PROJECT REPORT

COURSE:
HUMAN COMPUTER INTERACTION

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PowerPoint control by hand gesture

- ## Introduction

Human-computer interaction's main objective is to make computers more attentive to user demands in order to enhance user-computer interaction. Nowadays, using a computer for personal usage involves more than just using the keyboard and mouse. Human interaction is facilitated through a variety of sensory modalities, including gestures, conversation, and body and facial expressions. In many areas of human-computer interaction, it is becoming increasingly crucial to be able to communicate naturally with technology.

- ## Project background

Human-computer interaction has always been difficult. In search of more effective and user-friendly interfaces, humans have spent more than half of the last century experimenting with different methods to communicate with computers, starting with early mediums like perforated cards. As time went on, the industry standard for user input was keyboard and mouse. The invention of the touch screen brought some major improvements to the man-computer interaction, making it more natural and tactile. Even though communication has advanced significantly, we think that with a wider vocabulary of gestures, people could communicate even more successfully. A new dimension to communication can be added by hand gestures. Similar to how nuanced movements and facial expressions can enhance spoken communication, gestures provide a new level of involvement to the machine interface. The voice recognition industry has made great strides in recent years. Already, facial expression recognition is done using machine learning. But it has always been more difficult to recognize gestures, and only recently has this technology begun to gain appeal. Machine learning has made it possible and more accurate than ever to recognize gestures.

This project is Arduino-based. Here, Python is used to implement Hand Gesture Control for all computer features. This project uses Python to control an Arduino's on-board LED. By Installing the Arduino and Python IDE will make this simple to implement. In order to set up our tools with computers, connect them to software, and control them easily after implementation.

The goal of this project was to create a computer application that uses controls other than the keyboard and mouse.

- **Methodology**

Arduino is used in this project. Here, Hand Gesture Control is implemented for all computer features using Python.

Tools Required:

- Arduino UNO
- Two Ultrasonic Sensors
- USB Cable (for Arduino)
- Few Connecting Wires
- A Laptop with an internet connection

The idea behind the Arduino-based Hand Gesture Control of Computer is really rather straightforward. All you have to do is take an Arduino board and two ultrasonic sensors, lay your hand in front of the sensor, and figure out how far away it is from the sensor. The computer can take the appropriate steps based on this information. The placement of the ultrasonic sensors is crucial. Place the two Ultrasonic Sensors at either end of the top of a laptop screen. A Python program collects the distance data from the Arduino, and a specialized module called PyAutoGUI turns the data into keyboard click commands.

The circuit design is straightforward, but the component placement is critical. The Trigger and Echo Pins of the first Ultrasonic Sensor located on the left side of the screen are linked to Arduino Pins 11 and 10. The Trigger and Echo Pins of the second Ultrasonic Sensor are linked to Arduino Pins 6 and 5. When it comes to sensor positioning, we set both Ultrasonic Sensors on top of the Laptop screen, one on the left and one on the right. Double-sided tape was used to secure the sensors to the screen.

- **Result**

Data = “next” – – > Action = Ctrl+PgDn
Data = “previous” – – > Action = Ctrl+PgUp
Data = “down” – – > Action = Down Arrow
Data = “up” – – > Action = Up Arrow
Data = “change” – – > Action = Alt+Tab

To go to the next slide in a PowerPoint presentation, use the next command. We can access the previous slide using the prior command. We may scroll the slide up and down with the up and down commands, respectively.
The slide can also be opened and closed.

- **Discussion**

All goes according to the plan then we move on to writing the Python code after we see the Arduino code which instructs the Arduino to transmit five different texts or commands through Serial Port when it recognizes the proper hand motions. These instructions are

Next
Previous
Down
Up
Change

These commands, together with a few PyAutoGUI routines, allow us to create a straightforward Python script that will carry out the following keyboard and mouse operations. The ideal distance for the sensor is between 15 to 35 cm. To produce the best results, our hands must be moved correctly. When we move quickly or over distances, the sensor is unable to detect the instruction that we provide

- **Conclusion**

The term "human-computer interaction" (HCI) refers to the interaction between a computer and a human that facilitates information sharing and communication between the two. By utilizing our project, we will strengthen the bond between humans and machines. The machine will adapt to human behavior and carry out instructions from humans. Using hand gestures is another approach to communicating with machines like robots or computers. A stronger bond between humans and machines will be established than in the past.

Many times, gestures can be improved. The best gestures make you take up a lot of space, similar to The Best Gestures. The more substantial you appear, the more certain you will come across to your audience. If marking is an option, we can mark where we need to with that. With the volume increase and decrease option, we should be able to operate much more effectively when in video mode. Better sensors could perform considerably better.

- **References**

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