

Smart Door (IR Sensor)

Project 1

Class - VI

Objective :

To design and build an automatic smart door that opens or closes automatically when a person approaches, using an IR sensor and a servo motor controlled by an Arduino.

Concept / Principle:

- This project works on the principle of infrared (IR) detection.
- The IR sensor detects the presence of an object or person by emitting and receiving infrared light.
- When the IR sensor detects someone nearby, the Arduino activates the servo motor to open the door.
- After a few seconds, the servo motor returns the door to its closed position automatically.
- This demonstrates automation using sensors and actuators, a key concept in robotics.

Components Required :

S.No.	Component	Quantity	Description
• 1	Arduino UNO	1	Microcontroller board
• 2	IR Sensor Module	1	Detects objects
• 3	Servo Motor (SG90)	1	Controls door movement
• 4	Jumper Wires	As required	For circuit connections
• 5	Breadboard	1	For easy wiring
• 6	Power Supply (5V)	1	To power the circuit

Connections :

- IR Sensor OUT → Pin 2
- Servo Signal → Pin 9
- VCC → 5V, GND → GND

6. Arduino Code:

```
#include <Servo.h>
```

```
Servo doorServo;
```

```
int irSensor = 2;    // IR sensor connected to pin 2
```

```
int sensorValue;
```

```
void setup() {
```

```
    doorServo.attach(9); // Servo connected to pin 9
```

```
    pinMode(irSensor, INPUT);
```

```
    doorServo.write(0); // Door initially closed
```

```
}
```

```
void loop() {
```

```
    sensorValue = digitalRead(irSensor);
```

```
    if (sensorValue == LOW) { // Object detected (LOW = active)
```

```
        doorServo.write(90); // Open door
```

```
        delay(3000); // Wait 3 seconds
```

```
        doorServo.write(0); // Close door
```

```
    }
```

```
}
```

Working :

- The IR sensor continuously monitors for obstacles.
- When someone comes near, the sensor output changes, sending a signal to the Arduino.
- The Arduino activates the servo motor, opening the door.
- After a short delay, the door closes automatically.

Observation :

- The door opens automatically when a person approaches and closes after a few seconds.
- Demonstrates basic automation using sensors and actuators.

Applications :

- Automatic gates and sliding doors.
- Smart home and office automation systems.
- Energy-saving doors in malls and hospitals.