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**Instructions:**

Option 1: 1. Webpage based wireless joint space control

* 1. Setup instruction: manual of step-by-step “how to” for successfully set up hardware and software to achieve the robot arm wireless control
  2. Webpage wireless control with LilyGo: Code for this option. Ensure you have the *platformio* extension installed on your Visual Studio code software. Open this code folder through the platformio PIO home, then select the “src🡪main.cpp” form the file explorer, click the “check” button on the bottom to build the code under the virtue environment of platformio, then check the uploading COM is selected correctly, after ensuring the COM port is the port for your ESP32 board, click the “arrow” button next to the check button to complete uploading the code to your ESP32 board.
  3. Once the code is uploaded, you may click the “plug” button at the bottom to open the serial monitor to check if your ESP32 board has connected to the Wi-Fi corrected. If yes, you should be able to see, “connected, IP address: 192.168.1. 211 (or the ip address you set or the ESP32 in the main code”.

A screenshot of a computer program

Description automatically generated

* 1. Webpage OMNI3 Robot arm control: a webpage-based graphic user interface to enable the user to control the robot arm wirelessly.

This option provides a Wi-Fi-based wireless control of robot arm. In this option, both your PC and LilyGo (the ESP32 micro controller unit) are connected to a public 3rd-party Wi-Fi network. You are connecting with LilyGo to send robot arm control command through the Wi-Fi, like using a wireless printer.

Option 2: CAN-based Robot Arm Joint Space Control

* 1. ZCANpro software: a visualizer to transport/receive CAN commands to/with robot arm
  2. USB-CAN tool driver: driver to solve the hardware compatibility of PC for first-time installing the USB-CAN
  3. CAN communication protocol: understand CAN command for joint actuators

This option is the most fundamental but solid robot control method. Namely, you directly send CAN command to each robot arm’s joint motor via the CAN debugging software. However, because this method cannot efficiently and intuitively control the robot arm, we usually only use this method to test if the robot hardware is still in working, or there is some hardware issues, like the cable damages or encoder zero point lost.