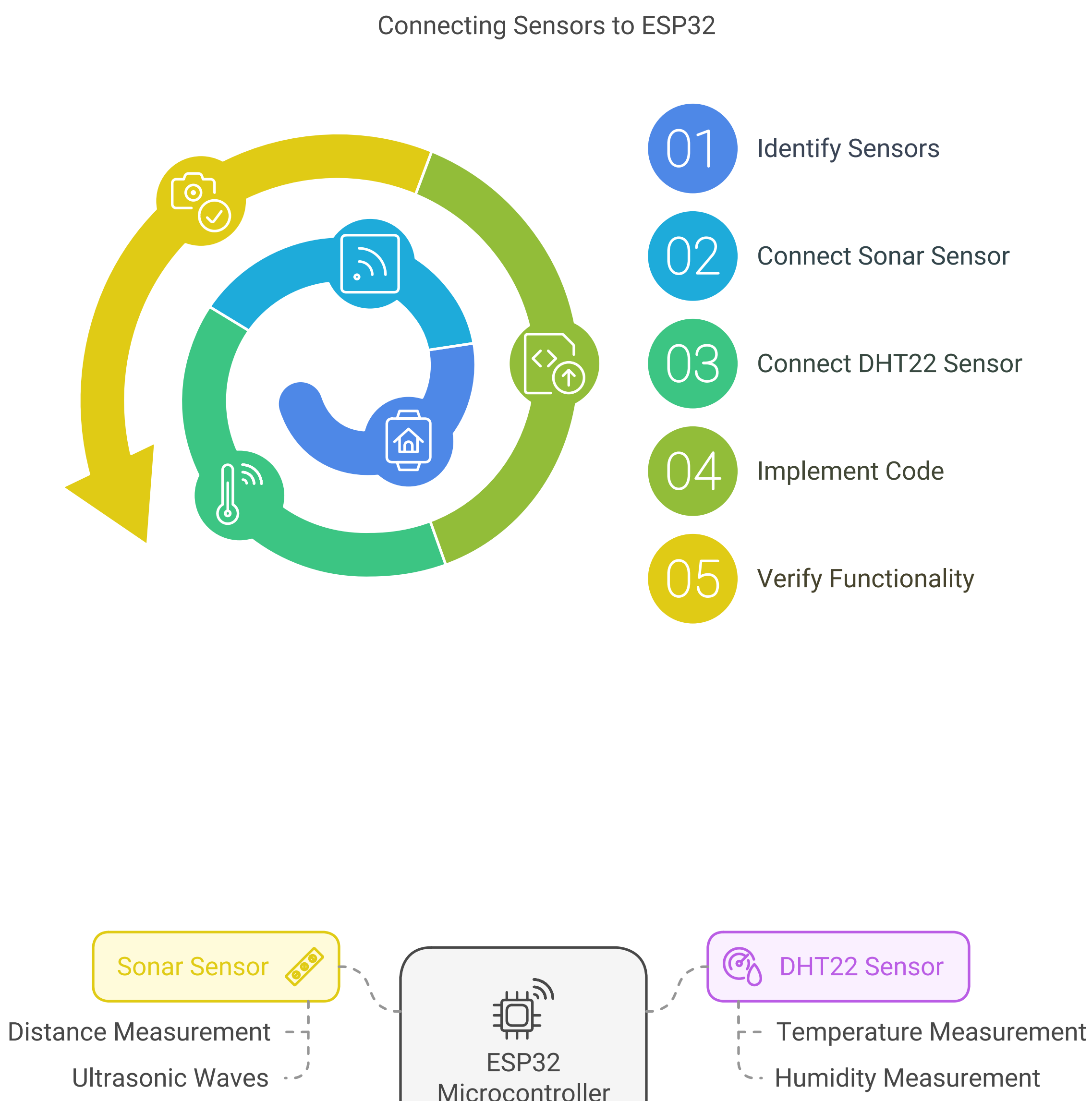


Connecting Sensors to ESP32: Sonar Sensor and DHT22 Sensor

In this document, I will explain the process of connecting my sonar sensor and DHT22 sensor to the ESP32 microcontroller. The ESP32 is a powerful and versatile microcontroller that supports various sensors and modules, making it ideal for IoT projects. The sonar sensor is used for distance measurement, while the DHT22 sensor is used for measuring temperature and humidity. This guide will provide a step-by-step overview of the connections and the code required to get these sensors up and running.



Components Required

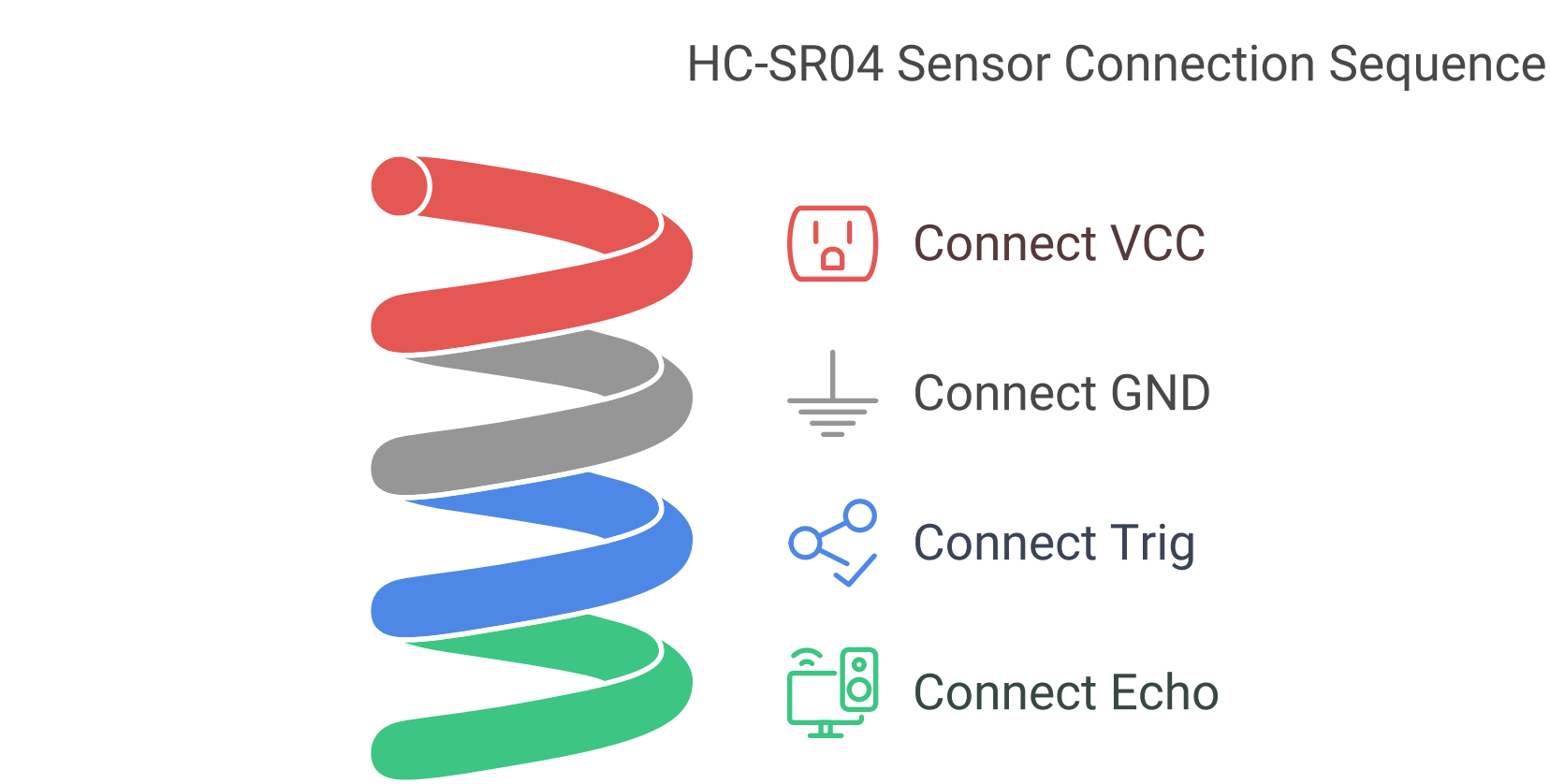
- ESP32 microcontroller
- HC-SR04 ultrasonic sonar sensor
- DHT22 temperature and humidity sensor
- Breadboard and jumper wires
- Power supply (USB or battery)

Wiring the Sensors

HC-SR04 Sonar Sensor

The HC-SR04 sonar sensor has four pins: VCC, Trig, Echo, and GND. Here's how to connect it to the ESP32:

1. **VCC**: Connect to the 5V pin on the ESP32.
2. **GND**: Connect to the GND pin on the ESP32.
3. **Trig**: Connect to a digital pin on the ESP32 (e.g., GPIO 23).
4. **Echo**: Connect to another digital pin on the ESP32 (e.g., GPIO 22).



DHT22 Sensor

The DHT22 sensor has three pins: VCC, GND, and Data. Here's how to connect it to the ESP32:

1. **VCC**: Connect to the 3.3V pin on the ESP32.
2. **GND**: Connect to the GND pin on the ESP32.
3. **Data**: Connect to a digital pin on the ESP32 (e.g., GPIO 21).

Code Implementation

To read data from both sensors, we need to write a program using the Arduino IDE. Make sure to install the necessary libraries for the DHT sensor. Here's a sample code snippet:

```
#include <DHT.h>

#define DHTPIN 21      // DHT22 data pin
#define DHTTYPE DHT22 // DHT 22 (AM2302)
#define TRIG_PIN 23    // HC-SR04 Trig pin
#define ECHO_PIN 22    // HC-SR04 Echo pin

DHT dht(DHTPIN, DHTTYPE);

void setup() {
  Serial.begin(115200);
  dht.begin();

  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
}

void loop() {
  // Reading DHT22 sensor
  float humidity = dht.readHumidity();
  float temperature = dht.readTemperature();

  // Reading HC-SR04 sensor
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);

  long duration = pulseIn(ECHO_PIN, HIGH);
  float distance = (duration * 0.034) / 2;

  // Print the results
  Serial.print("Temperature: ");
  Serial.print(temperature);
  Serial.print(" °C, Humidity: ");
  Serial.print(humidity);
  Serial.print(" %, Distance: ");
  Serial.print(distance);
  Serial.println(" cm");

  delay(2000); // Wait for 2 seconds before the next loop
}
```

Conclusion

Connecting the HC-SR04 sonar sensor and the DHT22 sensor to the ESP32 is a straightforward process that allows for effective distance, temperature, and humidity measurements. By following the wiring instructions and using the provided code, you can easily integrate these sensors into your IoT projects. This setup opens up numerous possibilities for monitoring environmental conditions and distance measurements in real-time.