Project 4: Wi-Fi Robot Car

Objectives:
1. The student will be able to install a Wifi Shield on the Uno board.
2. The student will be able to wire the sensors for power and data transfer.
3. The student will be able to download code.
4. The student will be able to install the app to a phone or device.
5. The student will be able to control the robot through a phone or device.

Time:
2 hours

Introduction:
In this project, the students will download and install the Osoyoo Wi-Fi Robot App to their phone or device. Students will install a Wi-Fi shield and wire for power and data collection, as well as upload the given code to the board. The student will then be able to control the car using their phone or device.
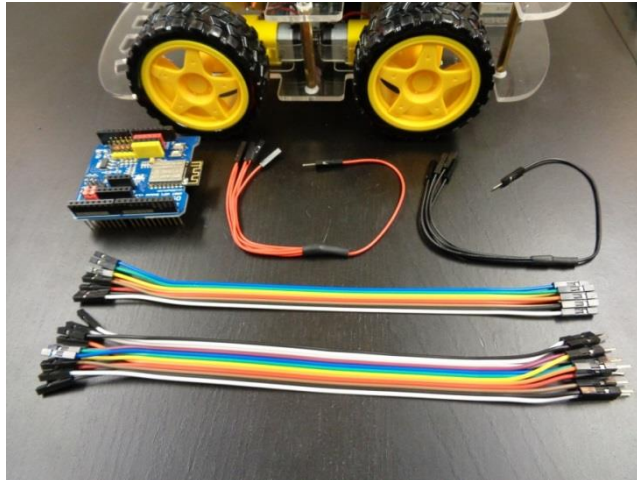
Project 4: Wi-Fi Robot Car

This project allows you to control the robot car through your phone or device instead of the remote.

Download and install the Osoyoo Wi-Fi Robot App from Google Play or the Apple Store on your phone or device.

Part 1: Installing Wi-Fi Shield

A. Locate the Wi-Fi Shield, one of the one male to five female jumper wires, male to female wires, and female to female wires, and four jumper caps.
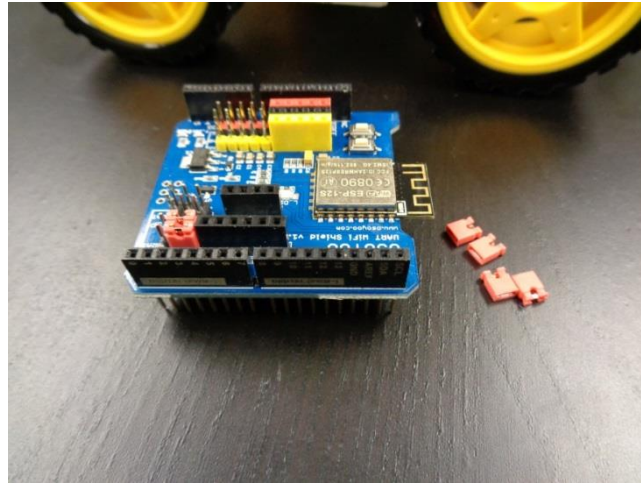

B. Remove all wires from the Uno board and insert the Wi-Fi shield on top of the Uno board.
   a. Gently line up all pins before firmly pressing down to connect.
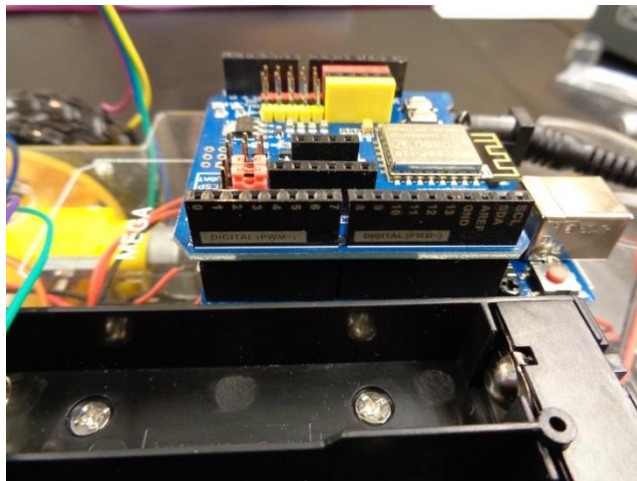
Tip: Our Wi-Fi board came with jumper caps pre-installed. If yours does not, install them as follows: D4 to B_TX and D5 to B_RX.

Part 2: Wiring

A. Connect the wires from the Model X to the Wi-Fi Board. These are the same ones that you unplugged from the Uno board before installing the Wi-Fi Board on top of it.

Wi-Fi Board	Wire Color	Model X
D3	Black	ENA
D12	Purple	IN1
D11	Green	IN2
D7	Yellow	IN3
D8	White	IN4
D6	Red	EN
D9	Blue	S

B. Connect wires from the tracking sensors to the Wi-Fi Board. These are the same ones that you unplugged from the Uno board before installing the Wi-Fi Board on top of it.

Tracking Sensors	Wire Color	Wi-Fi Board
VCC	Red	5V
GND	Black	GND
Left 1 D0	Green	A0
Left 2 D0	Blue	A1
Left 3 D0	Purple	A2
Left 4 D0	Gray	A3
Left 5 D0	White	A4

C. Connect wires from the ultrasonic module to the Wi-Fi Board. These are the same ones that you unplugged from the Uno board before installing the Wi-Fi Board on top of it.

Ultrasonic Sensor	Wire Color	Wi-Fi Board
GND	Black	GND
Echo	Yellow	D2
Tr1G	Green	D10
VCC	Red	5V

D. Connect wires from the E_TX to D4 (both on the Wi-Fi board) and E_RX to D5 (both on the Wi-Fi board).
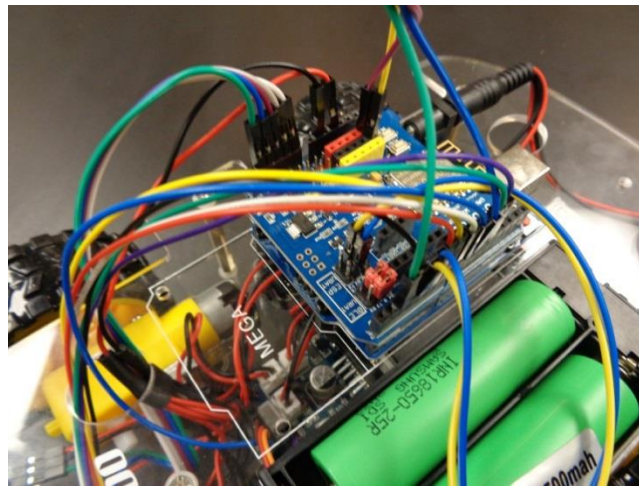
Part 3: Loading the Library and Code

A. Download the Wi-Fi library for this project from Arduino.nacase.org.
   a. Click on the file link to begin the download and save to your computer
   b. Once the download is complete, unzip the file or right click—Open With—UnRAR Metro. This will extract the file and save it to your computer.
B. Import the library into Arduino.
   a. Open Arduino IDE
   b. Sketch
   c. Include Library
   d. Add.zip library
   e. Search for the IR Remote file that you downloaded
C. Download the code for this project from Arduino.nacase.org.
   a. Click on the file link to begin the download and save to your computer
   b. Once the download is complete, unzip the file or right click—Open With—UnRAR Metro. This will extract the file and save it to your computer.
D. Connect Uno board to PC with USB cord.
E. Upload the code to Arduino IDE
   a. Open Arduino IDE, select File, Open, then select the downloaded code.
   b. Change the 100th line of code to your Wifi Router's SSID (your router's name)
   c. Change the 101st line of code to your Wifi Router's password
F. Verify your code with the checkmark.
   a. If you get an error message with Configuration.h file was not found you must:
      1. Drag configuration.h from your download file to your Arduino program
      2. Drop it at the top.
      3. Verify again
      4. You should see "Done Compiling" when finished.
G. Upload your code using the arrow next to the check mark. You will see "Done uploading" when complete. Disconnect the USB cord.

Part 4: Connect your App

A. In Arduino IDE, click the Serial Monitor button in the upper right corner; it looks like a magnifying glass.
B. A new window will open and run.
C. Locate the IP address of the car.
D. Enter the car's IP address in the app on your phone under settings and connect.

Tip: Make sure that both the car and your phone are connected to the same network and router.

Part 5: Try your car

    A. Set your car on the ground and turn the battery box on.

    B. Use the controls on your phone to control the movement of the car including obstacle avoidance and tracking.

Tip: The car will run in one direction until you press pause.