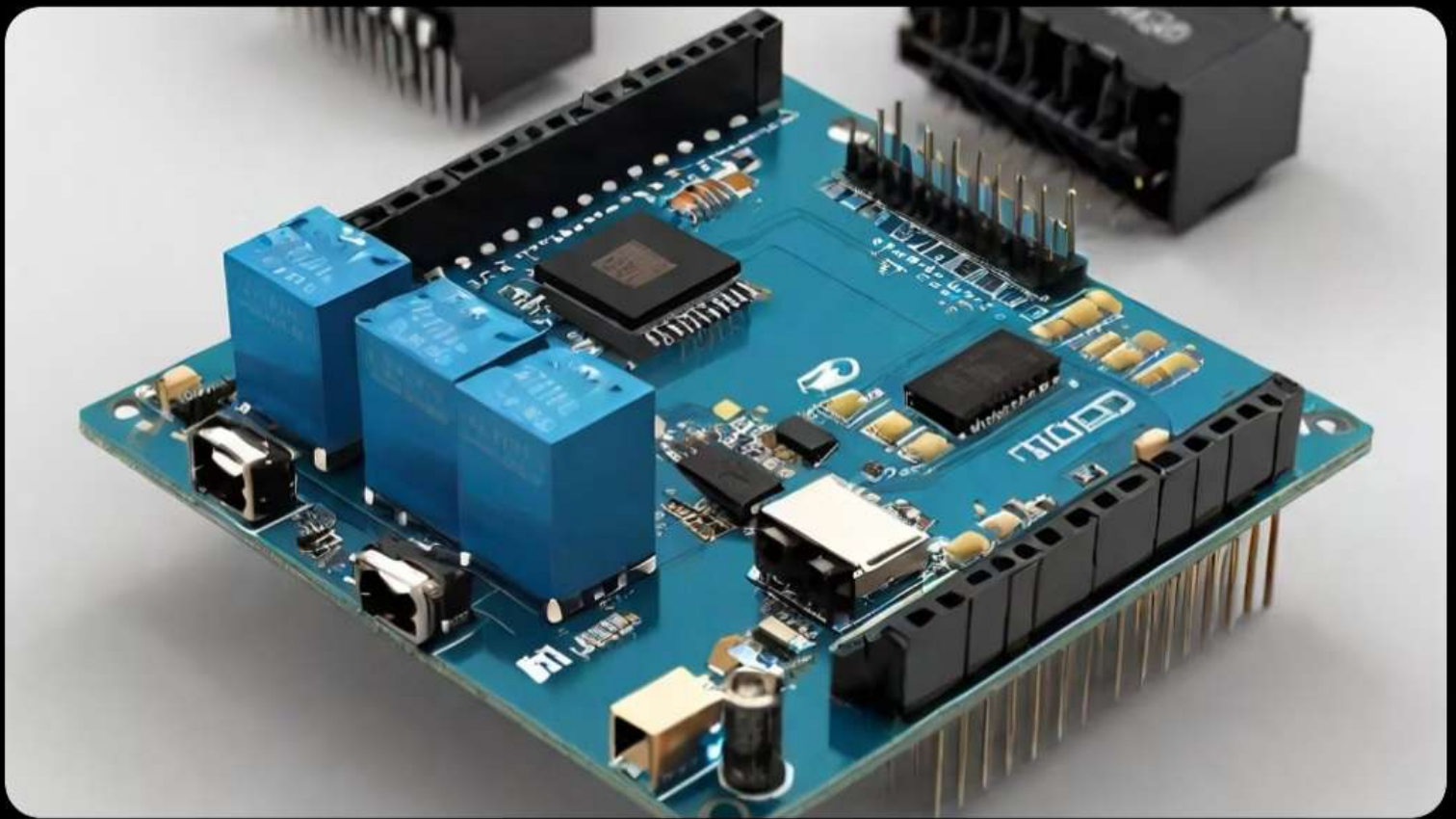
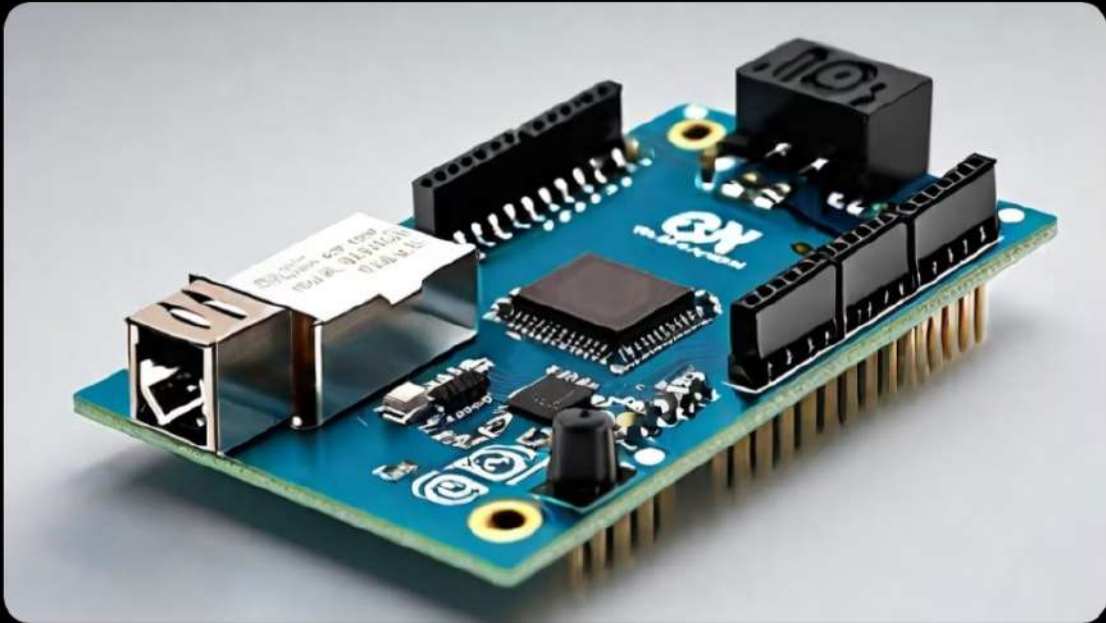


Arduino Uno and WiFi Module (HC-05) Project



Introduction



Arduino Uno

- The Arduino Uno is a popular microcontroller board used for various electronics projects.
- It is easy to use, versatile, and provides a wide range of input and output options.

WiFi Module (HC-05)

- The WiFi Module (HC-05) is a wireless communication module that enables Arduino Uno to connect to WiFi networks.
- It allows for wireless data transfer and remote control of Arduino projects.

Project Overview

Objectives

- Develop a project using Arduino Uno and WiFi Module (HC-05).
- Create a wireless communication system between Arduino and other devices.
- Implement various features and functionalities using the Arduino and WiFi Module.

Key Features

- **Wireless communication:** Establish a wireless connection between Arduino and other devices.
- **Data transmission:** Send and receive data wirelessly using the WiFi Module.
- **Control and automation:** Use Arduino to control and automate devices or systems.
- **Sensor integration:** Integrate sensors with Arduino to collect and process data.



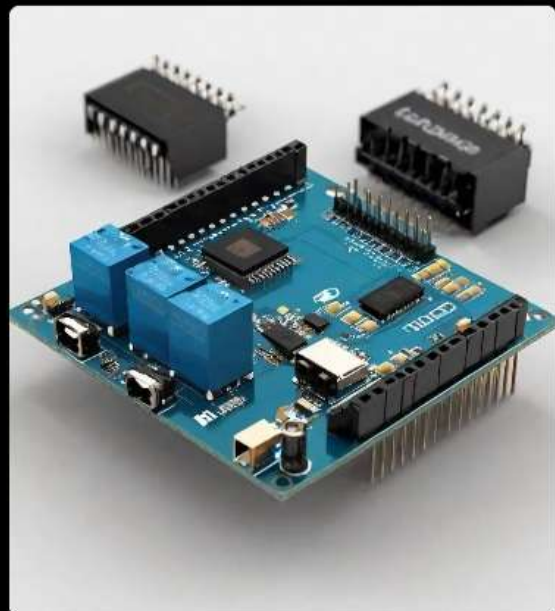
Hardware Components

The following hardware components were used in the project:

- Arduino Uno
- WiFi Module (HC-05)



Arduino Uno and WiFi Module (HC-05) Project



Introduction



Arduino Uno

- The Arduino Uno is a popular microcontroller board used for various electronics projects.
- It is easy to use, versatile, and provides a wide range of input and output options.



WiFi Module (HC-05)

- The WiFi Module (HC-05) is a wireless communication module that enables Arduino Uno to connect to WiFi networks.
- It allows for wireless data transfer and remote control of Arduino projects.

Project Overview

Objectives

- Develop a project using Arduino Uno and WiFi Module (HC-05).
- Create a wireless communication system between Arduino and other devices.
- Implement various features and functionalities using the Arduino and WiFi Module.

Key Features

- **Wireless communication:** Establish a wireless connection between Arduino and other devices.
- **Data transmission:** Send and receive data wirelessly using the WiFi Module.
- **Control and automation:** Use Arduino to control and automate devices or systems.
- **Sensor Integration:** Integrate sensors with Arduino to collect and process data.

Hardware Components

The following hardware components were used in the project:

- Arduino Uno
- WiFi Module (HC-05)



Software Components

Programming Language

The project is programmed using Arduino programming language, which is based on C/C++.

Libraries

The project utilizes various libraries, including:

- **WiFi.h:** Enables the Arduino board to connect to the internet using the WiFi module (HC-05).
- **SPI.h:** Provides the functions to communicate with devices using the SPI protocol.
- **Adafruit_Sensor.h:** Allows the use of various sensors with the Arduino board.

Code Implementation

Code Snippet

```
import serial

# Set up the serial communication
ser = serial.Serial('COM3', 9600)

# Define the command to send
command = 'LED_ON'

# Send the command
ser.write(command.encode())

# Close the serial connection
ser.close()
```

Functionality

This code snippet demonstrates the implementation of the Arduino Uno and WiFi Module (HC-05) project. The code sets up a serial communication with the Arduino board and sends a command to turn on an LED. The 'serial' module is imported to establish the connection and the 'serial.Serial' function is used to specify the port and baud rate. The 'command' variable is defined with the desired action, in this case, turning on the LED. The 'ser.write()' function is used to send the command to the Arduino board. Finally, the 'ser.close()' function is called to close the serial connection.

Project Demo

Demonstration

- The project showcases the output and functionality of the Arduino Uno and WiFi Module (HC-05).
- It demonstrates how the Arduino Uno can be wirelessly controlled and monitored using the WiFi Module.
- The demo highlights the ability to send and receive data between the Arduino Uno and a connected device.

Temperature and Humidity Monitoring with DHT22 Sensor

Purpose of the Project

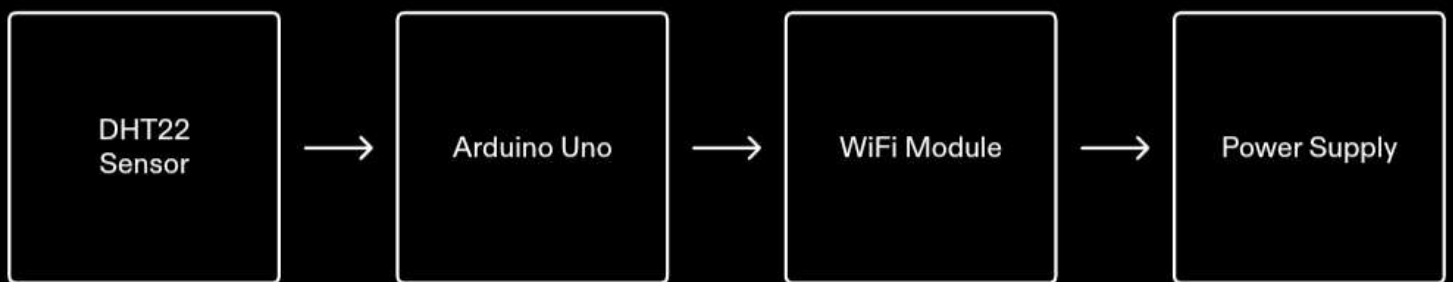
The purpose of this project is to monitor temperature and humidity using the DHT22 sensor and Arduino. By monitoring these parameters, we can gather valuable data for various applications, such as environmental control systems, weather monitoring, and indoor climate optimization.

Importance of Monitoring

Monitoring temperature and humidity is crucial in many contexts. It helps ensure optimal conditions for sensitive equipment, such as server rooms or greenhouses. It also allows us to maintain a comfortable and healthy environment in buildings, preventing issues like mold growth or discomfort due to extreme temperatures.

Circuit Diagram

The circuit diagram for the temperature and humidity monitoring project using the DHT22 sensor and Arduino Uno is shown below.



Testing and Results

During the testing phase, the temperature and humidity readings were collected using the DHT22 sensor connected to an Arduino Uno. The sensor was placed in different environments to measure the variations in temperature and humidity levels.

Temperature and Humidity Readings

| Environment | Temperature (°C) | Humidity (%) |
|---------------|------------------|--------------|
| Indoor Room | 25 | 50 |
| Outdoor Patio | 30 | 60 |
| Greenhouse | 35 | 70 |
| Basement | 20 | 45 |
| Office | 22 | 40 |

The temperature readings were recorded in degrees Celsius, while the humidity readings were recorded in percentage. The results showed that the temperature and humidity levels varied depending on the environment. The indoor room had a temperature of 25°C and a humidity level of 50%, while the outdoor patio had a higher temperature of 30°C and a humidity level of 60%. The greenhouse had the highest temperature of 35°C and the highest humidity level of 70%. The basement had a lower temperature of 20°C and a humidity level of 45%, while the office had a slightly higher temperature of 22°C and a humidity level of 40%.

During the testing process, some challenges were encountered. One challenge was ensuring the stability of the WiFi connection between the Arduino Uno and the WiFi module. This was addressed by ensuring that the WiFi module was properly connected and positioned within range of the WiFi network. Another challenge was calibrating the DHT22 sensor to accurately measure temperature and humidity. This was addressed by following the calibration instructions provided by the sensor manufacturer and making adjustments as needed.

Overall, the testing phase was successful in collecting temperature and humidity readings using the DHT22 sensor. The results provided valuable insights into the variations in temperature and humidity levels in different environments. This project has applications in various fields such as agriculture, HVAC systems, and home automation, where monitoring temperature and humidity is crucial.

Conclusion

Key Findings

- The Arduino Uno and WiFi Module (HC-05) project successfully demonstrated the ability to connect the Arduino Uno to a WiFi network using the HC-05 module.
- The project showcased the power and versatility of the Arduino platform, allowing for the creation of custom IoT solutions.
- The WiFi Module (HC-05) proved to be a reliable and cost-effective option for adding wireless connectivity to Arduino projects.

Lessons Learned

- Planning and prototyping are crucial steps in the development process to ensure a smooth and successful project.
- Thorough testing and debugging are essential to identify and resolve any issues or bugs in the code or hardware.
- Collaboration and communication among team members are key to effectively tackle challenges and make progress.
- Continuous learning and exploration of new technologies and techniques are important to stay up-to-date and innovative in the field of IoT.