain of the window. Robotic industry is also using gesture technology to manage and control the activities of the robot as part of the Human Robot interaction. Like Select-and-Point, many researches are easily accepted by users and it can significantly improve users' interaction with various devices in a ubiquitous computing environment. Based on networking technologies and hand gestures, users can connect multiple devices.

Simulation

Body gesture creates the simulation of human body activities in the screen. Physical simulation can improve the realism of the resulting gestural animation in several ways. GestureTek develops a stimulating computer- generated virtual reality therapy world that guides patients through clinician-prescribed interactive rehabilitation exercises, games and activities that can target specific body parts. Patient performance is measured and recorded.

Training & Education

The technology solution can be developed for training and education purpose. In the rehabilitation or fitness centers, it can train people automatically based on the user's profile, body structure. Taking natural input from the body movements is the most important advantage here over mouse or keyboard.

Assistive living

Technologies such as multi-agent systems, safe communications, hypermedia interfaces, rich environments, increased intelligence of home appliances, and collaborative virtual environment are now converging and represents an important enabling factor for the design and development of virtual elderly support community environments. TeleCARE aims to design and develop a configurable framework for virtual communities focused on supporting assistance to elderly people. During the study we tried to see the gesture controlled systems for elderly and disable with more attention. Still we need to work more for them as the numbers are growing over time. For the autonomous and assistive living of elderly and disabled people, new technology can play an important role. They can achieve by regaining some control and some very psychologically valuable independence. Tele-health, tele-care, telemedicine and personal safety systems are all examples of this trend. A multimodal approach suits them best, due to external circumstances or personal preferences. Multiple considerations influence interface design decisions when designing for older users. Removing isolation of age restricted users doesn't reflect that much during interface design.

III. PROPOSED SYSTEM

This system is based on gesture recognition method proposed for interactive projection systems. There have been the increasing demands for a more active and interesting viewing experience, and interactive projection technology. Using this system you can flip pages with a gesture when you make a presentation, or write a sentence without any manual tools and the appliances can control using the gesture. Then the presentations can be more immersive and attractive to the audiences. This system is to provide a means to control electronic devices using hand gestures. The detected and recognized hand gestures are used as the command signals for controlling devices. It's a great advance of technology which will make the presentations more attractive.

There have been the increasing demands for a more active and interesting viewing experience, and interactive projection technology has been considered as a solution to this issue. For example, if you can flip pages with a gesture when you make a presentation, if the appliances can control using the gesture, change the background of a live show, then the presentations can be more immersive and attractive to the audiences. This product is a wearable device, which recognizes user's hand gestures, and covers a wide range for wireless signal transmission. An interactive projection system also helps people to produce more attractive artistic exhibits, such as interactive walls and floors. This product deals with the development of an interactive projection technology, which provides more active and interesting viewing experience by recognizing the user's gesture in real-time. The presenter can perform by walking into the audience. Using this method, a few interactive applications are developed. The system also provides a means to control electronic devices using hand gestures. Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house. The detected and recognized hand gestures are used as the command signals for controlling devices. The product can be also used to display a text or an image. This can be used by disabled for displaying their needs. All what the user has to do is just to wear the product and show a pre-defined gesture. By using this single product it helps in presentation field, home automation, as well as an aid for the disabled. It's a great advance of technology.
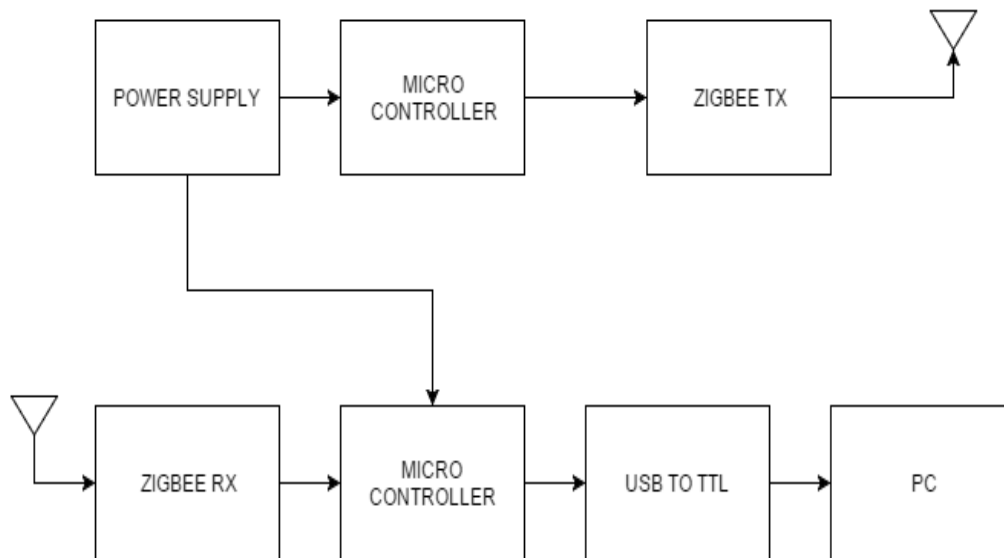
Fig 3.1Basic Block Diagram of Proposed System

When the fingers are folded the signals come in contact with the metal plate, thus the corresponding letters or the signal is transmitted through the ZigBee from transmitter part to the receiver part. This signal is then connected to the PC via a USB to TTL cable. Here the signal undergoes serial to virtual keyboard transmission and the keyboard is produced which is the processed in the PC.

Transmission of input signals
The transceiver module contains a set of Zigbee and microcontroller combination. The user has to wear the device on his palm, with its conductive rings on each finger and the metallic plate band on his palm. By showing a particular gesture, which is pre -defined in the program, the conductive rings come in contact with the metal plate and get shorted. The signals are send wirelessly through Zigbee over a range of 100 m. Each finger ring is given each name. For eg: A,B,C,D,E. Their combinations also are named. The shorted finger combinations are detected. The Arduino program runs for each combination detected.

Receiving signals
The receiver module contains a set of Zigbee and microcontroller combination. The signals are transmitted wirelessly from the transceiver to receiver part**.**

Processing by languages
The program for detecting each input combination is done is Arduino programming. The input is detected. Python code programmed for each input signal is made to run. The python code is coded to perform the particular operations to get the desired result.

Customizing
The proposed system is completely customizable. That is, it can be programmed to get the user's desired result. If a user request for a particular finger gestures only, it can be designed accordingly. The python program can be written for each user's requirements. If a user need only the controlling appliances application, then it is programmed accordingly**.**

Advantages of proposed system
The proposed system is intended to avoid all the drawbacks of existing system. It will add some more features than the existing system. The proposed system is a cost effective way of doing the manual processes done in the existing system.
- An interactive projection technology
- Wearable device
- No physical contact with computer
- Recognizing gestures in real time
- Flip pages with a gesture
- Change background
- Control appliances
- Sign language
- Low cost
- Easily fits palm of user's hand
- Easy to install and use at any platform
- No camera use
- Good range of wireless signal transmission

- Customizable
- Reduce the time needed
- Saves money

IV. FEATURES

Presentation Controller

Gesture recognition lets you control your innovative presentation without touching a remote control or even the screen of your Smartphone or tablet. Since PowerPoint can be used to make online tutorials and demos, it may be useful to use gesture images and icons in our presentations, in order to show how an application is used. For example, if you can flip pages with a gesture when you make a presentation then the presentations can be more immersive and attractive to the audiences. This can also be useful for the new digital TVs that will be capable to understand gestures, like Samsung Smart TV, etc. MS PowerPoint is very important part of our professional and student life .we face several problems while giving the presentation or seminar on some topic like we need an operator to operate the slides and sometimes this will create problems if speaker and operator are not well prepared. To overcome this problem we made the gesture device which can be connected to the computer and operated by the speaker gesture.

The device basically have two part gesture transmitter and computer receiver. When the user wearing the device on his/her palm, shows a gesture, the metallic rings on the finger get in contact with the metallic plate band on the palm. Here, it gets grounded. The corresponding signals are sending wirelessly to the receiver part. The grounded finger's or their combinations are detected using Ardunio code. The receiver part is connected to the PC. The codes corresponding to the combination of fingers are run, which was previously coded in Python language. The Python codes of the recognized signals are executed.

The Python code is programmed for presentation controller such that, using a single simple finger gesture, user can:

- Go to the next slide of a PowerPoint
- Go to the previous slide of a PowerPoint
- Go to a required slide of a PowerPoint
- To display some stored images
- To display text or graphics
- Using hand gestures to control applications is a fun way to control your digital life.

Home Automation

The basic purpose of this system is to provide a means to control electronic devices using hand gestures. You can control a number of electronic appliances in a room without any switch or remote at a good range, by simply giving a connection to the relay board of the system, and then showing its specific gesture.

Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house. The detected and recognized hand gestures are used as the command signals for controlling devices. This is a device to replace all other remotes used in households and perform all their functions. Normally in homes, remotes are used for appliances like TV, CD player, Air Conditioner, DVD Player and Music System. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse. The system also provides a means to control electronic devices using hand gestures. Thus, this system will act like a remote control for operating all the consumer electronic devices present in a house. The detected and recognized hand gestures are used as the command signals for controlling devices.The most important advantage of the usage of hand gesture based input modes is that using this method the user can interact with the application from a distance without.

The system uses zigbee for wireless transmission. Simple system controls all the electronic appliances connected to it. All what the system settings include is to give a electrical connection from the devices on the switchboard to the relay board of the system. When a particular gesture to control the device is shown, the code programmed for it runs, receives the command, and the relay fails and the connected device is turned ON/OFF accordingly. This is cheaper and have a good range of coverage up to 100m.The advantage of the system is that it does not require any high level technologies like IoT for home automation. The system can be used in various applications.

- It can be used to play simple video games.

- It can be used to control various home appliances.

- It can be used in home theatre system where short distance communication is required.

Background Change

This would be very helpful for in case of a live presentation, seminar, talk where you don't require any assistance to change the background or other settings. An interactive projection system also helps people to produce more attractive artistic exhibits, such as interactive walls and floors. This product deals with the development of an interactive projection technology, which provides more active and interesting viewing experience by recognizing the user's gesture in real-time. The presenter can perform by walking into the audience. Using this method, a few interactive applications are developed. During a live show, if

appropriate events occur when an actor performs on stage, a better reaction can be obtained from the audience because such events are well synchronized with the actor's performance. Using this concept, new applications with interesting interactions are possible such as the magic drawing board or virtual combat simulation.This system saves time and effort for a presenter to get assistance for setting an interactive live show.

Sign Language

The objective of this system is to develop such a system which will help physically impaired to control home appliances by hand gestures. . For the autonomous and assistive living of elderly and disabled people, new technology can play an important role. They can achieve by regaining some control and some very psychologically valuable independence. It can be used by patient suffering from Paralysis. This technology is also used for home automation for physically impaired. It helps the old and disabled to express their emotions. The old or disabled can show a gesture to express what they feel. That is, for example: a particular finger gesture for showing "I'm hungry".

V. RESULTS AND DISCUSSIONS

In present environment a number of facilities and various modes for providing input to any application are available. It is though unfortunate that with the ever increasing smart environments and corresponding input technologies still not many applications are available which are controlled using current and smart facility of providing input which is by hand gesture. The most important advantage of the usage of hand gesture based input modes is that using this method the user can interact with the application from a distance without using the keyboard or mouse. The application of manipulating objects through hand gestures in virtual environment is being proposed and implemented in the present paper provides a suitable efficient and user friendly human computer interface. With the help of this application the user can interact with the virtual objects using hand gesture instead of any other physical input devices .As the application provides the flexibility to the users and specifically physically challenged users to define the gesture according to their feasibility and ease of use. we have proposed a method based on gesture recognition system for multi purposes. The experiments have confirmed that continuous training of the users results in higher skills and, thus, better performances. More applications can be controlled using hand gestures in future using this method. These applications include Paint, slide shows, multi-player games and many more.
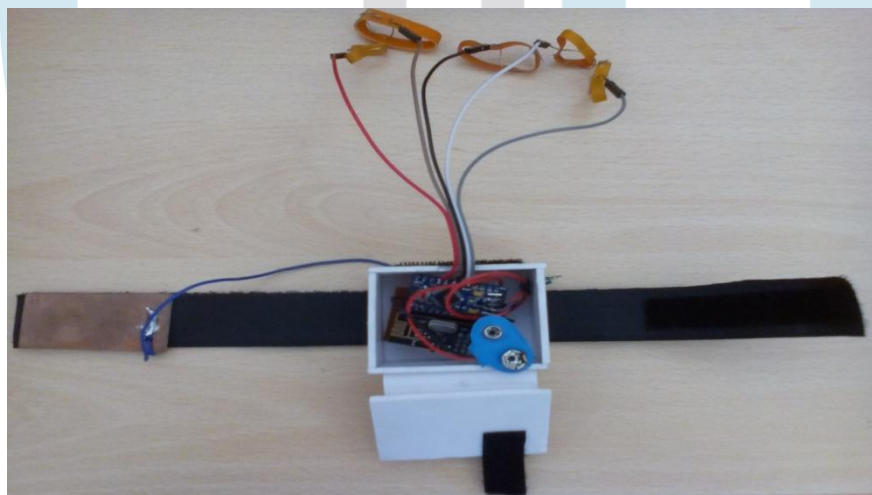

Fig 5.1 Prototype of the System

VI. ACKNOWLEDGMENT

VII. CONCLUSION

In this paper it provides advanced facilities to the common society. We have proposed a gesture recognition system which overcomes the limitations of earlier systems like recognizing gesture. This paper presents a gesture recognition method for use with an interactive projection system. The most important advantage of the usage of hand gesture based input modes is that using this method the user can interact with the application from a distance without using the keyboard or mouse. The application of manipulating objects through hand gestures in virtual environment is being proposed provides a suitable efficient and user friendly human computer interface. With the help of this application the user can interact with the virtual objects using hand gesture instead of any other physical input devices .As the application provides the flexibility to the users and specifically physically challenged users to define the gesture according to their feasibility and ease of use. Hence, building such a system on the above proposed method has many a advantages in terms of cost, time and efficiency. The importance of gesture recognition lies in building efficient human machine interaction. Its applications range from sign language recognition through medical rehabilitation to virtual reality. Thus, gesture recognition promises wide-ranging applications in many fields.

VIII. FUTURE ENHANCEMENTS

The desire to give effective presentations has been the driving force for the invention of Visual aids. There are several types of visual aids that have been developed to the effect, Such as flip charts, overhead transparencies, posters or digital slide shows. The challenge Remained on the ease of use during the presentation session. The digital slide shows had improved the effectiveness of the presentation and the audience size, but the need to be next to the keyboard or mouse, created a vacuum for new innovations. There was a need for some form of wireless control of the slides movement. The purpose of this system was to design a controller that would change the slides remotely, without contact to the computer keyboard or mouse. The controller would allow the presenter to change the slides without being a captive to the keyboard or mouse. The presenter would have improved contact to his or her audience due to increased freedom of movement. By adding more gestures, we can handle all My Computer operations like Cut, Copy, Paste and Undo etc. By integrating our system with voice recognition system we can embed it in ROBOTS. We can enhance our system to control PowerPoint application. We are also able to handle dynamic image processing and event handling accordingly. That is a single technology can be used for various kinds of purposes rather than uses different techniques for each purpose.

- Extract the gesture form the moving scene.

- It can also be very helpful for the physically impaired persons.

- This system can be used to operate any electronic devices by just keeping a sensor which recognizes the hand gestures.

- Another application is that this can be used for security and authorization by keeping any particular hand gesture as the password.

- To develop a system that can translate snapshot of hand gesture to a set of playback instruction on a model of car audio playback function.

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