

Motion Detection activating Buzzer with De bouncing and Filtering Technique

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#define MOTION_SENSOR_PIN 3 // Input pin connected to the PIR sensor's OUT
#define OUTPUT_PIN 2 // Output pin to go HIGH on motion

// Filtering parameters
const unsigned long MOTION_DEBOUNCE_TIME = 1000; // Minimum time (ms) motion must be HIGH
unsigned long motionStartTime = 0; // Tracks when motion started
bool motionDetected = false; // Tracks stable motion detection

void setup() {
  pinMode(MOTION_SENSOR_PIN, INPUT); // Set PIR sensor pin as input
  pinMode(OUTPUT_PIN, OUTPUT); // Set D2 as output

  digitalWrite(OUTPUT_PIN, LOW); // Ensure D2 is LOW initially
  Serial.begin(9600); // For debugging (optional)
}

void loop() {
  int sensorValue = digitalRead(MOTION_SENSOR_PIN); // Read PIR sensor output

  if (sensorValue == HIGH) { // Motion signal detected
    if (!motionDetected) { // If motion was not previously stable
      if (motionStartTime == 0) { // First detection
        motionStartTime = millis(); // Start timer
      } else if (millis() - motionStartTime >= MOTION_DEBOUNCE_TIME) {
        // Signal stable for debounce period
        motionDetected = true; // Confirm motion detection
        digitalWrite(OUTPUT_PIN, HIGH); // Set D2 HIGH
        Serial.println("Motion Stabilized: D2 HIGH");
      }
    }
  }
}
```

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    }  
  }  
  } else { // No motion  
    motionStartTime = 0; // Reset timer  
    if (motionDetected) { // If motion was previously detected  
      motionDetected = false;  
      digitalWrite(OUTPUT_PIN, LOW); // Set D2 LOW  
      Serial.println("Motion Ended: D2 LOW");  
    }  
  }  
  
  delay(50); // Small delay for stability  
}
```

