GESTURE CONTROLLED COMPUTER USING ARDUINO

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PRN : 17030121023

Under the guidance of

Dr.Farhana Desai

Submitted in partial fulfilment of undergraduate Degree

Bachelor of Computer Application

To

SYMBISOIS INSTITUTE OF COMPUTER STUDIES AND RESEARCH

CONSTITUTENT OF SYMBSIOSIS INTERNATIONAL DEEMED UNIVERSITY, PUNE

March 2020

Contents

Acknowledgement

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We are thankful to and fortunate enough to get constant encouragement, support and guidance from all Teaching staffs of Symbiosis Institute of Computer Studies and Research, which helped us in successfully completing our project work.

Sumeet Sunil Jirwankar

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Mr.Sumeet Sunil Jirwankar

Has successfully completed the Dissertation/Project entitled

Gesture Controlled Computer using Arduino

For

In the partial fulfillment of the
Bachelor of Computer Applications- BCA
From

Symbiosis Institute of Computer Studies & Research
(Constituent of Symbiosis International (Deemed University), Pune)

Mr. Shirkant Mapari
Programme In Charge- BCA

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Prof. Dr. Jatinderkumar R. Saini
Professor and Director,

Name of Project Guide:

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Sign : Farkhana

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I hereby declare that the dissertation/ project work entitled

"Gesture Controlled Computer Using Arduino"

Submitted to Symbiosis Institute of Computer Studies & Research (Constituent of Symbiosis International (Deemed University), Pune, under the guidance of

Dr. Farhana Desai

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Signature of Project Guide	Sumeet Jinwankar	
Name of Project Guide		

Farkhana
(DR FARHANA DESAI)

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Abstract

The purpose of this project is to build a tool which can control pc using ultrasonic sensors. Using Arduino to interact between ultrasonic senor and computer. The Arduino can be connected to the Laptop for powering the module and also for Serial communication. Once the connections are done place them on your monitor as shown below. The concept behind the project is simple. Two sensors will be placed on top level of the laptop which will measure or read the distance between the monitor and hand. Based on this distance we will perform various actions.

INTRODUCTION

Gestures are used in human lifestyle and have an importance in day to day life. Human have been interacting with each other or within the physical world with five senses. During the era of technology and machines which are influencing human lifestyle thus its an objective to make use of gestures in technology as well.

As this dissertation deals with gesture-controlling of computer, the primary focus is going to be utilization of hand gestures on media application.

The concept behind this project is very simple, two ultrasonic sensors will be placed on top of the laptop which will scan the gap between the monitor and hands. Arduino will support and measure this distance which will perform the actions. Use of Pyautogui library will be taken and the commands from Arduino will be sent to the laptop through port. This information will be scanned by python that is running on the laptop and the actions will be performed.

Objectives:

1. To minimize the use of keyboard and mouse in computer.

2. To use ultrasonic sensors to recognize gestures.

3. To integrate gesture recognition features to any computer at low cost.

4. To help in the development of touch less displays.

Advantages:

1. Low cost.

2.It is portable and handy as well as mobile and can be carried anywhere.

3. The circuitry is simple and thus can be easily tested and troubleshooted.

4. No moving parts are included therefore there is no need to wear the device.

5. Less cost for making a gesture control computer.

6. This will reduce the use of devices like mouse, remote control as well as keys for interaction with the devices.

Disadvantages:

1. The distance between ultrasonic sensors and user is limited.

2. The distance between sensor and user must be accurate.

Applications:

1. This project can be used in gesture control gaming in gaming industry.

2. This system can be used for making touch less displays at low cost.

3. This project can be implemented in medical area for making gesture control displays.

Conclusion:

The following approach proves that it is possible to use ultrasonic sensors which are inexpensive to control the video for gesture recognition. Unfortunately, very limited set of gestures can be recognized. But it is very useful for communication between human and computer.

Future development:

1. This project can be further implemented on platform like AVR, ARM microcontroller etc.

2. We can add many video controlling features just by modifying the python code.

3. We can integrate this type of module for many applications like browsers, designing and editing applications.

Literature Review

Project Profile:

This research project mainly emphasizes on the aspects of human computer interaction advancement making it better than normal interaction with keyboard and mouse etc. This new way of interaction can be useful in gaming industry, making touchless displays and in virtual reality controls as well. The following researches are similar to use this technology and thus this project gets inspiration from them.

Existing System Projects and Research:

Research Paper No.1: -

(William T. Freeman, December 1994)

This research paper describes how a viewer can control a television set remotely with the help of hand gestures. This paper focuses on issue of gesture–based human–computer interaction :(1) How can one communicate with a set of commands without any user training and memorization of gestures?

Research Paper No.2: -

(Piyush Kumar ; Jyoti Verma and Shitala Prasad, June 2012)

In this research paper a real-time HCI based data glove and KNN classifier is used.In this research data is extracted with the help of gloves. The results shown in this project are used for interaction better than a keyboard and mouse interaction.

Research Paper No.3: -

(Suat Akyol, Ulrich Canzler Dept. of Technical Computer Science University of Technology (RWTH) Aachen, Germany; Bengler, Klaus Wolfgang Hahn BMW AG Munich, Germany, Nov. 28-30. 2000)

This paper describes a real-time gesture recognition in automobiles generally cars, reducing the use of physical buttons is shown in this paper.

Research Paper No.4: -

(Harish Kumar Kaura, Vipul Honrao , Sayali Patil , Pravish Shetty , Nov 5 2013)

This research paper tells about a feasible solution, the project is tells us about how a robot can be controlled.

Research Paper No.5: -

(Zivkovic, Sept 2006)

This research talks about using an ir sensor to use for hand gestures recognition.

To minimize the costs, an innovative approach is used in this thesis by using ir sensors and the microcontroller.

Problem Formulation

Objective of Proposed System:

The purpose of gesture recognition in laptop is used to minimize the distance of physical and digital world. The kind of way that humans interact with machines could be solved by implementing gestures via mathematical algorithm. The aim of this project is to build a machine which can control pc using ultrasonic sensors.

Scope of Proposed System:

This Project is not only limited for gaming purpose but also can be very useful in medical industry. Hand gestures can be useful as a method when the instrument is away from reach in medical domain.

Feasibility Study:

Operational Feasibility:

Operational feasibility includes number of staff members allocated for the project as well as the responsibilities given to different staff members based on their expertise area.

Table.1

Staff ID	Staff Member Name	Responsibilities	Area
01	Sumeet	Identify and resolve system level bugs	Resolving system and unit level bugs.
		Quality Testing of the system	Analysing the functions and features of the system
		Preparation of test summary report (Identification of pass/fail test cases).	Quality Assurance Testing
		Execution of all test cases.	Unit and System level Programming

Technical Feasibility:

Technical feasibility includes identification of hardware as well as the software requirements.

- Hardware Requirements:
    1. HC-SR04 Ultrasonic Sensor
    2. Arduino Uno
    3. Laptop (Windows 7/8/10 OS)

- Software Requirements:
    1. Arduino IDE
    2. Python 2.7.14
    3. VLC Media Player

Economic Feasibility

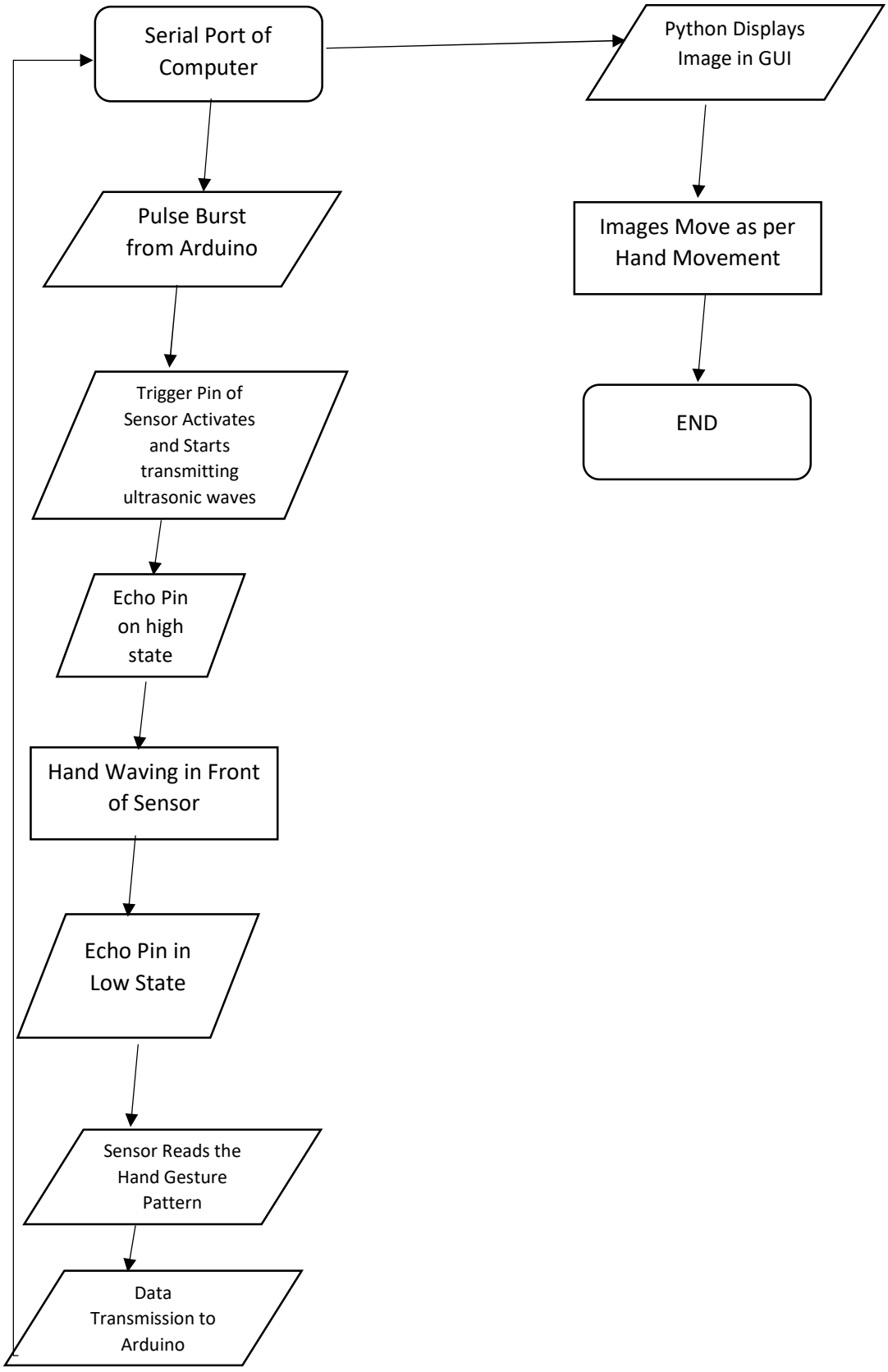
Economic Feasibility includes development cost, employee salary, maintenance cost and miscellaneous.

Table.2

Product	Cost
Arduino Uno	330 ₹ / original- 1,750₹
HCSR04 Ultrasonic Sensor 2pcs	160₹

Proposed Methodology

The following figure representation of the whole system can review in the flow chart as stated in the Figure It discusses the stepwise task processed in the project. Fig.1



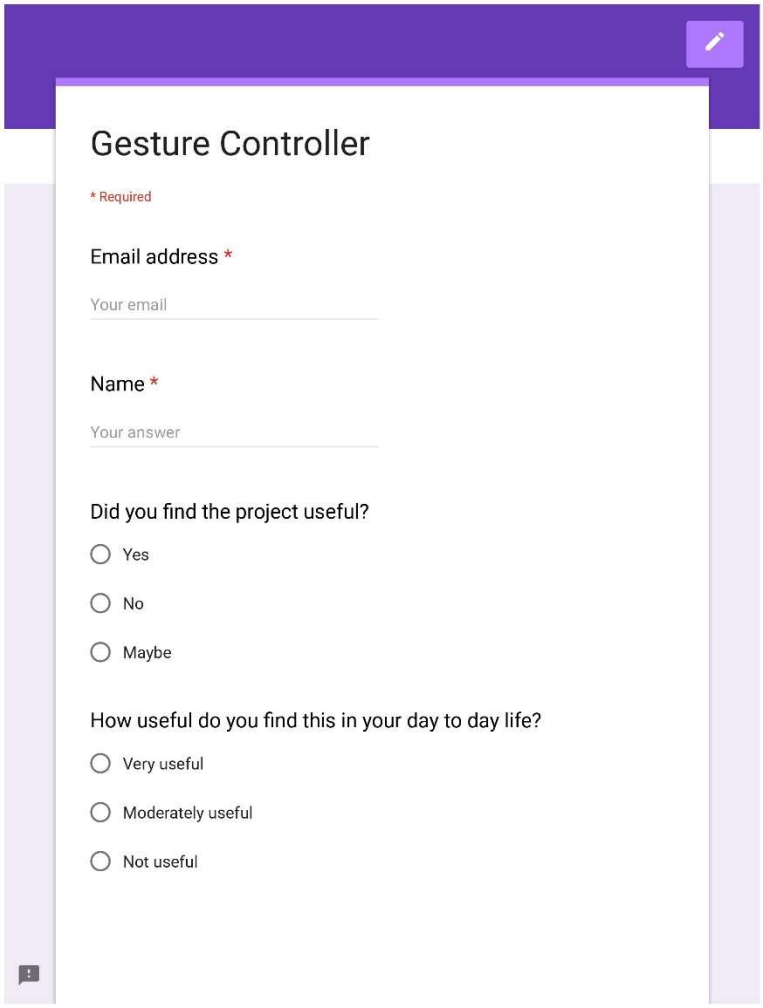
The following are the gestures and corresponding functions that are executed in the current project:

Table.3

Gesture Motion	Function
Placing both hands	Play/Pause
Left hand Towards Movement	Volume increase/ Decrease
Left hand Movement	Rewind

1. Type of Research

The proposed system is inclusive of descriptive, historical and empirical research. Therefore, our current issue is on primary data collection through the questionnaire form and secondary data is collected with reference to previous research paper.



Do you think this will have any impact on Human Computer Interaction?

- ◯ Yes
- ◯ No
- ◯ Maybe

Will this project have a long impact in future?

- ◯ Yes
- ◯ No
- ◯ Maybe

Can person of all ages use this project?

- ◯ Yes
- ◯ No
- ◯ Maybe

Should this technology be implemented in all computers?

- ◯ Yes
- ◯ No
- ◯ Maybe

Did you find this product better than typical keyborard and mouse?

- ◯ Yes
- ◯ No
- ◯ Maybe

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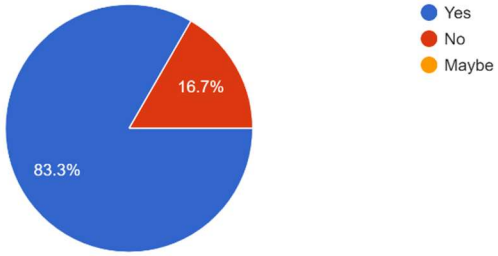
Google Forms

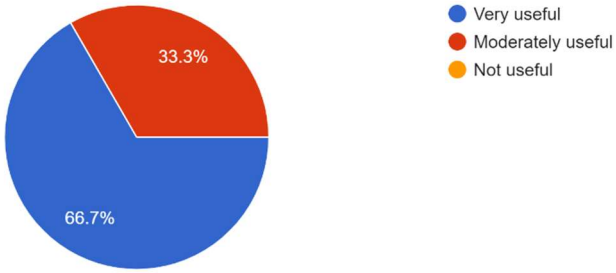
Did you find the project useful?

6 responses



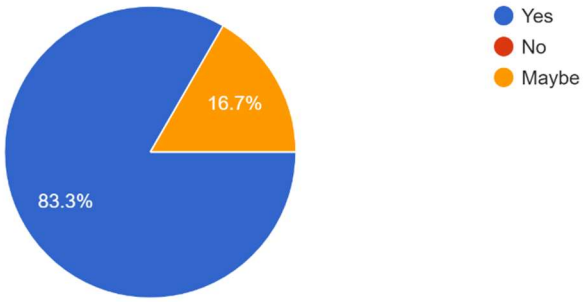
How useful do you find this in your day to day life?

6 responses



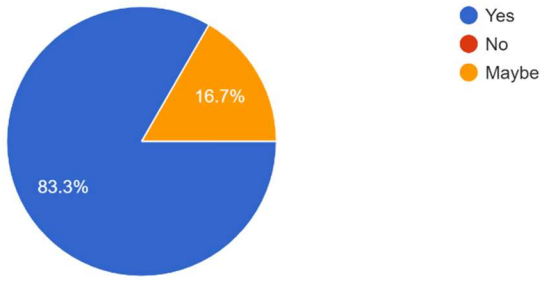
Do you think this will have any impact on Human Computer Interaction?

6 responses



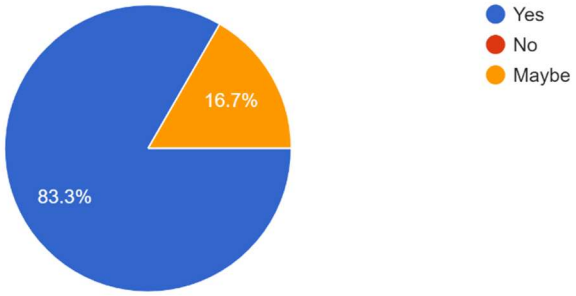
Will this project have a long impact in future?

6 responses



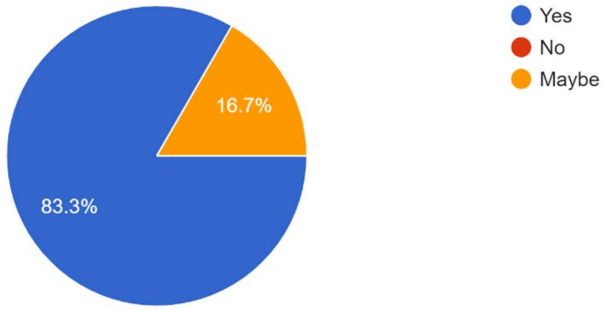
Can person of all ages use this project?

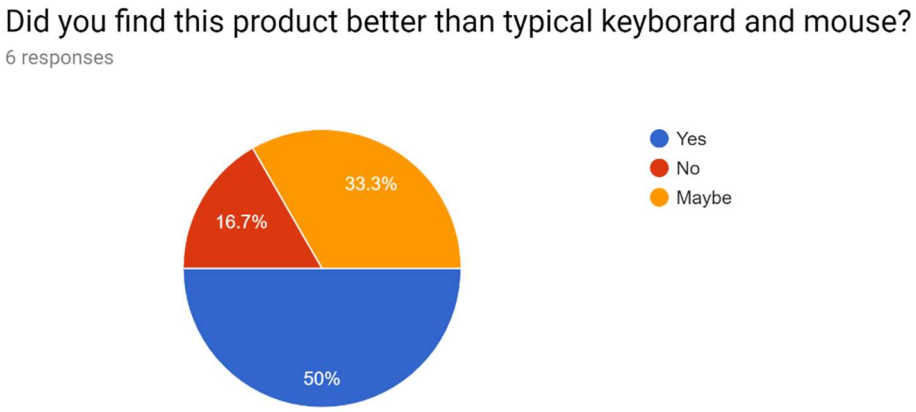
6 responses



Should this technology be implemented in all computers?

6 responses





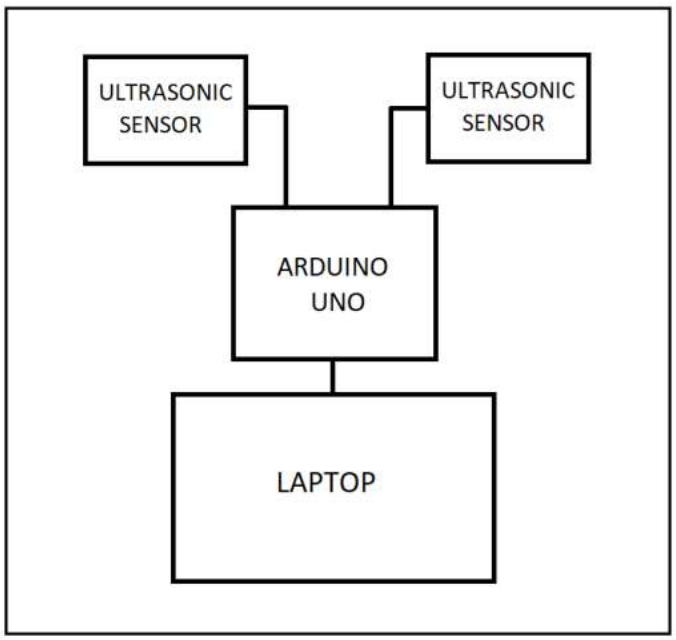
2. Research Design

The study relies on each primary information and secondary information. the first information was collected through structured form that samples of 06 respondents were designated for this study. The collected samples victimisation convenient sampling technique was valid and took it for any analysis.

Secondary information was collected from information sites and articles.

Basic Block Diagram:

Fig.2



Result and Analysis:

The project is designed fully for the purpose of reducing use of physical buttons and using hand gestures to control the computer. The project is reliable and sustainable the features of project are volume up and volume down, video forward and rewind. User can use hand gesture like keep hand near the sensors to rewind the video and vice versa to forward the video. This will work with sending the distance to the sensors which will be supported by Arduino and Pyautogui library.

Conclusion:

In this project to control laptop hand gestures uses an Arduino Uno board, Two Ultrasonic sensors and a computer to carry perform the operations of controlling media playback and volume. Its main focus is to reduce the operations of controlling media player. Its other focus is to reduce efforts of interacting with a computer through input devices. This kind of technology can be used in gaming as well as classrooms for interactive learning for hologram developed technology can also be taken in use. More applications exist in medical applications, in case a medical the user may not be within reach of the display and yet can operate with hand gestures. Gestures such as swipe using finger as a virtual mouse, are a safer and faster way to control the device.

References

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Annexures:

Plagiarism Report:

Arduino

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2	15/12/19	Discussion of Implementation		
3	1/2/20	Work status reporting		
4	15/2/20	Assembling of Hardware		
5	18/2/20	Dissution on the hardware		
6	25/2/20	Discussion on the Arduino code.		
7	27/2/20	Arduino code implementation		
8	5/3/20	Plagiarism check		
9	7/3/20	Final Discussion and submit		