Objectives

The principle behind this project is very simple. We have made a simple hand gesture device using Arduino Leonardo & some IR sensors. Now we can control the cars of racing games by this hand gesture device by using the movements of our hands. By completing this project now we can play the racing games only by the movements of our hand. We don't have to use keyboard or mouse. By this hand gesture device we don't have to be pushing a button all the time. This device makes the racing games easier to play & very easy to control.

Concept

There is the description about how the sensors will work :

We are just using Arduino keyboard library to convert the inputs from IR obstacle sensor to key strokes for controlling the car in racing games.

1. If the top right and top left sensors are trigged then it will simulate up arrow key.

2. If the down right and down left sensors are trigged then it will simulate down arrow key.

3. If the top right and down right sensors are trigged then it will simulate right arrow key.

4. If the down left and top left sensors are trigged then it will simulate left arrow key.

Equipment:

1. Arduino Leonardo

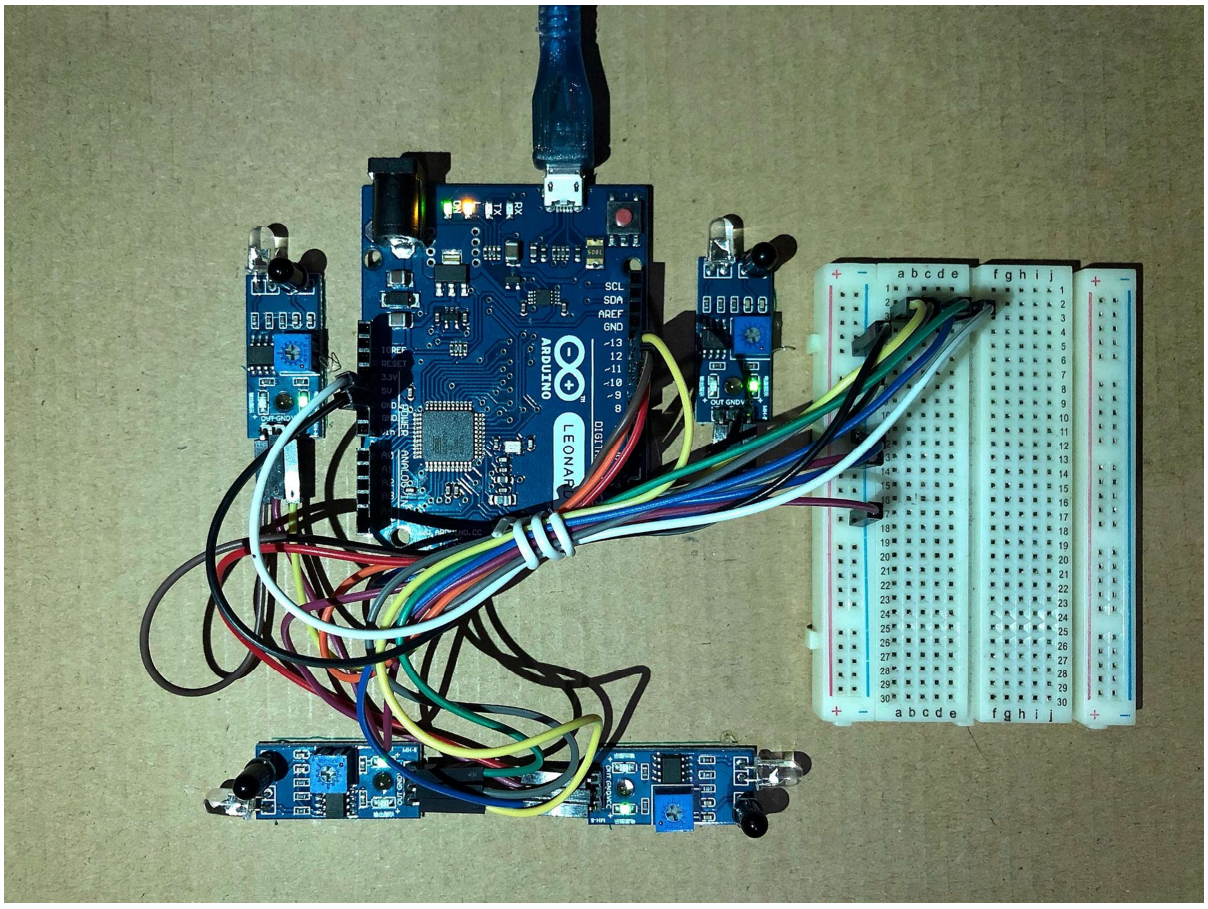
2. FC-51 IR Obstacle Avoidance Sensor

3. Arduino USB Connector

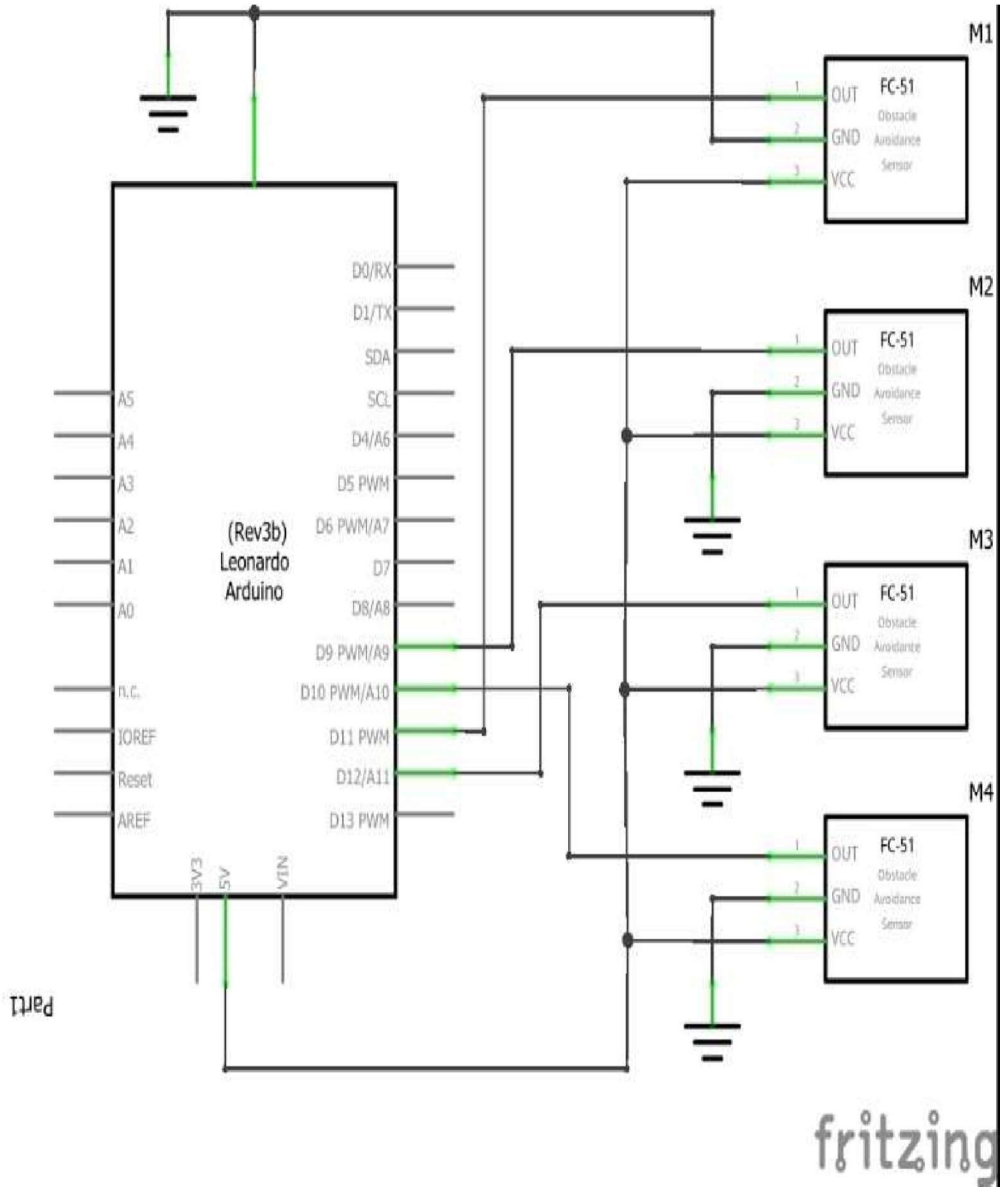
4. Jumper Wires

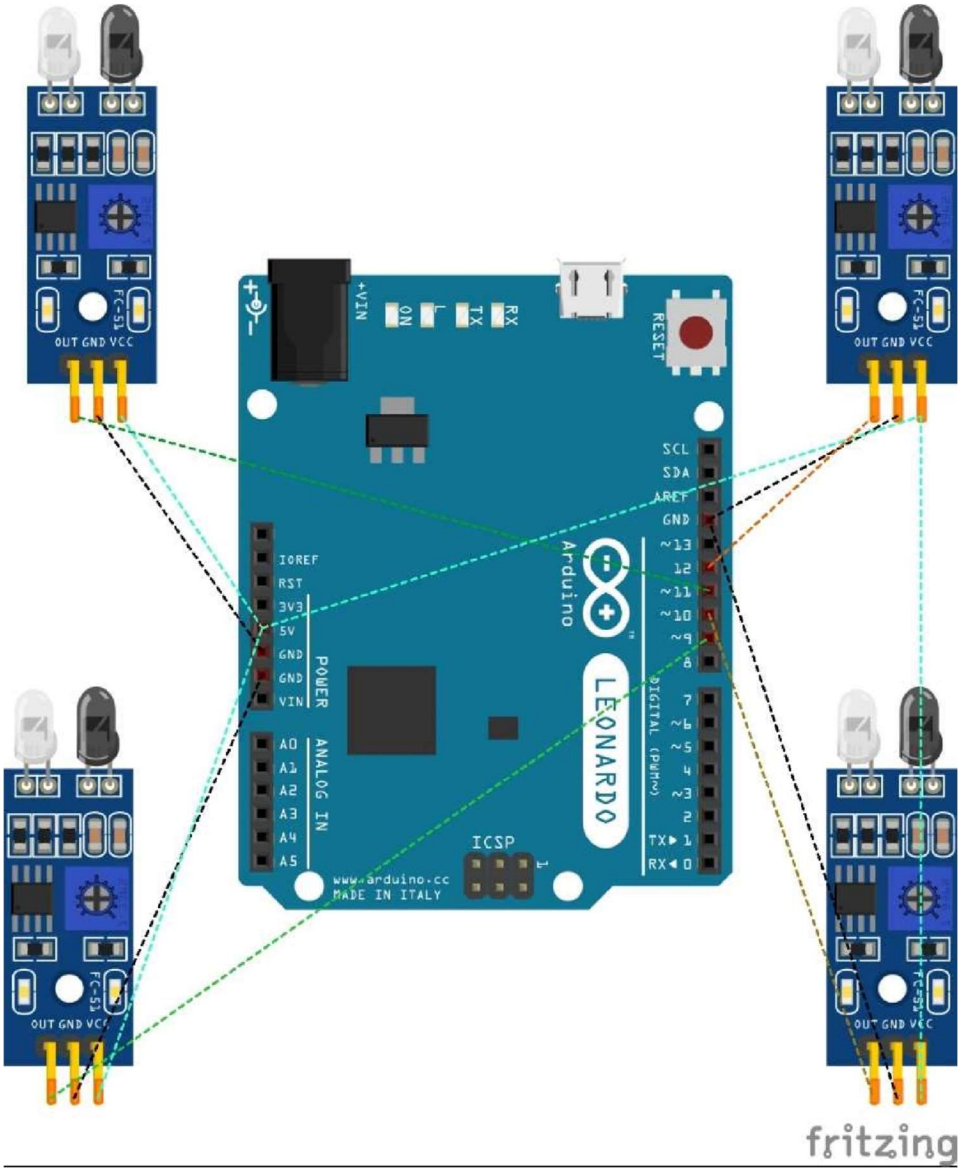
Circuit Description

We have arranged the sensors on the four corners of the Leonardo board as shown in the picture below. We've connected all the ground of the sensors to the ground of the Arduino and connected the output pins of the sensors to the Arduino digital pins.



Here is the Schematic Diagram:




OUT GND VCC
FC-51
+VIN
ON
L
TX
RX
RESET
SCL
SDA
AREF
GND
IOREF
RST
3V3
5V
GND
GND
VIN
POWER
A0
A1
A2
A3
A4
A5
ANALOG IN
Arduino
LEONARDO
DIGITAL (PWM~)
ICSP
www.arduino.cc
MADE IN ITALY
fritzing

Arduino Code

Here is the code of this project:

```
//gesture control
#include <Keyboard.h>
int up_right = 9;
int up_left = 11;
int down_right = 10;
int down_left = 12;

bool up_right_state;
bool down_right_state;
bool down_left_state;
bool up_left_state;
void setup()
{
  Keyboard.begin();
  Serial.begin(9600);
  pinMode(up_right, INPUT);
  pinMode(up_left, INPUT);
  pinMode(down_right, INPUT);
  pinMode(down_left, INPUT);
}
void loop()
{
```

```
up_right_state = digitalRead(up_right);
up_left_state = digitalRead(up_left);
down_right_state = digitalRead(down_right);
down_left_state = digitalRead(down_left);
Serial.print(up_right_state);
Serial.print(up_left_state);
Serial.print(down_right_state);
Serial.println(down_left_state);



if (digitalRead(up_left) == 0 && digitalRead(up_right) == 0)
  while ((digitalRead(up_left) == 0 && digitalRead(up_right) == 0))
  {
    Serial.println("move up");
    Keyboard.press(KEY_UP_ARROW);
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
  }
if (digitalRead(down_left) == 0 && digitalRead(down_right) == 0 )
  while ((digitalRead(down_left) == 0 && digitalRead(down_right) == 0 ) )
  {
    Serial.println("move down");
    Keyboard.press(KEY_DOWN_ARROW);
```

```
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
}
 if (digitalRead(down_left) == 0 && digitalRead(up_left) == 0 )
  while (digitalRead(down_left) == 0 && digitalRead(up_left) == 0 )

  {
   Serial.println("move left");
   Keyboard.press(KEY_LEFT_ARROW);
   delay(100);
   Keyboard.releaseAll();
   Keyboard.end();
  }
 if (digitalRead(up_right) == 0 && digitalRead(down_right) == 0)
  while (digitalRead(up_right) == 0 && digitalRead(down_right) == 0)
  {
   Serial.println("move right");
   Keyboard.press(KEY_RIGHT_ARROW);
   delay(100);
   Keyboard.releaseAll();
   Keyboard.end();
  }
 if (digitalRead(up_right) == 0 && digitalRead(down_right) == 1 &&
digitalRead(down_left) == 1 && digitalRead(up_left) == 1)
```

```
  while (digitalRead(up_right) == 0 && digitalRead(down_right) == 1 && digitalRead(down_left) == 1 && digitalRead(up_left) == 1)


   {
    Serial.println("move right up corner");
    Keyboard.press(KEY_RIGHT_ARROW);
    Keyboard.press(KEY_UP_ARROW);
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
   }
 if (digitalRead(up_left) == 0 && digitalRead(down_right) == 1 && digitalRead(up_right) == 1 && digitalRead(down_left) == 1)
  while (digitalRead(up_left) == 0  && digitalRead(down_right) == 1 && digitalRead(up_right) == 1 && digitalRead(down_left) == 1)
   {
    Serial.println("move left up corner");
    Keyboard.press(KEY_LEFT_ARROW);
    Keyboard.press(KEY_UP_ARROW);
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
   }
 if (digitalRead(down_left) == 0 && digitalRead(up_right) == 1 && digitalRead(up_left) == 1 && digitalRead(down_right) == 1 )
```

```
  while (digitalRead(down_left) == 0 && digitalRead(up_right) == 1 && digitalRead(up_left) == 1 && digitalRead(down_right) == 1 )
   {
    Serial.println("move left down corner");
    Keyboard.press(KEY_LEFT_ARROW);
    Keyboard.press(KEY_DOWN_ARROW);
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
   }
 if (digitalRead(down_right) == 0 && digitalRead(up_right) == 1 && digitalRead(up_left) == 1 && digitalRead(down_left) == 1)
  while (digitalRead(down_right) == 0 && digitalRead(up_right) == 1 && digitalRead(up_left) == 1 && digitalRead(down_left) == 1)
   {
    Serial.println("move right down corner");
    Keyboard.press(KEY_RIGHT_ARROW);
    Keyboard.press(KEY_DOWN_ARROW);
    delay(100);
    Keyboard.releaseAll();
    Keyboard.end();
   }
}
```

Work Process

To complete this project we have used Arduino keyboard library to convert the inputs from IR obstacle sensor to key strokes for controlling the car in racing game.

We have used sensors to control the up key, down key, right key and left key. As we mentioned before, we've set the sensors in four corners of the Arduino Leonardo Board as we've planned. These four sensors will work like the four keys.

These sensors will help us to use our hands to work same as the typical game controllers and keyboard keys. The sensors is connected in the Arduino. The Arduino is connected to a PC with an Arduino USB connector. So, now we can experience the use of just hands instead of pushing any keyboard buttons to play racing games.

Conclusion

We've tried our best to implement this project. The goal of this project was to make playing racing games more easily. There are many people who may have problems with their fingers by an accident, so this hand gesture device will be the medium for them to play racing games. There were some problems we faced during uploading the code, but ultimately we've uploaded the code successfully. This project is just a crack we might say in the endless possibilities of gesture control.