Arduino Based Computer Controlling Using Hand Gestures

Deepika Teegapuram, Student ID: 200415938, *Graduate Student, University of Regina*

I. Introduction

THE purpose of this paper is to make a modification to the existing project to support additional features. The source project, published by Smart Technology in www.hackster.io in 2017, describes a Gesture-Controlled System[1] for operating computers with the combination of Arduino and Python.

Instead of using human touch required devices like Keyboard, Mouse or Joystick, we can use sensors to understand the hand gestures and to perform necessary actions in the computer. The following are the actions listed by the source project on the VLC media player by using distance between Ultrasonic Sensors and the hand.

- Play or Pause the video
- Increase or Decrease the volume
- Forward or Rewind the video

The distance changes the type of actions to be performed. These six operations are developed by using 2 Ultrasonic Sensors.

II. Novel Contribution

The aim is to carry forward an existing functionality with the addition of supporting three more independent applications. The information does not flow from one application to the other. The three features are listed below.

- To switch between the tabs of the browser and to scroll up/down the web pages
- Open the webcam and record a video
- Shutdown the Computer[2]

All the above characteristics are controlled by hand gestures without using any input device.

III. Materials Required

According to the list provided from the source website, the following materials are needed:

- Arduino UNO
- Ultrasonic sensors(HC-SR04)-3
- Connecting Wires
- The USB cable for connecting Arduino
- A Laptop

IV. Milestones

The milestones are set to track the progress of the project and to deliver the project within the deadline.

Milestone 1	Mar 8, 2019	All the required materials are gathered.
Milestone 2	Mar 9, 2019	Test if the Integration between Python and Arduino is working
Milestone 3	Mar 13, 2019	Initial Assembly for replicating the existing project and testing the functionality and start the documentation
Milestone 4	Mar 17, 2019	Write up the code and assemble the connections for achieving feature 1 and update the document
Milestone 5	Mar 24, 2019	Make connections and prepare code for achieving feature 2 and update the document
Milestone 6	Apr 1, 2019	Develop feature 3 and update the document
Milestone 7	Apr 7, 2019	Test if all the features are working independently
Milestone 8	Apr 10, 2019	complete the documentation and programming and commit in GitHub

V. Motivation

Nowadays, we see most of the LCD Screens are supporting the Finger-Touch Technology. The idea of the author behind this project is to build a Human Machine Interface (HMI) by reducing the Touch-Based Systems and replacing them with Sensor-Based Systems. The idea of integrating this project with Python has unveiled a new dimension to the Arduino Programming. With the support of sensors, more features can be added to improve a human interaction with the computer.

VI. Team Role

This is an individual project. I will be doing the documentation as well as the coding in parallel. It is my responsibility to design, code and test this project. I will update and commit the code and documentation in GitHub on a regular basis.

VII. Summary

It is an enhancement of an existing project by adding more features to it. Since the solution provided by the author of this project has given the list of libraries for Arduino to interact with the Computer. Also, there are many components in this project, they need good amount of time to develop each property and get the results as expected. Goals are set to reach the Milestones defined on time.

References

[1] Technology, S. and Arduino, A. (2017). Amazing Control Computer Using Hand Motion And Arduino. [online] Hackster.io. Available at: https://www.hackster.io/smart-tech/amazing-control-computer-using-hand-motion-and-arduino-d933f1 [Accessed 2 Mar. 2019].

[2] YouTube. (2018). Python code for Shutdown and Restart your System. [online] Available at: https://www.youtube.com/watch?v=J77J232QdIE [Accessed 7 Mar. 2019].