

“Game Controls Through Gesture”

Developed For
FCAIT, iMSc(IT)

Project Report (Sem – VI)
Submitted For
The Partial Fulfillment Towards
The Degree of
Integrated Master of Science (Information Technology)
iMSc(IT)

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GLS UNIVERSITY

Faculty of Computer Applications & Information Technology

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CERTIFICATE

This is to certify that

- 1) Shubham Koshti
- 2) Vinayak Nagar
- 3) Pooran Sen

Student/s of Semester- VI Integrated Msc(IT) [TY iMSc(IT)],
FCAIT, GLS University has/have successfully completed the

Mini Project

on

“Game Controls Through Gesture”

as a partial fulfillment of the study of Third year Semester-VI,

**Integrated Master of Science (Information Technology)
[iMSc(IT)]**

Date of Submission: _____

Prof. Name of Internal Guide
(PROF. Anjali)

Prof. Tripti Dodiya
(Project Co – ordinator)

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PROJECT PROFILE

Title – Game Controls Through Gesture

Objective – With the sudden outbreak of Covid-19, everyone in the country was forced indoors with minimum mobility options and limited options for entertainment. Covid-19 had also affect entertainment industry. This is what led to a rising inclination towards gaming. Every gaming platform including video games and eSports, saw a rapid rise in the number of users and time spent. So in current situation gaming is one of the biggest business in entertainment industry.

Gesture controls is the method to control and interact with a computer without direct physical contact. It could be implemented in the gaming systems through gaming gloves, visual recognition and 3D cameras. For example Kinect is a xbox gaming console gesture control based game controller which uses depth camera and motion sensor.

The project aims to design a cost-effective gaming controller for gaming industry. We can play game using this gesture gaming controller like GTA 5, Racing Games and other games. This will work as input device for computer and that input command will control games.

Most of the current gamers only uses keyboard and mouse for gaming, there are very few people who use gesture controller for gaming. Gesture controller more entertaining and useful in gaming because it involve user in awesome gaming experience. It is more interactive than any other gaming controller like joystick, keyboard and mouse. Gesture controller is the future of upcoming gaming industry and looking at current situation gaming industry will grow very well. Gaming industry is bigger than any entertainment industry like movie industry. Current it is the biggest entertainment industry and it will grow bigger and bigger.

TOOLS AND TECHNOLOGY USED-

1. **Arduino Leonardo** – Leonardo is different from other Arduino boards because it has a microcontroller with inbuilt USB 2.0 communication. The Arduino Leonardo is a microcontroller board based on the ATmega32u4 (datasheet). It has 20 digital input/output pins (of which 7 can be used as PWM outputs and 12 as analog inputs), a 16 MHz crystal oscillator, a micro USB connection, a power jack, an ICSP header, and a reset button.

1. Input voltage: 7V-12V

2. Operating voltage: 2.7V-5.5V

3. 12 analogue input pins and seven pulse-width-modulated (PWM) outputs

4. 32kB flash memory

5. 1kB EEPROM

6. 2.5kB SRAM

7. 40mA per I/O pin current (DC)

2. **FLEX Sensor** - A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is varied by bending the surface.

The Flex Sensor patented technology is based on resistive carbon elements. FLEX sensor converts flex angle to RESISTANCE parameter.

RESISTANCE parameter to VOLTAGE parameter. For that we are use VOLTAGE DIVIDER circuit(56K Ohms Resistor).

PinNo	Description
P1	Usually connected to positive of power source.
P2	Usually connected to ground.

FLEX SENSOR Features and Specifications

Operating voltage of FLEX SENSOR: 0-5V

Can operate on LOW voltages

Power rating : 0.5Watt (continuous), 1 Watt (peak)

Life: 1 million

Operating temperature: -45°C to +80°C

Flat Resistance: 25K Ω

Resistance Tolerance: $\pm 30\%$

Bend Resistance Range: 45K to 125K Ohms(depending on bend)

How to Use FLEX SENSOR

FLEX SENSOR is basically a VARIABLE RESISTOR whose terminal resistance increases when the sensor is bent. So this sensor resistance increases depends on surface linearity. So it is usually used to sense the changes in linearity.

3. **ADEXL 335** – The **ADXL335** is a small, thin, low power, complete 3-axis **accelerometer** with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ± 3 g.

Pin Name	Description
VCC	The Vcc pin powers the module, typically with +5V
GND	Power Supply Ground
X	X-axis Analog Output Pin
Y	Y-axis Analog Output Pin
Z	Z-axis Analog Output Pin
ST	Self-Test Pin. This pin controls the Self-Test feature.

Accelerometer Module Features & Specifications

Operating Voltage: 3V to 6V DC

Operating Current: 350 μ A

Sensing Range: $\pm 3g$

3-axis sensing

High Sensitivity for small movements

Needs no external components

Easy to use with Microcontrollers or even with normal Digital/Analog IC

Small, cheap and easily available

4. **Jumper Wire** - A jump wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

The difference between each is in the end point of the wire

Male ends have a pin protruding and can plug into things female

ends do not and are used to plug things into Male-to-male jumper

wires are the most common. Male-to-male jumper wires are the most common.

5. **Breadboard** - A breadboard is a construction base for prototyping of electronics. Originally the word referred to a literal bread board, a polished piece of wood used for slicing bread. In the 1970s the solderless breadboard became available and nowadays the term "breadboard" is commonly used to refer to these.

A breadboard is a widely used tool to design and test circuit. You do not need to solder wires and components to make a circuit while using a bread board. It is easier to mount components & reuse them. Since, components are not soldered you can change your circuit design at any point without any hassle. It consist of an array of conductive metal clips encased in a box made of white ABS plastic, where each clip is insulated with another clips. There are a number of holes on the plastic box,

arranged in a particular fashion. there are different kinds of breadboards:- "full-size," "half-size," and "mini" breadboards

A typical bread board layout consists of two types of region also called strips. Bus strips and socket strips. Bus strips are usually used to provide power supply to the circuit. It consists of two columns, one for power voltage and other for ground. in full size breadboard bus strip divide into 2 part. and each part have a 5 substitute with 6X2 matrix size.

Socket strips are used to hold most of the components in a circuit. Generally it consists of two sections each with 5 rows and 64 columns. Every column is electrically connected from inside.

FUTURE SCOPE:-

On a global level, the gaming market stood at a value of \$151.55 billion in 2019 and is likely to reach an approximate value of \$256.97 billion by 2025, recording a CAGR of 9.17% over the prediction period (2020-2025). Game developers throughout developing economies are constantly striving to improve gamers experience for varied platforms, like Xbox, Windows PC and PlayStation and gesture gaming is one of the main part of gaming system. It improve gaming experience. It took gaming experience to next level.

In future gesture gaming will be one of the most popular gaming way and it will surpass any other gaming technique like physical devices like mouse and keyboard.

Existing system :-

The Existing system to play a pc game is keyboard, joystick etc this all are the hand gadgets to play a pc game . While playing with this gadgets we have to press our fingers continuously and after playing bits of game our fingers start paining. so we fell boursing to play game . By pressing again and again some time our keyboard buttons are damage.

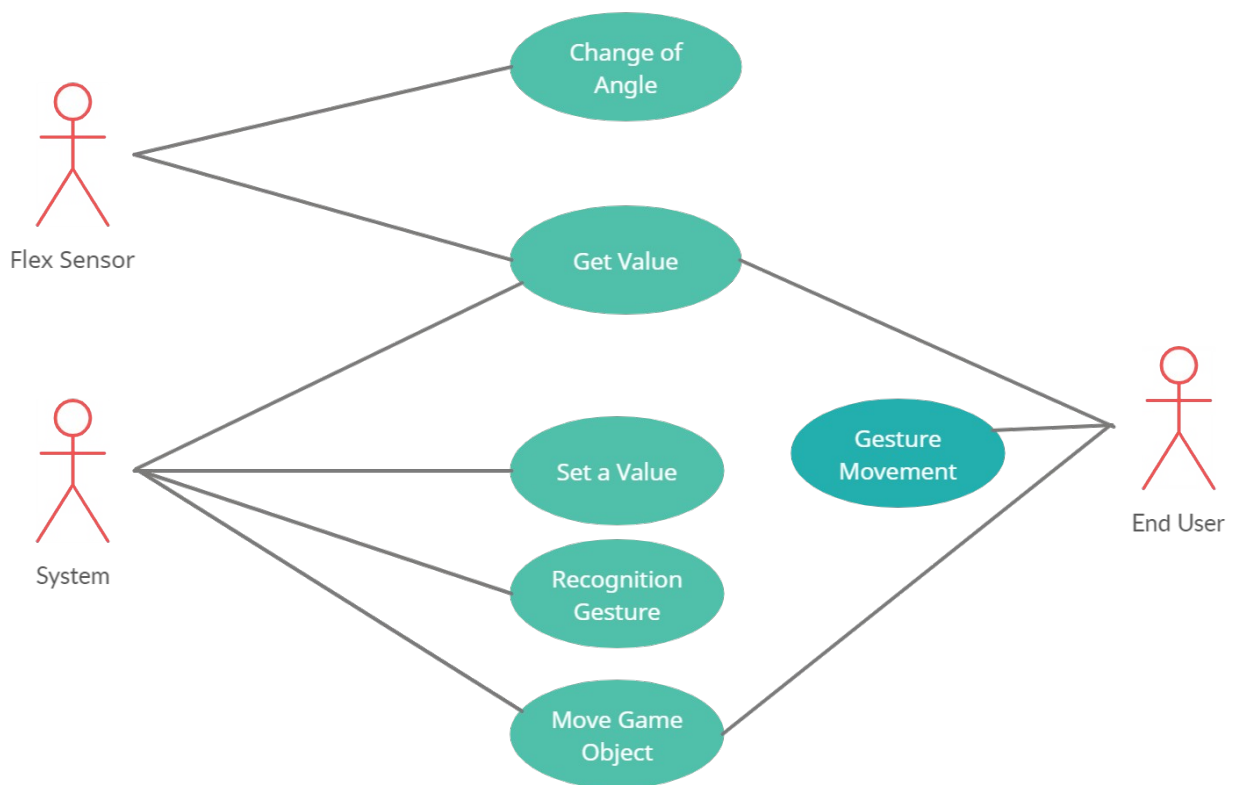
PROPOSED SYSTEM:-

- We will try to construct a gesture gaming controller using arduino leonardo and flex sensor and other components.
- In this way the game could be controlled without the need of mouse and keyboard.
- The project uses arduino as microcontroller which all the other devices are connected. The arduino processes the input taken from the flex sensors and provides an analog value as the output.
- Using this value we can determine the particular gesture and use this input to control game.

UML DIAGRAMS

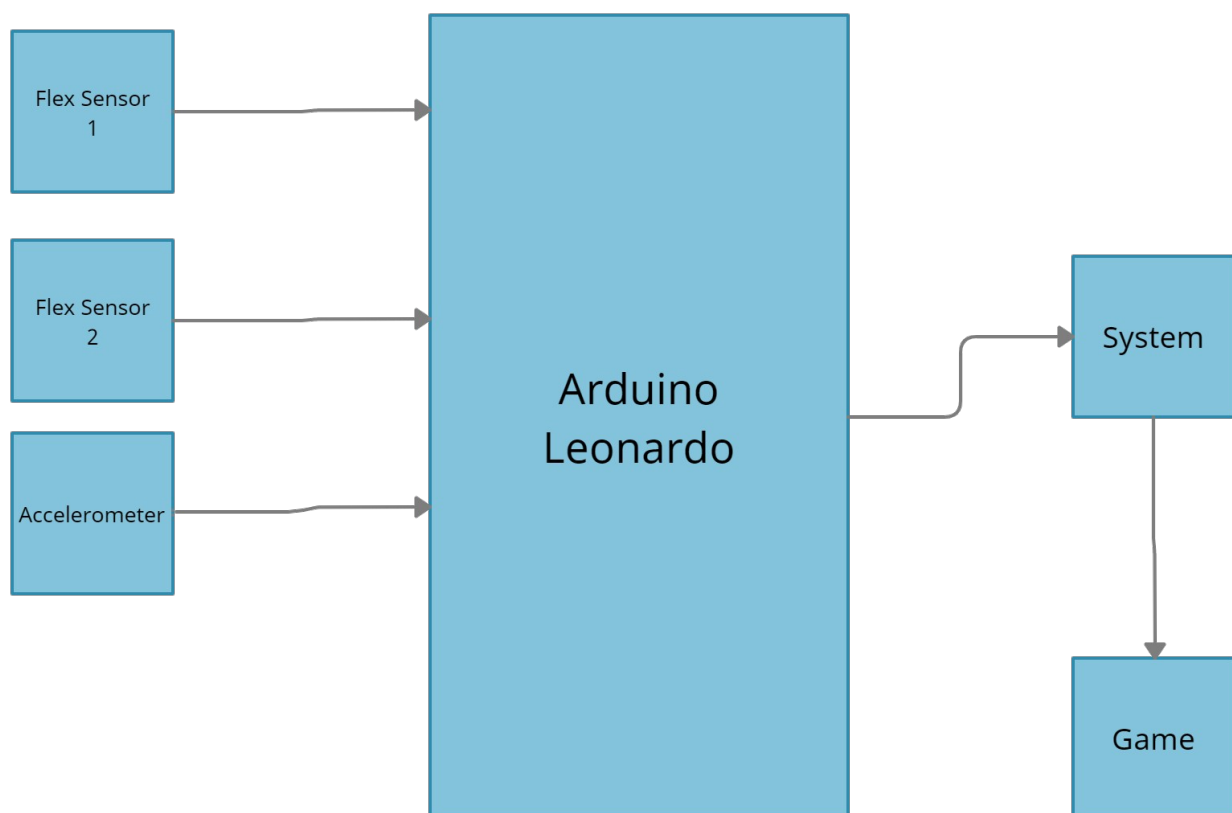
1. Use-Case Diagram:

- The Use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved.
- A gesture controller allowed user to control game using hand gesture.
- Flex Sensor get value of hand gesture. User uses gesture controller and he will move his hand in any direction and then system will get input according to user hand movement and then system recognition recognition gesture.
- According to user hand movement game object will be moved accordingly.

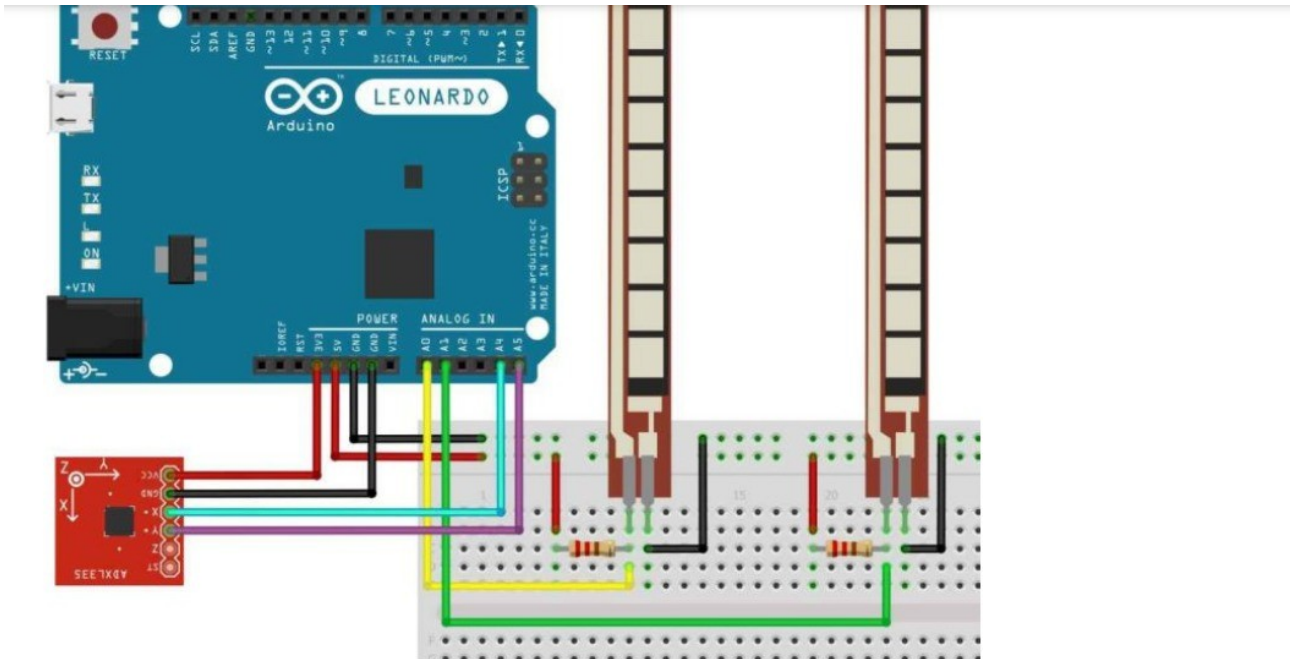


2. Block Diagram:

- The block diagram of Game Controls Through Gesture consists mainly three inputs, first 2 flex sensor and second one accelerometer.
- A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually, the sensor is stuck to the surface, and resistance of sensor element is varied by bending the surface.
- The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ± 3 g.
- First we need to move our hand so flex sensor will recognize hand movement and give input to arduino leonardo to system and then system control game according to input. It we control game object that when and where object move like left, right, up and down.



Circuit Diagram



The project uses arduino leonardo as the microcontroller at left side in which all other components are connected. The arduino processes the input taken from the flex sensors we can determine the particular gesture and use the input to control gaming object to move object in left, right, up and down.

The circuit diagram consists of arduino leonardo, accelerometer, flex sensor and breadboard.

CODING

```
#include "Keyboard.h"
```

```
void setup()
```

```
{
```

```
Serial.begin (9600);
```

```
Keyboard.begin();
```

```
}
```

```
void loop()
```

```
{
```

```
int accelerator = analogRead(A0);
```

```
int brake = analogRead(A1);
```

```
int x = analogRead(A4);
```

```
int y = analogRead(A5);
```

```
if (accelerator > 450 )
```

```
{
```

```
Keyboard.write('W');
```

```
delay(10);
```

```
}
```

```
if (brake > 400 )
```

```
{
```

```
Keyboard.write('S');
```

```
delay(10);
```

```
}
```

```
if (x <330){
```

```
Keyboard.press('R');
```

```
delay(250);
```

```
Keyboard.releaseAll();
```

```
}
```

```
if (y <380)
```

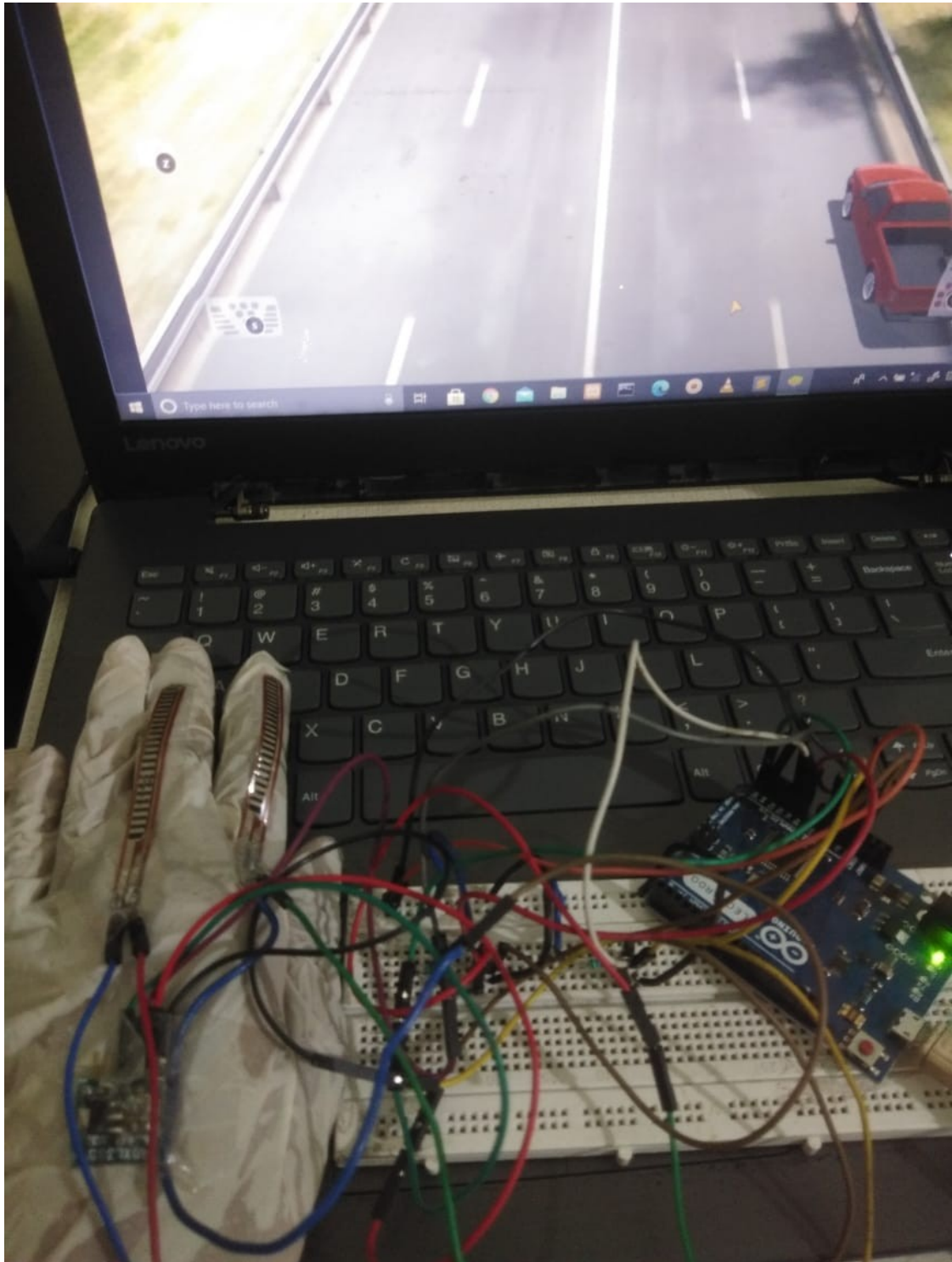
```
{
```

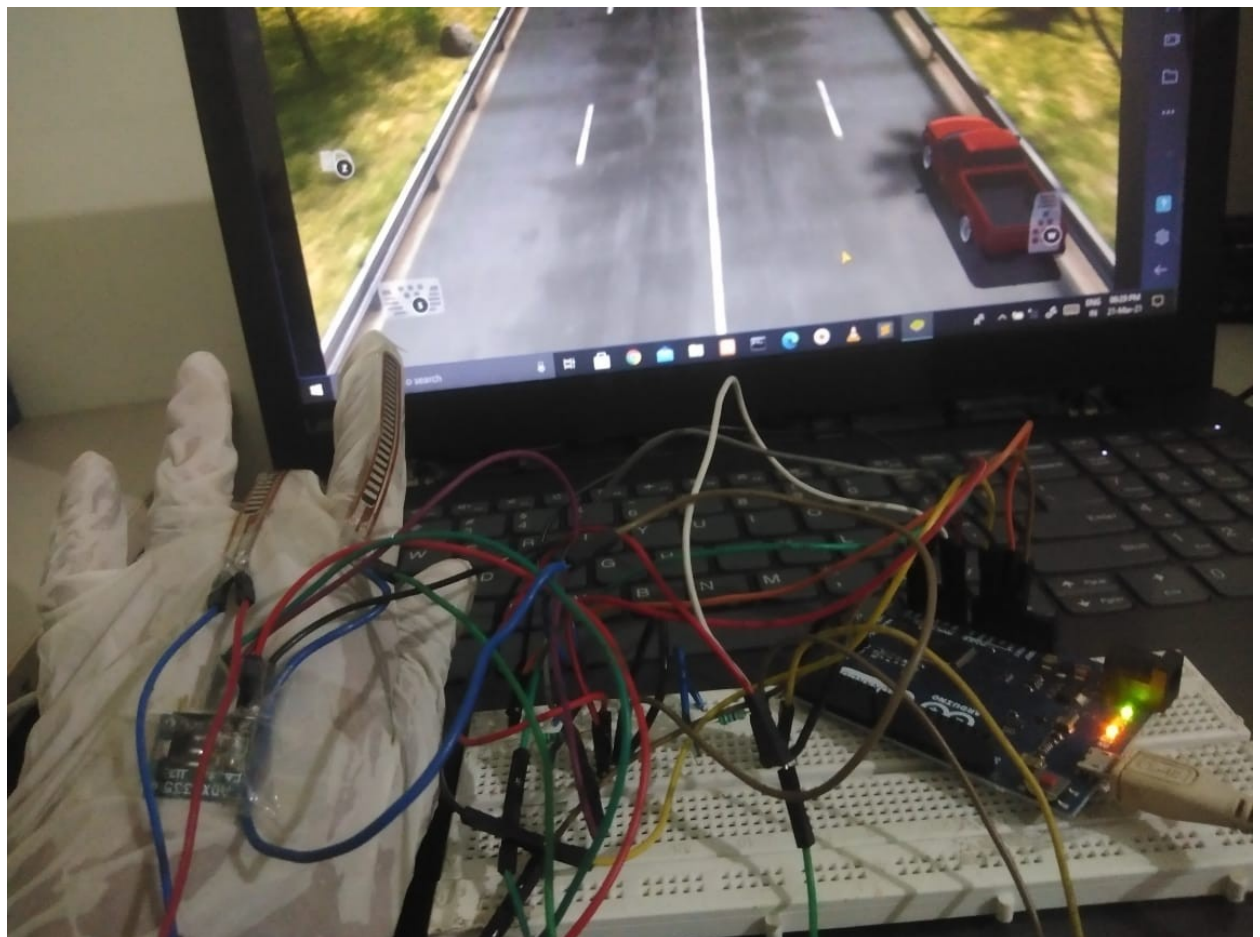
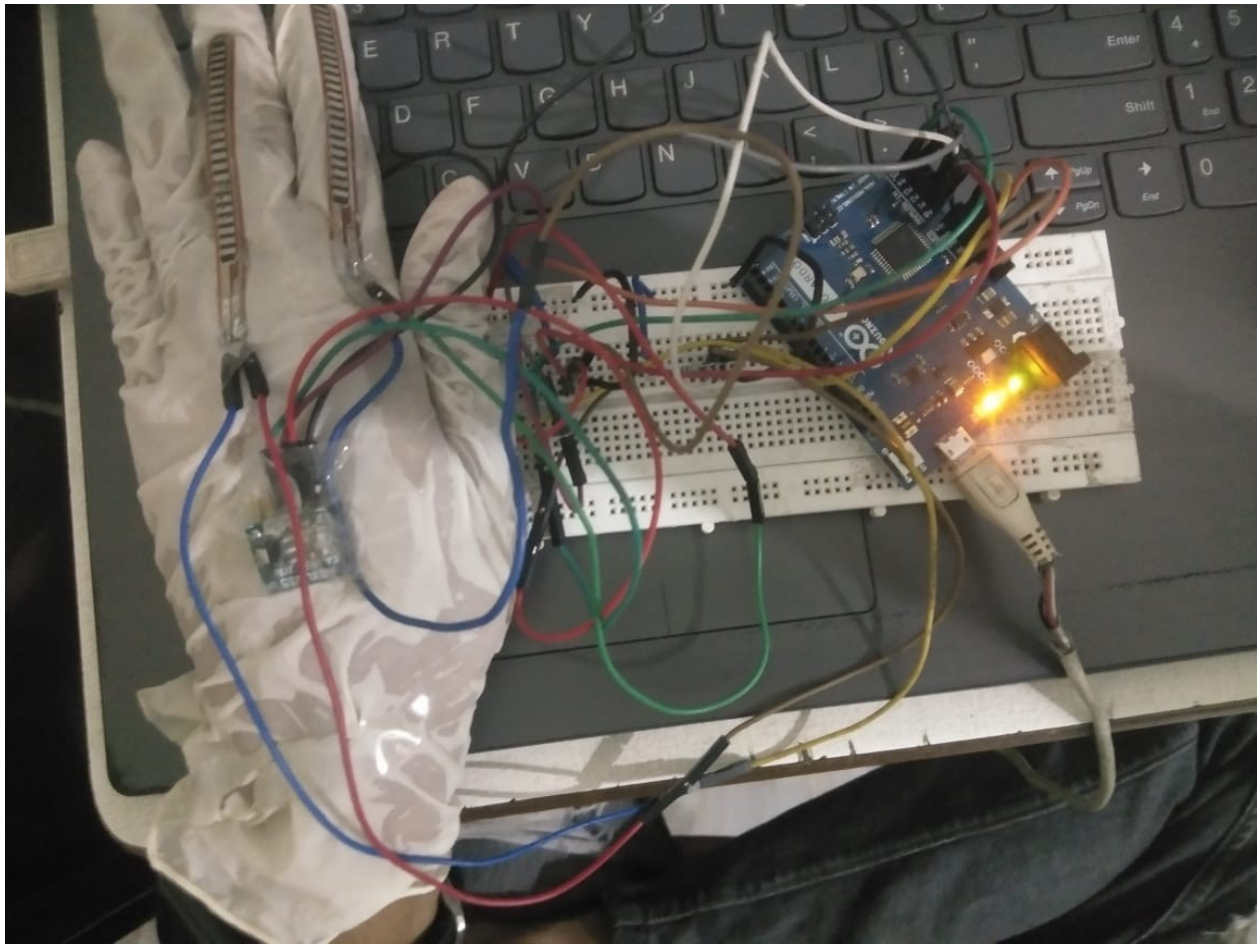
```
Keyboard.press('L');
```

```
delay(250);
```

```
Keyboard.releaseAll();} }
```

Sample Images





CONCLUSION

The project aims to build a cheap and usable gesture gaming controller. There are many future scope for this project. Firstly, instead of using keyboard, we can use this controller to play games. We can implement the Game controller for other games as well. Depending on the Demands of that particular game, we can make an effective Controller with the required sensor.

In this work, we described a design process of a gesture game controller. This project aim is to build a future proof gesture controller which we can use in our life to play game.

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