



Scanning Infrared Detector

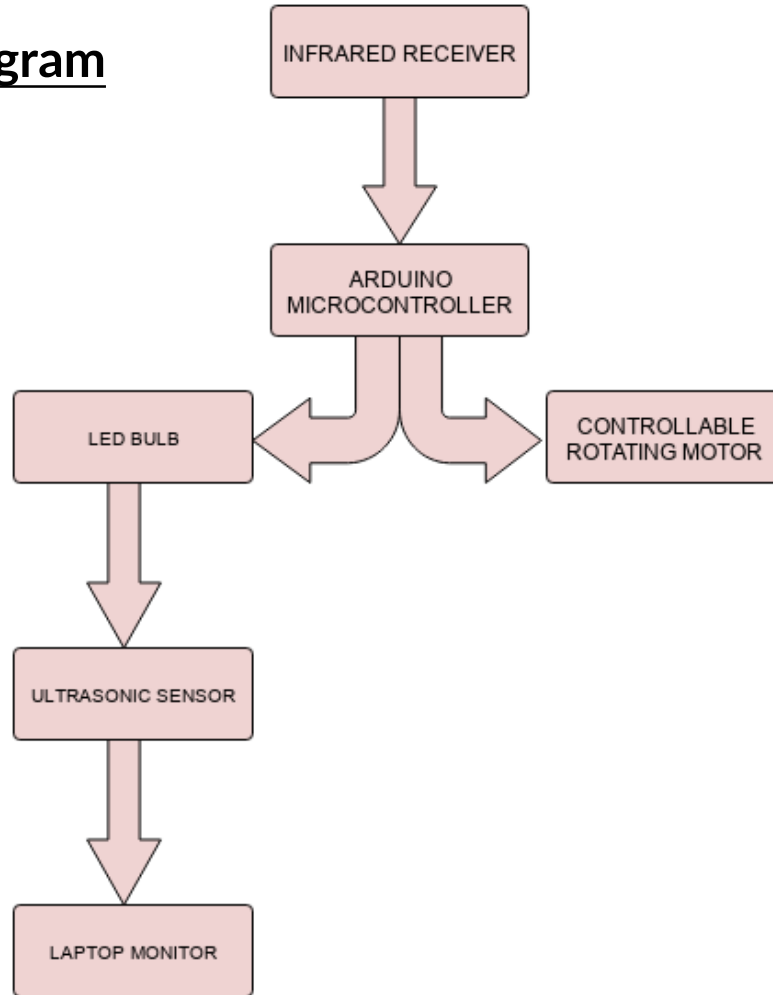
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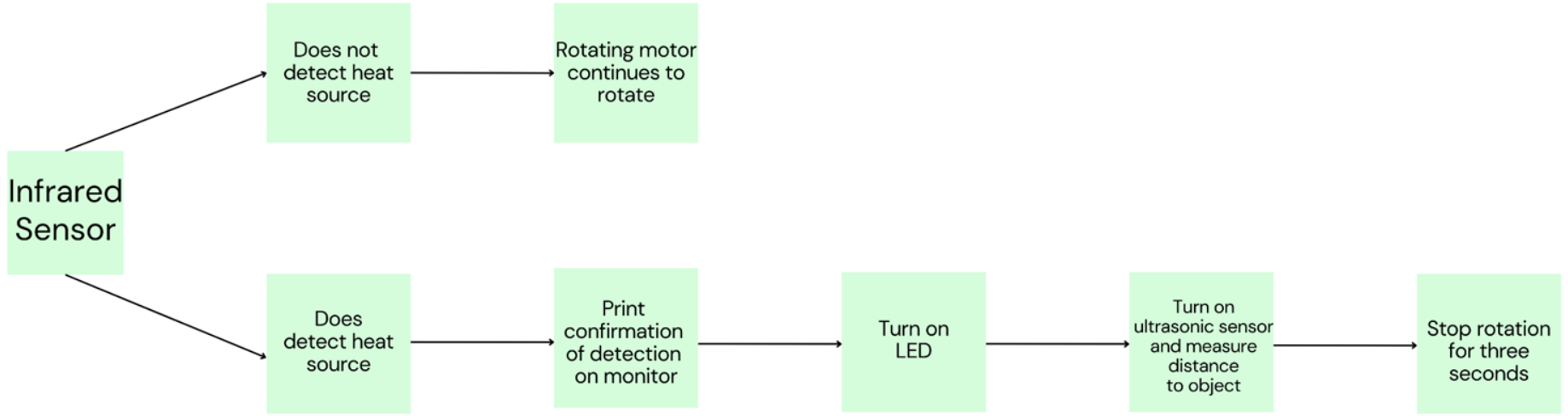
Abstract

- The arduino, ultrasonic detector, and infrared sensor are mounted on a continuously rotating servo motor
- The purpose of the system is to:
 - scan a room for sources of heat
 - Upon detection of a heat source, stop rotating and measure the distance to the detected object

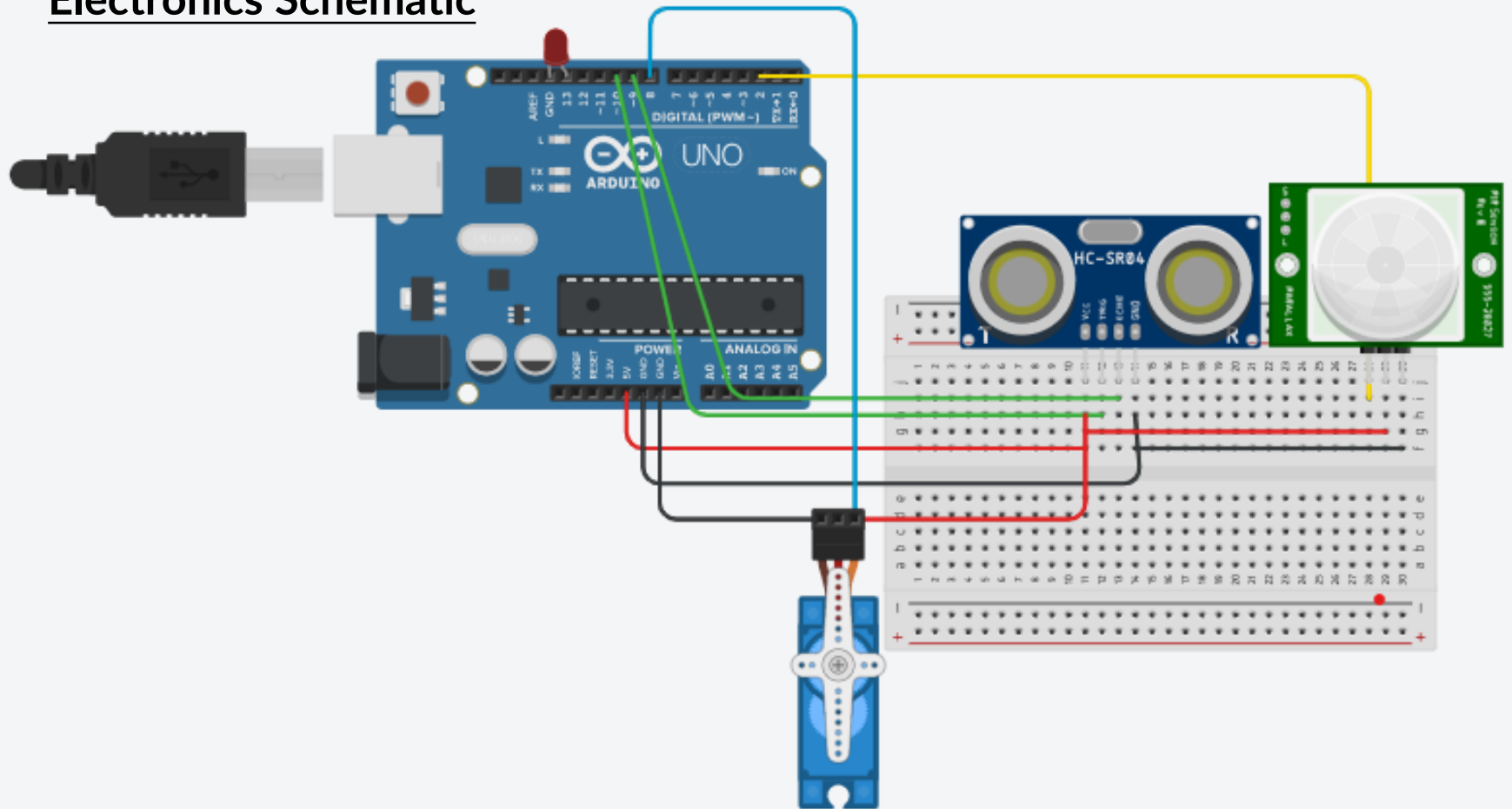
Hardware Block Diagram



Software Logical Flow Chart



Electronics Schematic



```

1  #include <Servo.h>
2
3  //Servo variables
4  Servo myservo; // create servo object to control a servo
5
6  int pos = 0; // variable to store the servo position
7
8
9  // IR receiver variables
10 int ledPin = 13; // LED pin
11 int inputPin = 2; // PIR sensor input pin
12 int motion = LOW; // begin by assuming there is no motion
13 int signal = 0; // inputPin status
14
15
16 //Ultrasonic sensor variables
17 int trig = 10; //trigger pin
18 int echo = 9; //echo pin
19 long duration; // travel time of sound between trigger and echo signals
20 int distance; // distance to object as a function of duration
21
22
23 void setup() {
24   myservo.attach(0); // attaches the servo on pin 9 to the servo object
25
26
27   pinMode(ledPin, OUTPUT); // declare LED as output
28   pinMode(inputPin, INPUT); // declare sensor as input
29
30   pinMode(trig, OUTPUT); // Sets the trig as an Output
31   pinMode(echo, INPUT); // Sets the echo as an Input
32
33   Serial.begin(9600);
34 }

```

```

35
36 void loop() {
37
38   for (pos = 0; pos <= 45; pos += 1) { // Servogoes from 0 degrees to 60 degrees in 1 degree steps
39
40     myservo.write(pos); // tell servo to go to position in variable 'pos'
41     delay(200); // waits 200ms for the servo to reach next position
42
43     motion_detect(signal); // for each pass, the motion detector and distace scanner code is running
44   }
45
46   for (pos = 45; pos >= 0; pos -= 1) { // goes from 60 degrees to 0 degrees in 1 degree steps
47
48     myservo.write(pos); // tell servo to go to position in variable 'pos'
49     delay(200); // waits 200ms for the servo to reach next position
50
51     motion_detect(signal);
52   }
53 }
54

```

```

55 void motion_detect(int signal){
56
57
58   signal = digitalRead(inputPin);      // read input value
59
60   if (signal == HIGH)                  // check if the signal is HIGH
61   {
62
63
64     if (motion == LOW)                  //only run code when there is no previous motion
65     {
66       Serial.println("Heat source detected"); // confirmation of motion printed on the serial monitor
67       Serial.print("Direction (degrees):");
68       Serial.println(pos);
69
70
71
72
73
74
75
76       digitalWrite(trig, LOW);          //when motion is detected, trigger ultrasonic sensor and measure distance to object
77       delayMicroseconds(2);
78
79
80       digitalWrite(trig, HIGH);          // Sets the trig on HIGH state for 10 microseconds
81       delayMicroseconds(5);
82
83       digitalWrite(trig, LOW);           //reset the trigger back to LOW
84
85       duration = pulseIn(echo, HIGH);    // measures the time of travel of sound waves between trig and echo signals
86
87       // calculate distance to object
88       // distance to object = 1/2 (time * velocity) = 1/2 (travel time * 34 cm / ms)
89       distance = duration * 0.034 / 2;    // calculate distance
90
91       Serial.print("Distance (cm): ");   // display the distance on the serial monitor
92       Serial.println(distance);
93
94
95
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```

```

93
94   myservo.write(pos);                  //servo holds position for 1 seconds
95   digitalWrite(ledPin, HIGH);         // turn LED ON when moition is detected
96
97   delay(3000);
98
99
100
101
102   motion = HIGH;                       // set variable 'motion' to HIGH
103 }
104 }
105 else
106 {
107   digitalWrite(ledPin, LOW);          // turn LED OFF
108
109   if (motion == HIGH)
110   {
111     Serial.println("Continuing scan"); // print on output change
112     Serial.println(" ");
113
114     motion = LOW;                     // reset variable 'motion' back to LOW
115   }
116 }
117 }

```