目录

基于小智 AI 的 AI 语音助手

本项目使用 Media Kit 实现一个 AI 语音助手，需要有一定的编程基础，且对于 ESP-IDF 和开源大模型有一定的了解。

项目介绍

本语音助手项目（https://github.com/Freenove/xiaozhi-esp32）来自开源项目（https://github.com/78/xiaozhi-esp32），该项目可以在嵌入式设备上调用市面上大多数长语言文本模型（LLM），并通过语音活动检测（VAD）服务、语音识别(ASR)服务、语音转文本（STT）服务、文本转语音（TTS 服务）、记忆存储（Memory）服务、意图识别（Intent）服务等多种服务，来实现语音对话功能，制作属于你自己的 AI 语音助手。Freenove 将该项目适配到了产品 Media Kit 上。本文将介绍如何在 Media Kit 上运行该项目。

本项目有两种运行方式，

1. 在线版本，接入 xiaozhi.me 服务器，目前个人用户可以免费试用。
2. 离线版本，以上提到的各项服务都需要在本地个人电脑上搭建本地服务器，使用体验完全取决模型的选取和本地电脑性能。本地服务器项目（https://github.com/Freenove/xiaozhi-esp32-server ）来自开源项目（https://github.com/xinnan-tech/xiaozhi-esp32-server ）。

对于偏向于使用 AI 助手的用户，我们建议你使用在线版本。
对于偏向于开发者用户，可以尝试部署离线版本，以深入学习和了解 AI 助手所需要的各项服务。值得注意的是，个人电脑难以同时运行以上各种服务，尤其是核心服务 LLM，这可能导致你的 AI 助手体检较差，因此，离线版本仅具有更多的学习研究价值。

注意事项

- **项目版权**:
  - 语音助手项目原始作者署名为“虾哥”，Freenove 公司 fork 该项目并适配到 Media Kit 中，该项目遵守 MIT 协议。
  - 本地服务器项目原始作者为“xinnan-tech”，Freenove 公司 fork 该项目并适配到 Media Kit 中，该项目遵守 MIT 协议。
- **支持的国家或地区:**
  - **在线版本**，这取决于 xiaozhi.me 服务器支持的国家或地区，并非所有国家或地区都受到支持。您可以注册页面查看（https://xiaozhi.me/login?redirect=/console/agents）。 对于使用体验，也受 xiaozhi.me 服务器的影响。如果您访问 xiaozhi.me 服务器的网络较差，则体验相对就差一些。
  - **离线版本**，无，您可以在任意国家或地区部署离线版本。
- **支持的语言：**
  - 在线版本：目前支持中文普通话、中文粤语、英语、日语、韩语等。如果您不会这些语言，那么使用在线版本您将无法与小智 AI 正常交流。
  - 离线版本：取决于您部署的 ASR 模型。默认的 FunASR 模型仅支持中文普通话、中文粤语、英语、日语、韩语。

- **费用**
  - 在线版本：当前 xiaozhi.me 提供免费服务，我们不能保证在线服务器一直免费。
  - 离线版本：上述提到的各项子服务中，均有收费服务或免费服务，取决于您自己的选择。
- **遇到问题**，如果您按照教程操作，仍然无法使用，请与我们联系（support.freenove.com）。由于在线服务由 xiaozhi.me 提供，如果 xiaozhi.me 关闭了服务，那么我们也将会关闭相关的文档、教程、代码。

小智 AI 使用声明

我们仅在 https://github.com/78/xiaozhi-esp32 基础上提供适配，用做第三方学习和 AI 功能试用，不做商业性质推广和应用。本教程仅给爱好者附加学习使用。

请注意：

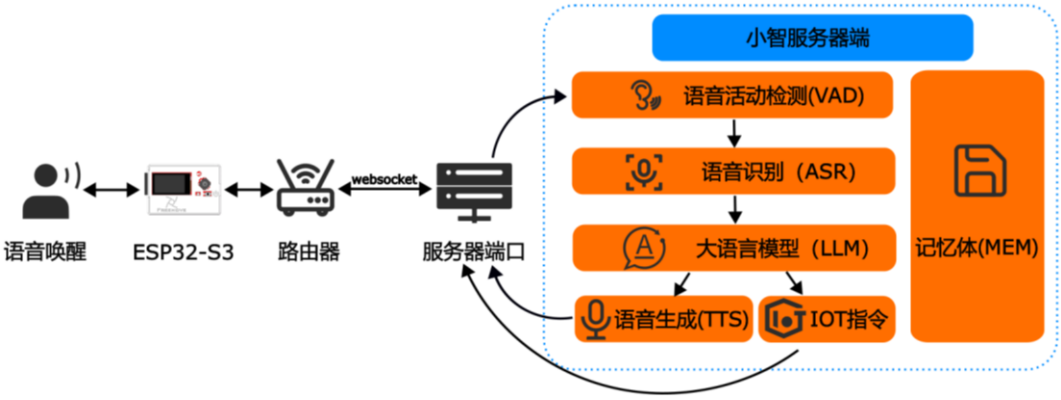
1， 由于这个项目是第三方开源项目，如果您在学习过程中遇见问题，请向开源项目发起 issue：https://github.com/78/xiaozhi-esp32/issues

2， 目前小智 AI 仅支持普通话，粤语，英语，韩语，日语这 5 种语言识别。其他语言暂时仍不支持。

3， 目前小智服务器的界面仅支持英语、中文、日语。且小智服务器目前仅支持下列国家使用手机注册账号。其他国家暂不支持。

Mainland China +86	Germany +49	Philippines +63	Pakistan +92
Hong Kong +852	Poland +48	New Zealand +64	Nigeria +234
Macau +853	Switzerland +41	Singapore +65	Bangladesh +880
Taiwan +886	Spain +34	Thailand +66	Saudi Arabia +966
United States/Canada +1	Denmark +45	Japan +81	United Arab Emirates +971
United Kingdom +44	Malaysia +60	South Korea +82	Brazil +55
France +33	Australia +61	Vietnam +84	Mexico +52
Italy +39	Indonesia +62	India +91	Chile +56
Argentina +54	Egypt +20	South Africa +27	Kenya +254
Tanzania +255	Kazakhstan +7		

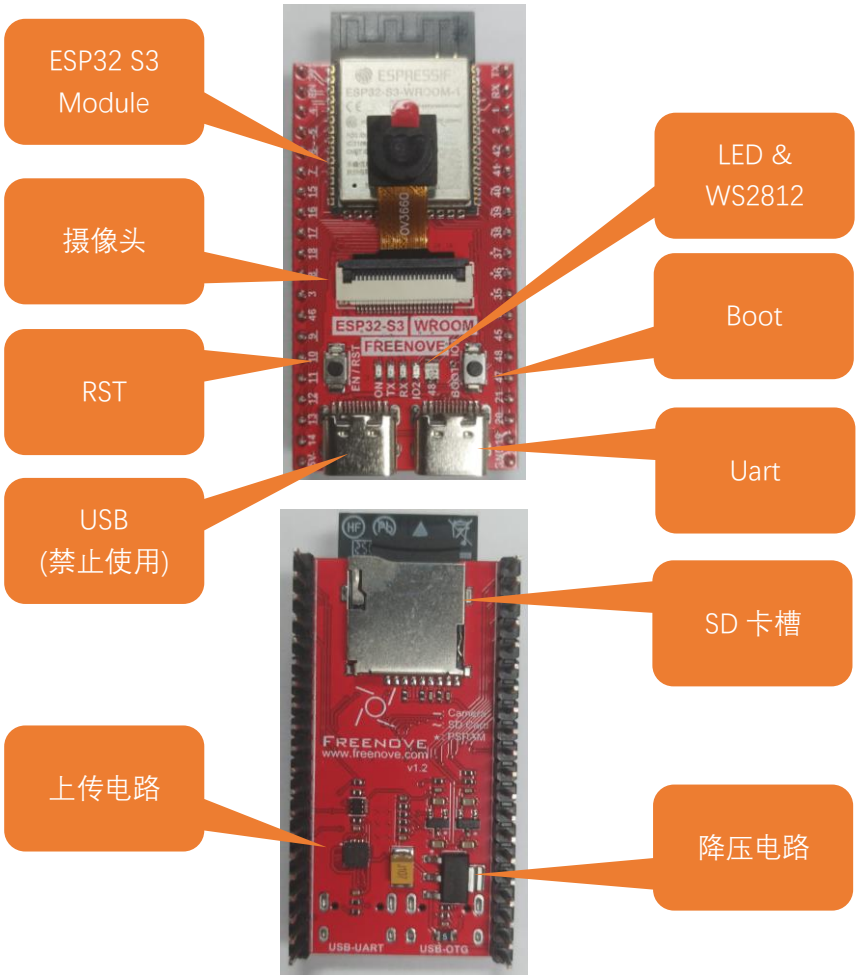
在这个项目中，ESP32-S3 使用 websocket 的方式，和小智 AI 服务器进行数据交互。



ESP32 S3 硬件说明

Freenove ESP32-S3 WROOM Board

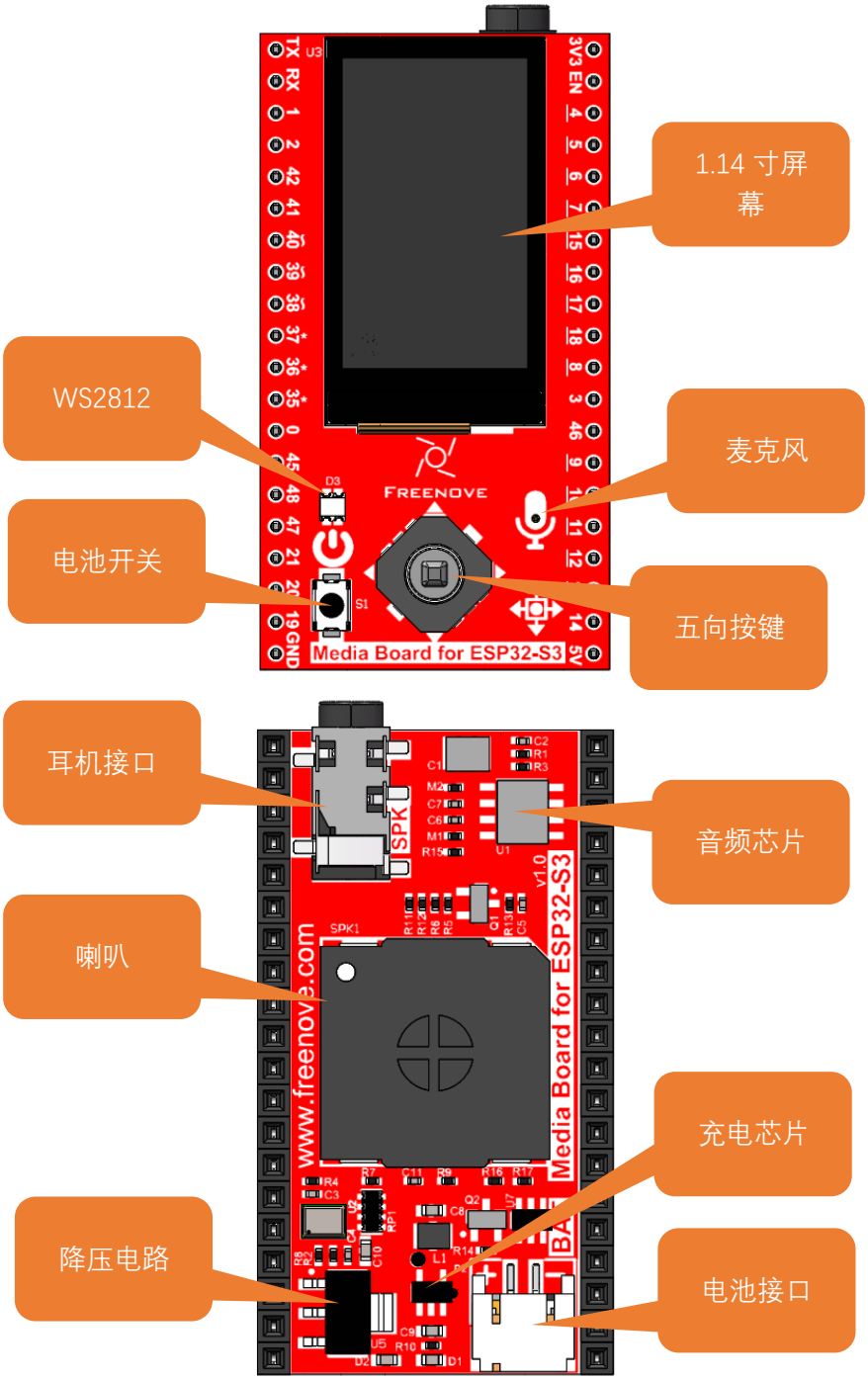
首先，我们使用 Freenove ESP32-S3 Board 作为主控板，它集成了 16Mb 的 Flash 和 8Mb 的 Psram。



更多关于 Freenove ESP32-S3 Board 的资料，请查看
https://github.com/Freenove/Freenove_Ultimate_Starter_Kit_for_ESP32_S3

音频电路板

音频电路板集成了多个不同功能的硬件，比如 1.14 寸 TFT 显示屏，麦克风，电池充电电路，音频电路，耳机接口和集成喇叭等。如下图所示。



安装 CH343 (Importance)

ESP32-S3 WROOM 使用 CH343 芯片下载代码，因此在使用前，需在电脑上安装 CH343 驱动程序。

Windows

首先下载 CH343 驱动，点击 http://www.wch-ic.com/search?t=all&q=ch343，根据您的操作系统选择对应版本进行下载。

keyword ch343

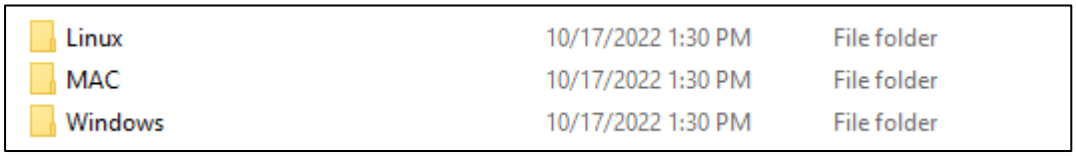
Downloads(8)

file category	file content	version	upload time
DataSheet			
CH343DS1.PDF	CH343 datasheet, USB to single serial port, supports up to 6M baud rate, serial port signals support 5V/3.3V/2.5V/1.8V, built-in crystal oscillator. CH343 supports built-in CDC driver in operating system or multi-functional high-speed VCP manufacture driver.	1.5	2021-11-18
Driver&Tools			
CH343SER.ZIP	For CH342/CH343/CH344/CH347/CH9101/CH9102/CH9103/CH9143, USB to high-speed serial port VCP vendor driver, supports Windows 11/10/8.1/ 0	1.61	2022-05-13
CH343CDC.ZIP	For CH342 H347/CH910X/CH9143/CH9340, USB to CDC serial port driver, supports Windows 11/10/8.1/8/7/VISTA/XP/2000	1.4	2022-05-13
CH343SER.EXE	For CH342 H347/CH9101/CH9102/CH9103/CH9143, USB to high-spee endor driver, supports Windows 11/10/8.1/ 0	1.61	2022-05-13
CH34XSER_MAC.ZI...	For CH340/CH341/CH342/CH343/CH344/CH347/CH9101/CH9102/CH9103/CH9143, USB to serial port VCP vendor driver of macOS	1.7	2022-05-13
CH343CDC.EXE	For CH342/CH343/CH344/CH347/CH910X/CH9143/CH9340, USB to CDC serial port driver, supports Windows 11/10/8.1/8/7/VISTA/XP/2000	1.4	2022-05-13
Application			
CH34xSerCfg.ZIP	USB configuration tool of Windows for CH340/CH342/CH343/CH344/CH347/CH348/CH9101/CH9102/CH9103. Via this tool, the chip's Vendor ID, product ID, maximum current value, BCD version	1.2	2022-05-24

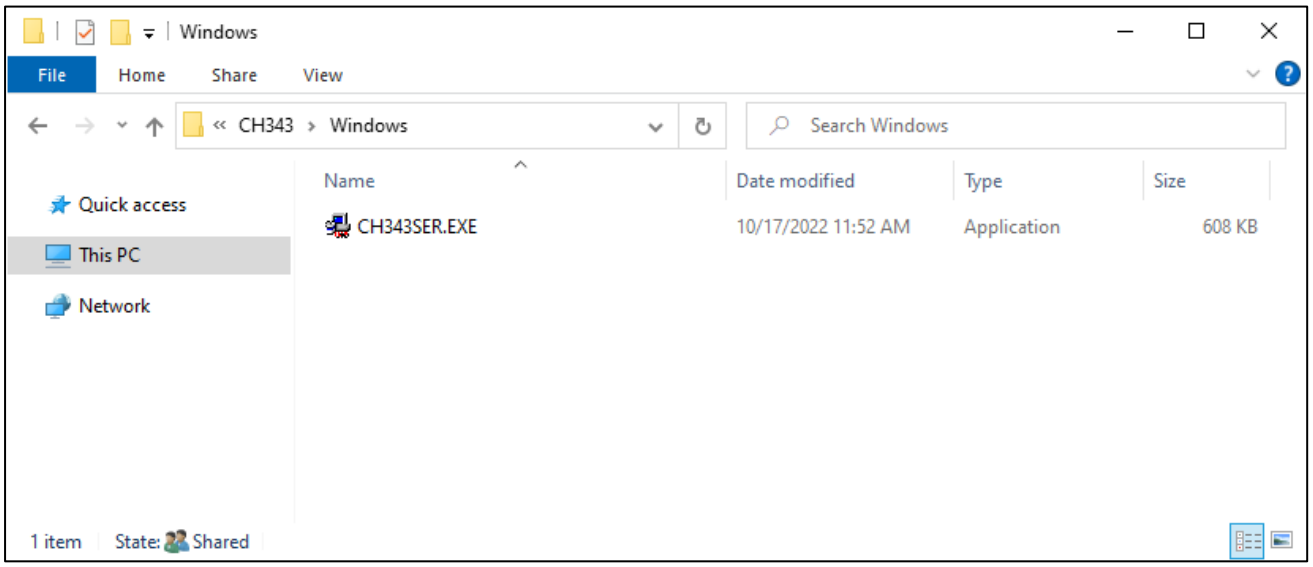
Windows

MAC

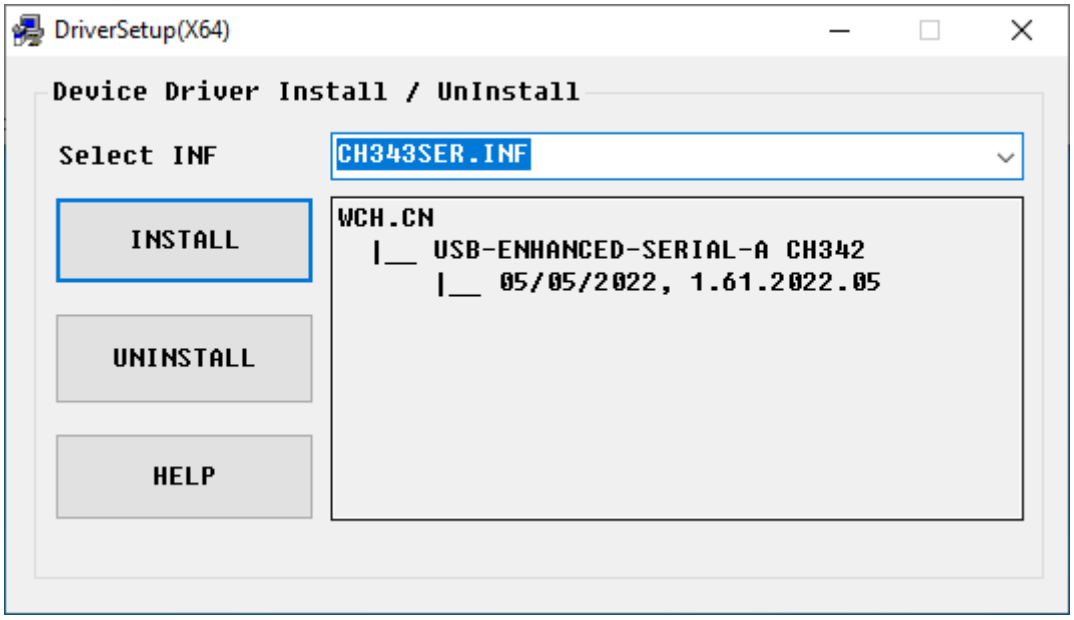
如果您不想从官网下载安装包，可以打开 **“Freenove_Media_Kit_for_ESP32-S3/CH343”** 文件夹，我们已为您准备好驱动安装包



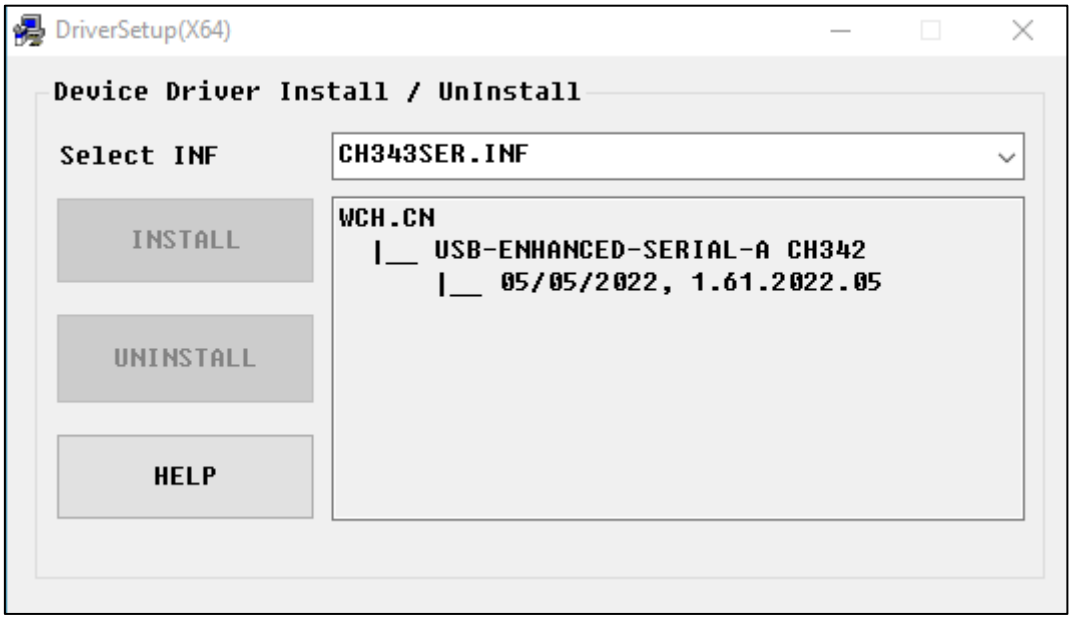
2. 打开文件夹进入目录： **“Freenove_Media_Kit_for_ESP32-S3/CH343/Windows/”**



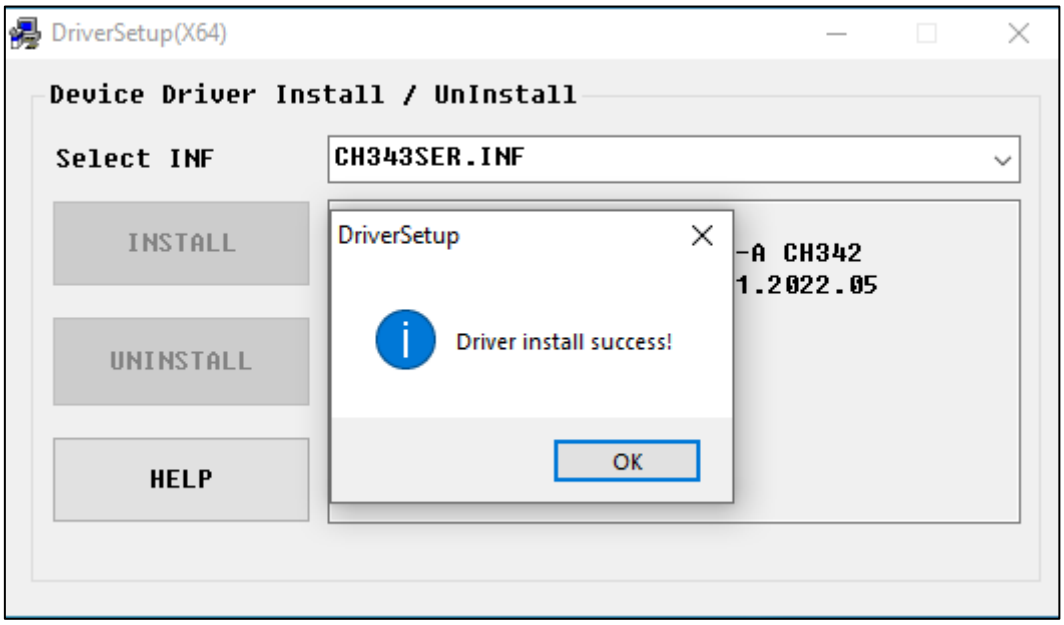
3. 双击运行“**CH343SER.EXE**”.



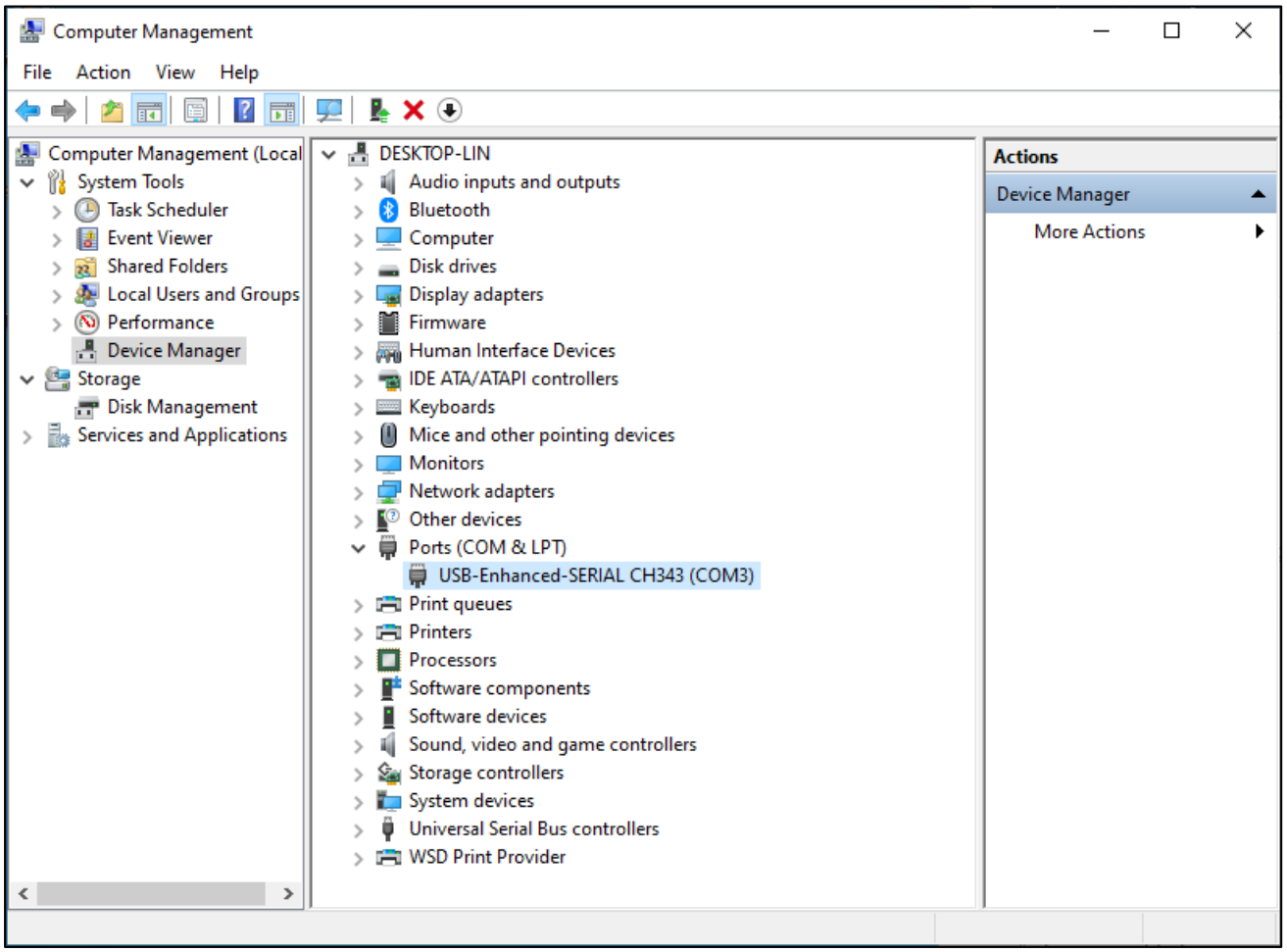
4. 点击 "INSTALL" 并等待安装完成



5. 安装成功！请关闭所有界面



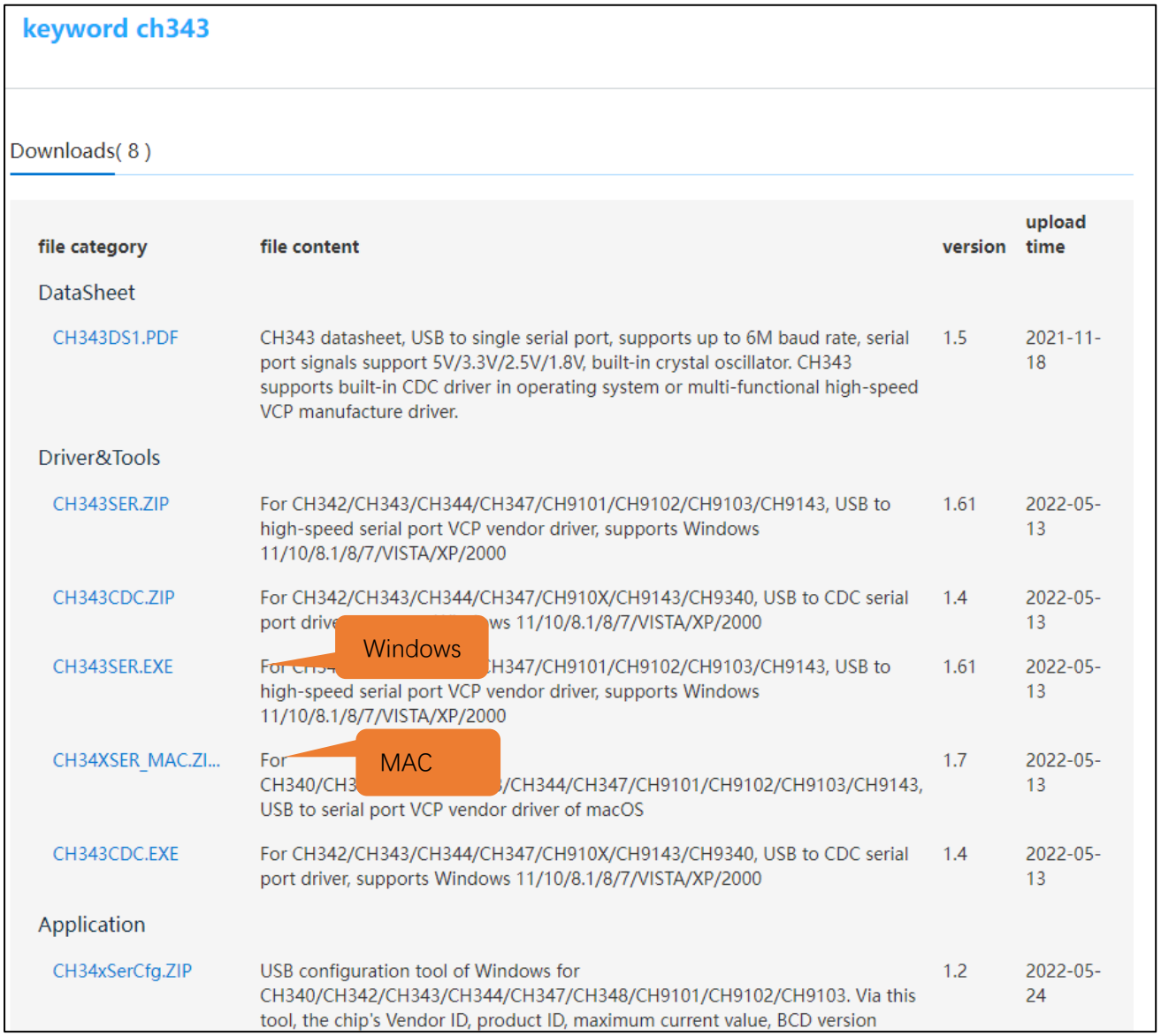
6. 当 ESP32-S3 WROOM 模块连接到电脑时，选中"此电脑"，右键选择"管理"，在弹出的新对话框中点击"设备管理器"，即可看到如下界面。



7. 至此，CH343 驱动已成功安装，关闭所有对话框。

MAC

首先下载 CH343 驱动，点击 http://www.wch-ic.com/search?t=all&q=ch343，根据您的操作系统选择对应版本进行下载。



keyword ch343

Downloads(8)

file category	file content	version	upload time
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Driver&Tools			
CH343SER.ZIP	For CH342/CH343/CH344/CH347/CH9101/CH9102/CH9103/CH9143, USB to high-speed serial port VCP vendor driver, supports Windows 11/10/8.1/8/7/VISTA/XP/2000	1.61	2022-05-13
CH343CDC.ZIP	For CH342/CH343/CH344/CH347/CH910X/CH9143/CH9340, USB to CDC serial port drive ws 11/10/8.1/8/7/VISTA/XP/2000	1.4	2022-05-13
CH343SER.EXE	For CH34 H347/CH9101/CH9102/CH9103/CH9143, USB to high-speed serial port VCP vendor driver, supports Windows 11/10/8.1/8/7/VISTA/XP/2000	1.61	2022-05-13
CH34XSER_MAC.ZI...	For CH340/CH3 /CH344/CH347/CH9101/CH9102/CH9103/CH9143, USB to serial port VCP vendor driver of macOS	1.7	2022-05-13
CH343CDC.EXE	For CH342/CH343/CH344/CH347/CH910X/CH9143/CH9340, USB to CDC serial port driver, supports Windows 11/10/8.1/8/7/VISTA/XP/2000	1.4	2022-05-13
Application			
CH34xSerCfg.ZIP	USB configuration tool of Windows for CH340/CH342/CH343/CH344/CH347/CH348/CH9101/CH9102/CH9103. Via this tool, the chip's Vendor ID, product ID, maximum current value, BCD version	1.2	2022-05-24

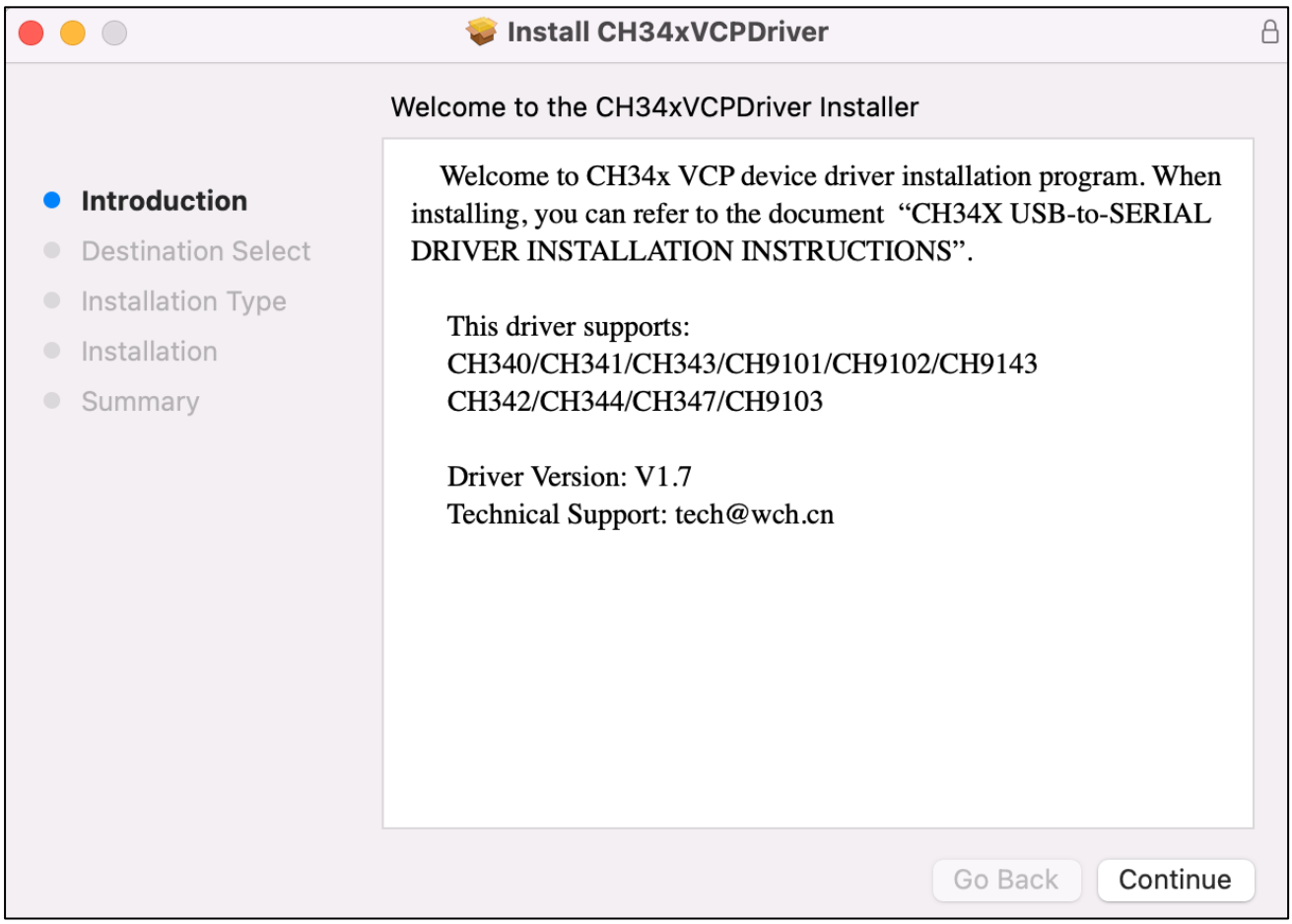
Windows

MAC

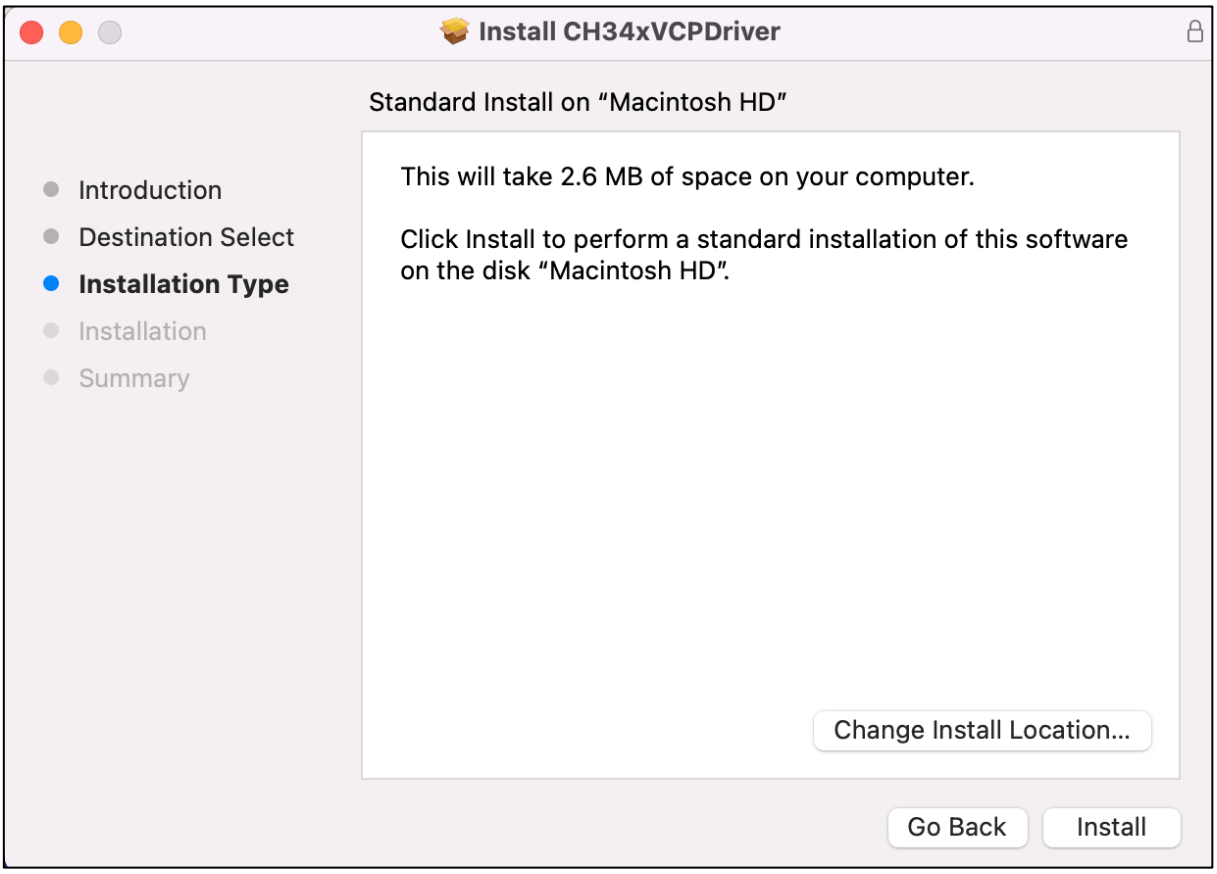
如果不想下载安装包，您可以打开 **“Freenove_Media_Kit_for_ESP32-S3/CH343”** 文件夹，我们已准备好安装包。

其次，打开 **“Freenove_Media_Kit_for_ESP32-S3/CH343/MAC/”** 目录。

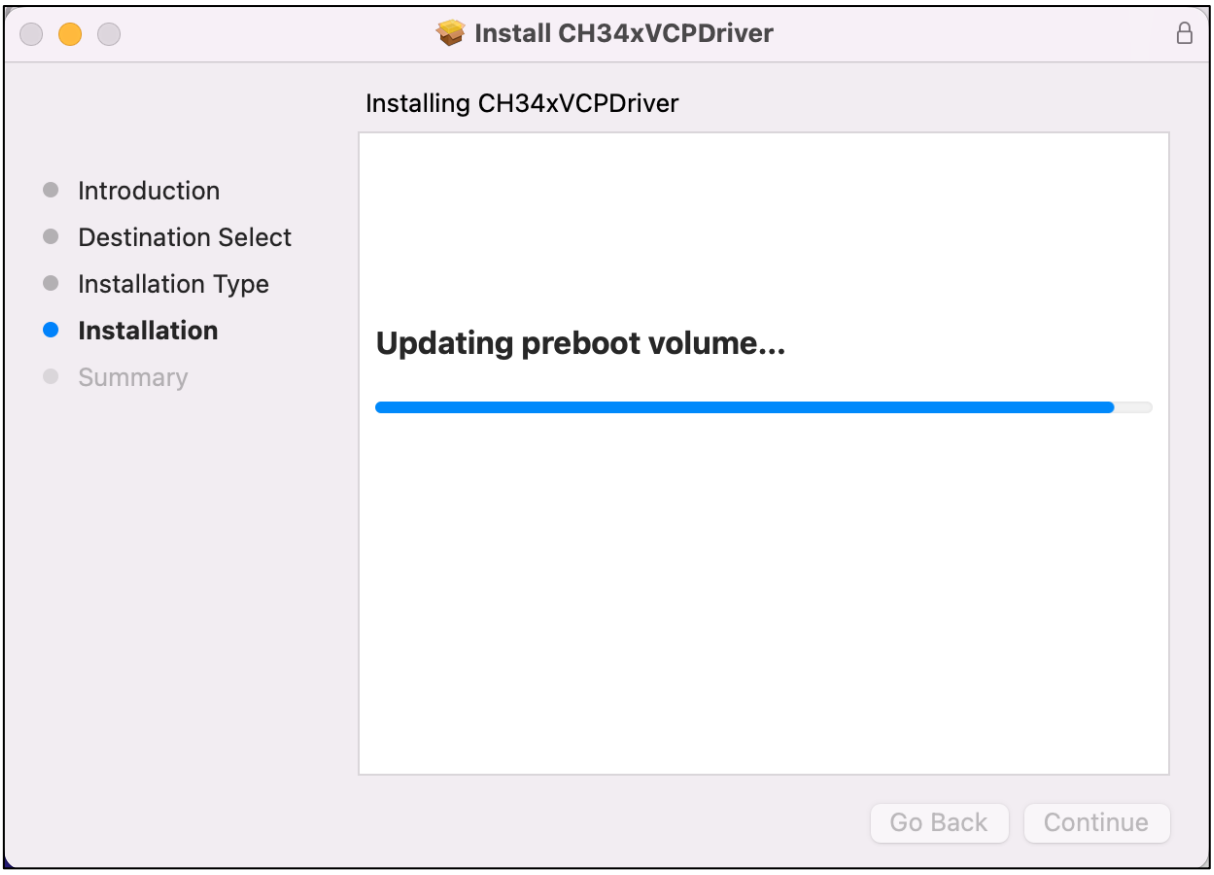
第三步，点击 Continue。



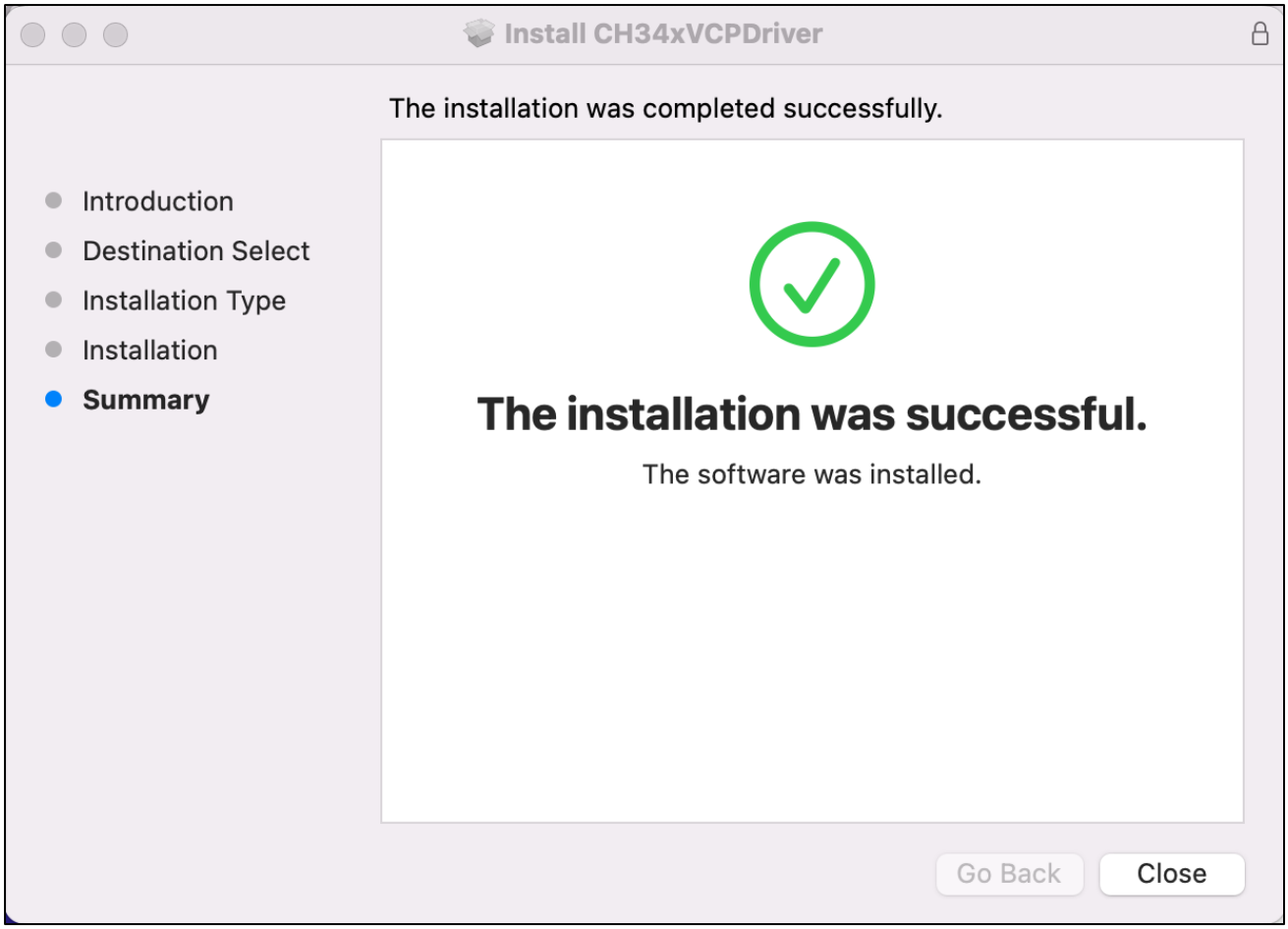
第四步，点击 Install。



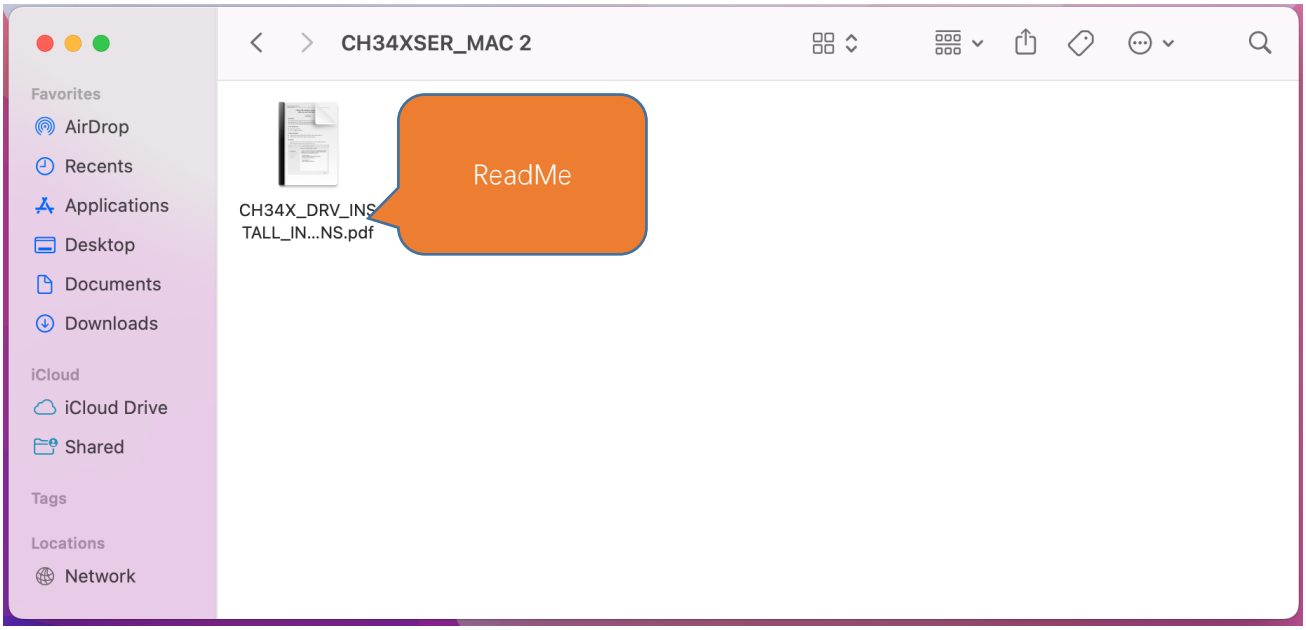
然后等待完成



最后，重新启动你的电脑

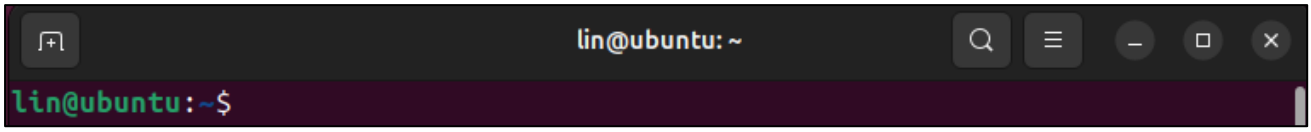


若按照上述步骤仍未成功安装 CH340 驱动，可查阅 **readme.pdf** 文件进行安装。



Linux

这里以 Ubuntu 为例。打开 Linux 系统的终端.



使用指令“lsusb”查看端口。

```
lsusb
ls /dev/tty*
```

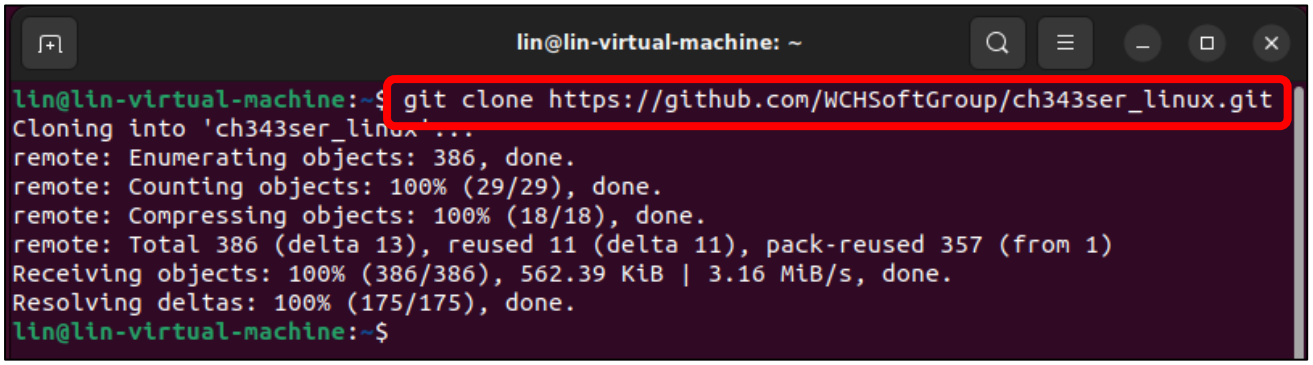
```
lin@lin-virtual-machine:~$ lsusb
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 004: ID 1a86:55d3 QinHeng Electronics USB Single Serial
Bus 001 Device 003: ID 0e0f:0002 VMware, Inc. Virtual USB Hub
Bus 001 Device 002: ID 0e0f:0003 VMware, Inc. Virtual Mouse
Bus 001 Device 001: ID 1d6b:0001 Linux Foundation 1.1 root hub
```

```
lin@lin-virtual-machine:~$ ls /dev/tty*
/dev/tty    /dev/tty23  /dev/tty39  /dev/tty54      /dev/ttyS1   /dev/ttyS25
/dev/tty0   /dev/tty24  /dev/tty4   /dev/tty55      /dev/ttyS10  /dev/ttyS26
/dev/tty1   /dev/tty25  /dev/tty40  /dev/tty56      /dev/ttyS11  /dev/ttyS27
/dev/tty10  /dev/tty26  /dev/tty41  /dev/tty57      /dev/ttyS12  /dev/ttyS28
/dev/tty11  /dev/tty27  /dev/tty42  /dev/tty58      /dev/ttyS13  /dev/ttyS29
/dev/tty12  /dev/tty28  /dev/tty43  /dev/tty59      /dev/ttyS14  /dev/ttyS3
/dev/tty13  /dev/tty29  /dev/tty44  /dev/tty6       /dev/ttyS15  /dev/ttyS30
/dev/tty14  /dev/tty3   /dev/tty45  /dev/tty60      /dev/ttyS16  /dev/ttyS31
/dev/tty15  /dev/tty30  /dev/tty46  /dev/tty61      /dev/ttyS17  /dev/ttyS4
/dev/tty16  /dev/tty31  /dev/tty47  /dev/tty62      /dev/ttyS18  /dev/ttyS5
/dev/tty17  /dev/tty32  /dev/tty48  /dev/tty63      /dev/ttyS19  /dev/ttyS6
/dev/tty18  /dev/tty33  /dev/tty49  /dev/tty7       /dev/ttyS2   /dev/ttyS7
/dev/tty19  /dev/tty34  /dev/tty5   /dev/tty8       /dev/ttyS20  /dev/ttyS8
/dev/tty2   /dev/tty35  /dev/tty50  /dev/tty9       /dev/ttyS21  /dev/ttyS9
/dev/tty20  /dev/tty36  /dev/tty51  /dev/ttyACM0    /dev/ttyS22
/dev/tty21  /dev/tty37  /dev/tty52  /dev/ttyprintk  /dev/ttyS23
/dev/tty22  /dev/tty38  /dev/tty53  /dev/ttyS0      /dev/ttyS24
lin@lin-virtual-machine:~$
```

如果您的电脑没有 CH343 驱动，您可以按照接下来的步骤安装它。如果您的电脑能识别到 CH343 驱动，您可以跳过下面的步骤。

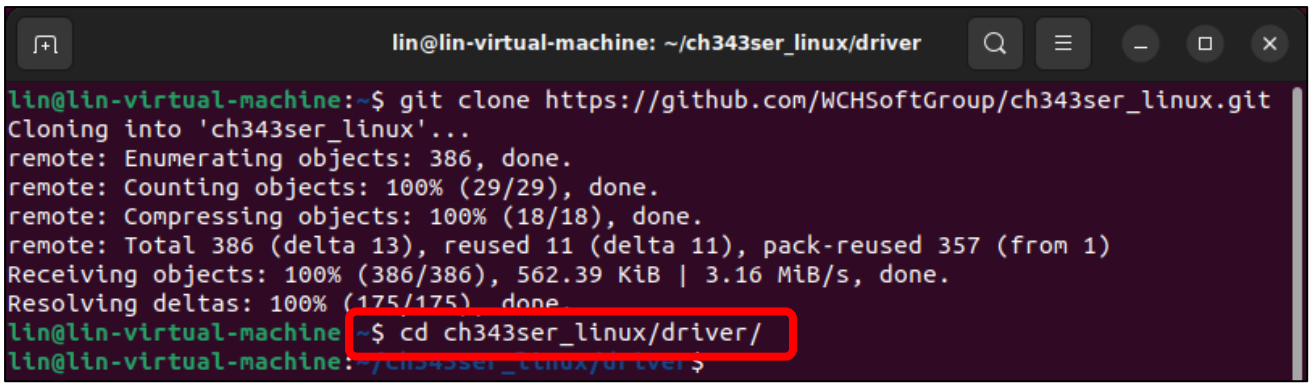
使用指令下载 CH343 驱动。

```
git clone https://github.com/WCHSoftGroup/ch343ser_linux.git
```



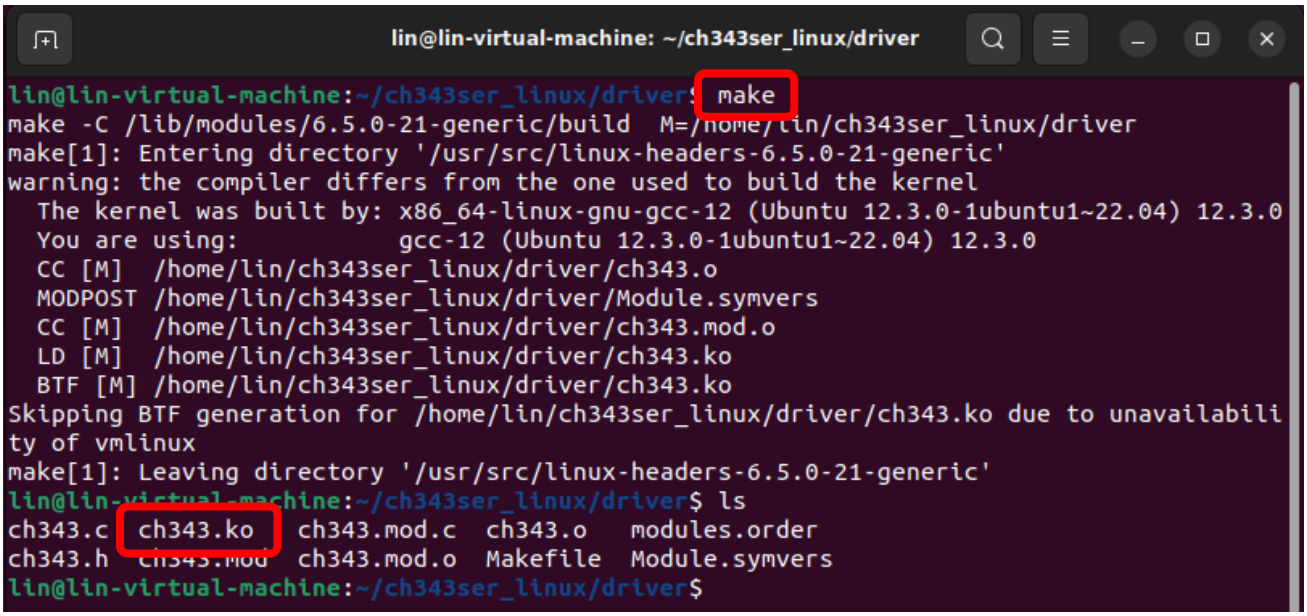
进入 ch343 驱动文件夹。

```
cd ch343ser_linux/driver/
```



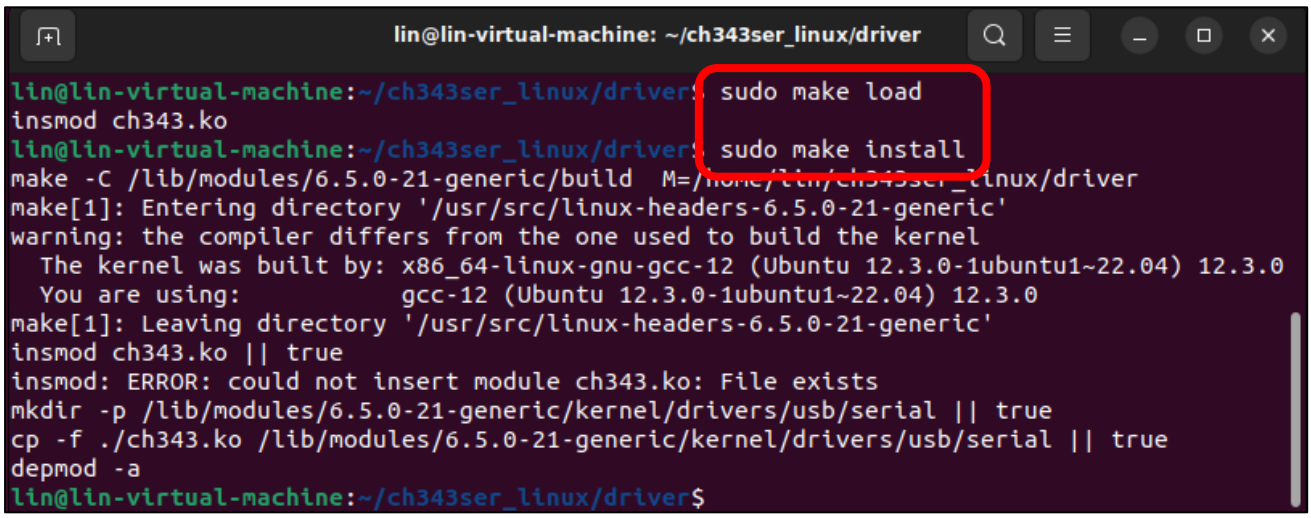
编译并生成 ch343.ko 文件。

```
make
```



安装 ch343p 芯片的驱动。

```
sudo make load
sudo make install
```

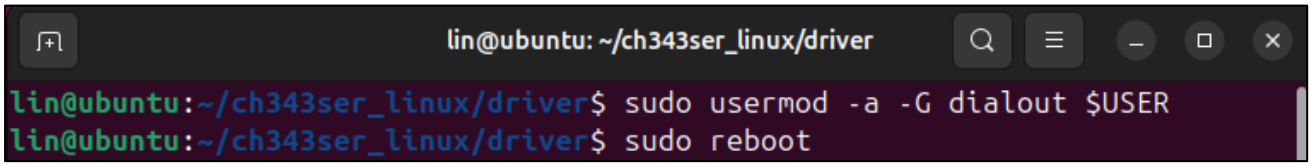


当将 ESP32S3 连接到电脑时，使用指令后的显示内容如下图所示。

```
ls /dev/tty*
```

在 Linux 中调用"ttyACM0"通常需要较高的权限，因此使用指令提升用户权限是必须的。

```
sudo usermod -a -G dialout $USER
sudo reboot
```



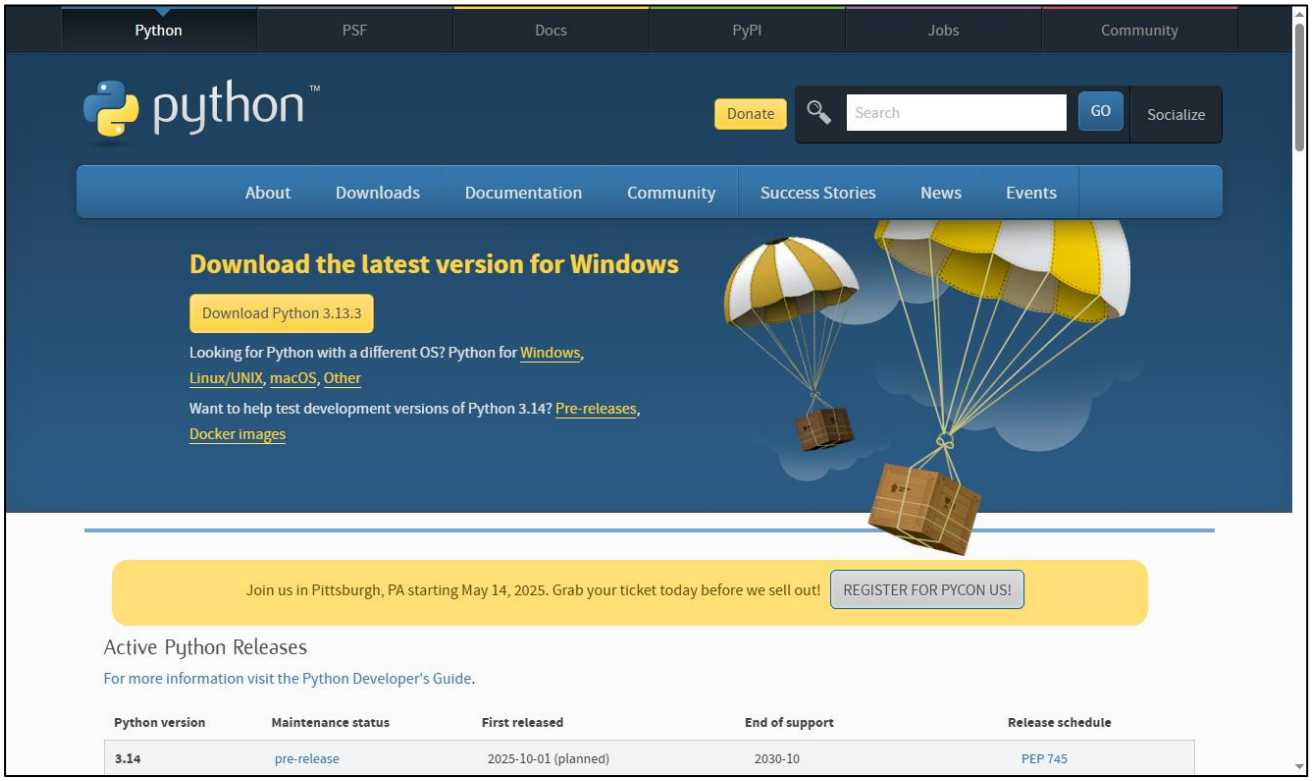
小智 AI 固件

如果您的硬件还没有小智的固件，您可以参考接下来的教程，重新给 ESP32 S3 WROOM 上传固件。
如果您的硬件已经集成了小智的固件，您可以跳过这个章节。

安装 Python (Importance)

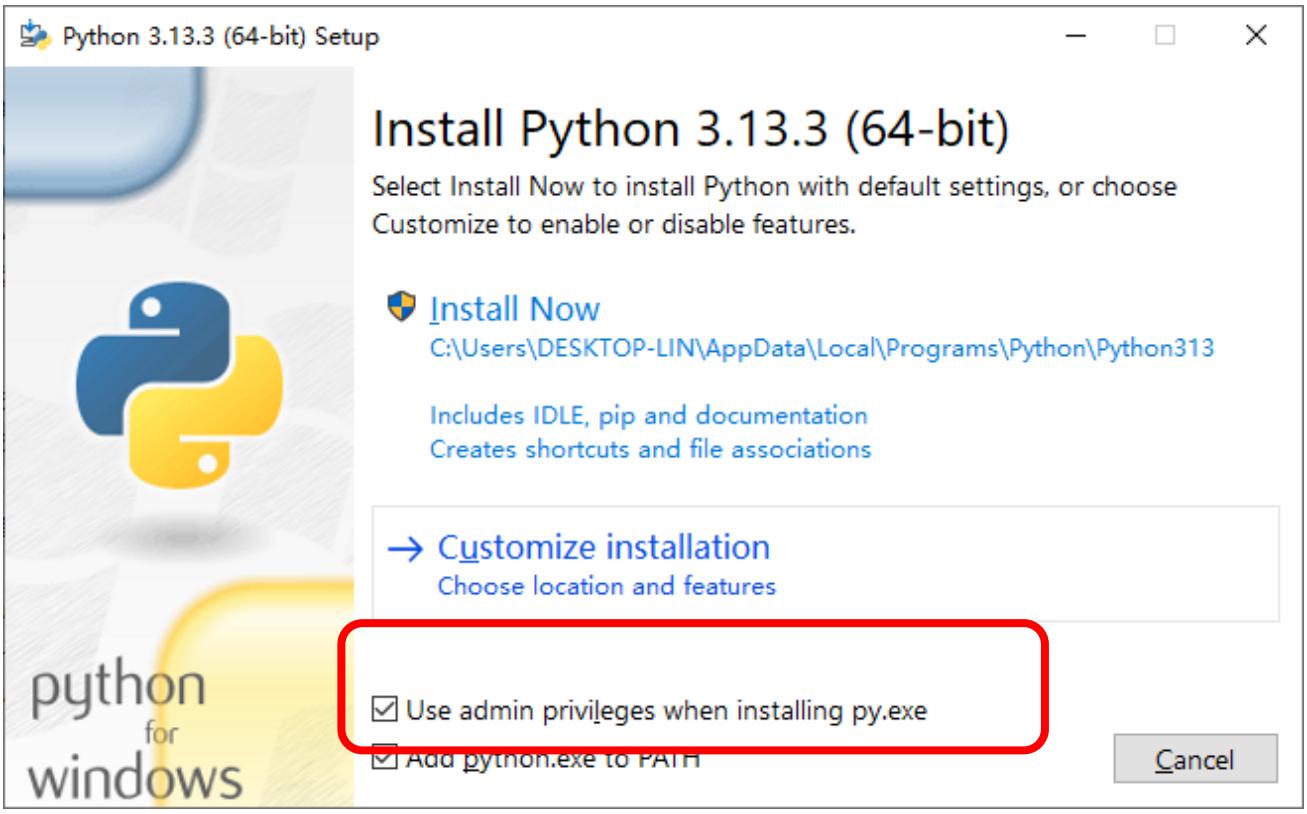
Windows

请下载并安装 **Python3** 软件包。
https://www.python.org/downloads/windows/

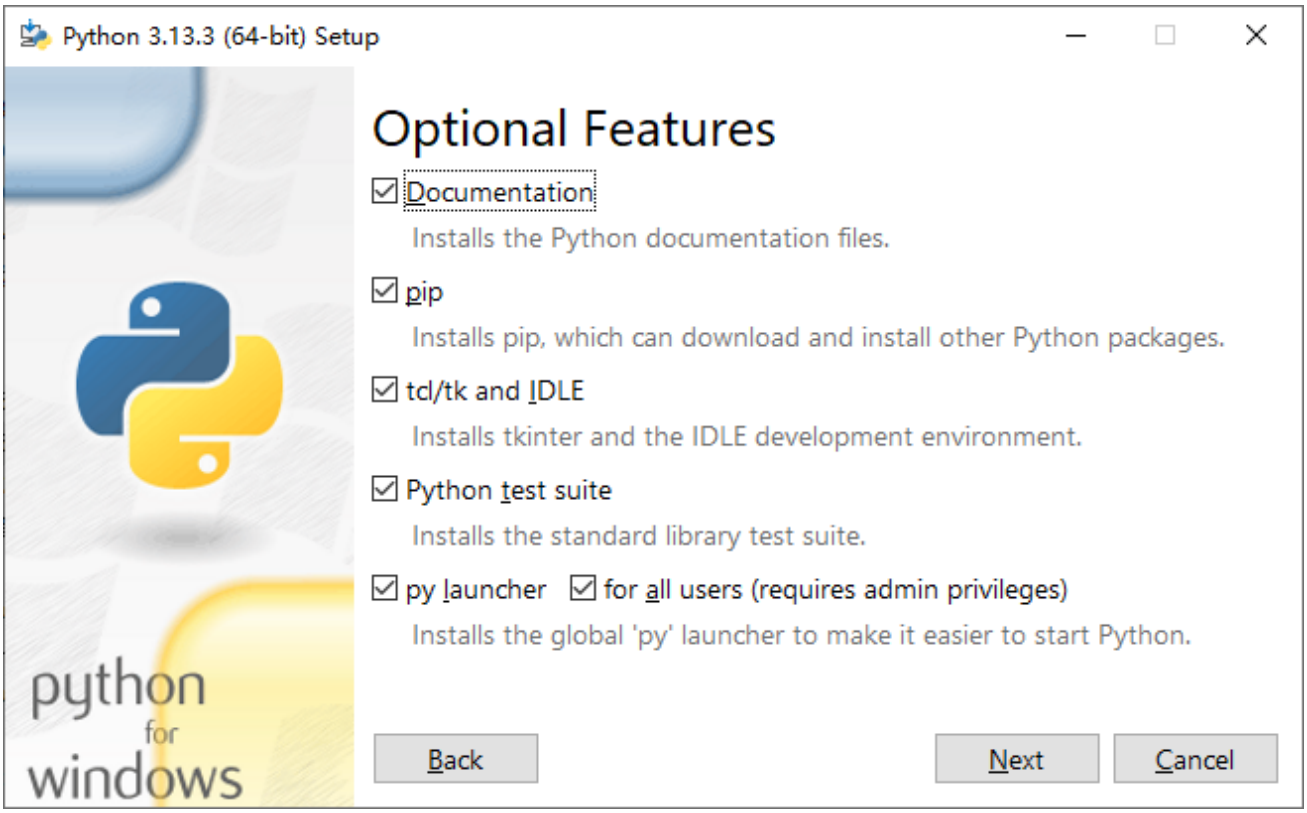


点击下载 **Python 3.13.3**

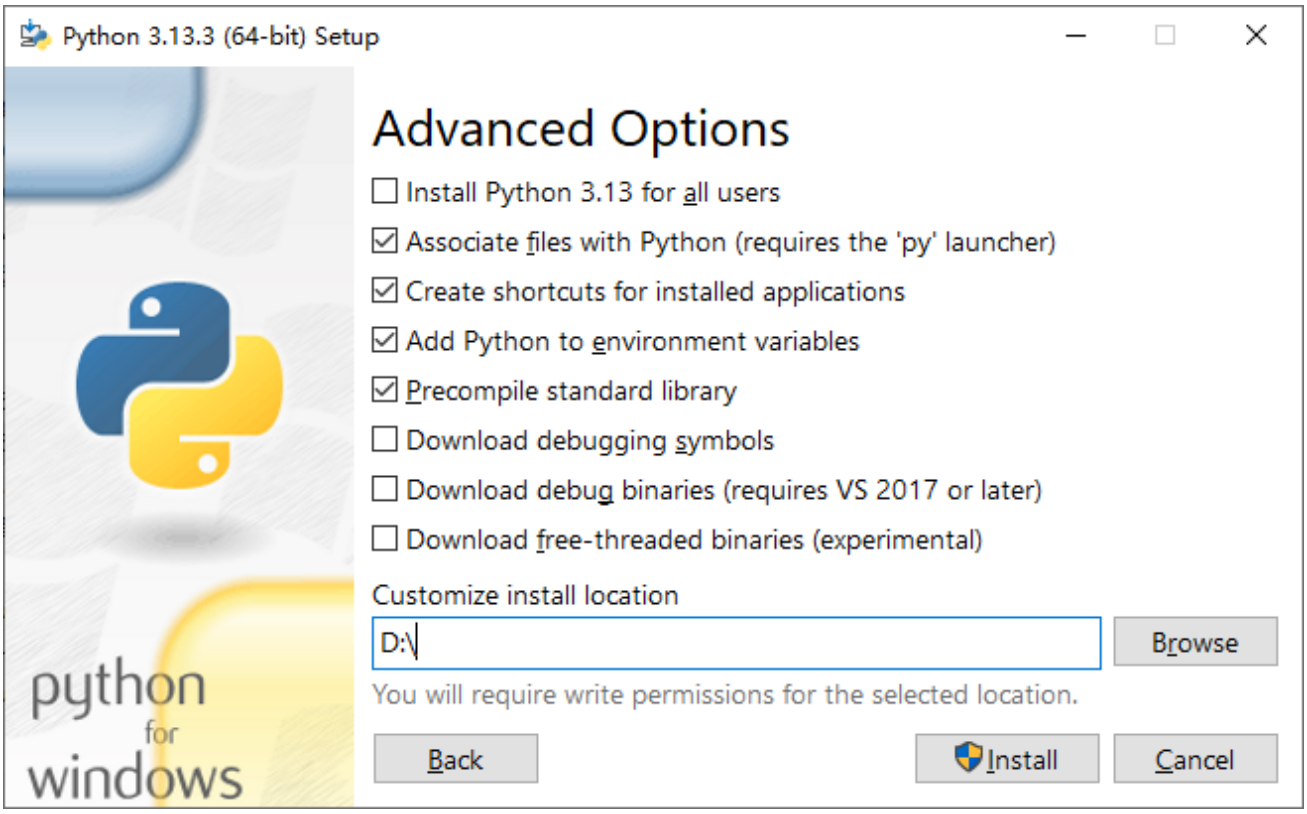
重要提示：务必勾选 "Add Python 3.13 to PATH" 选项。



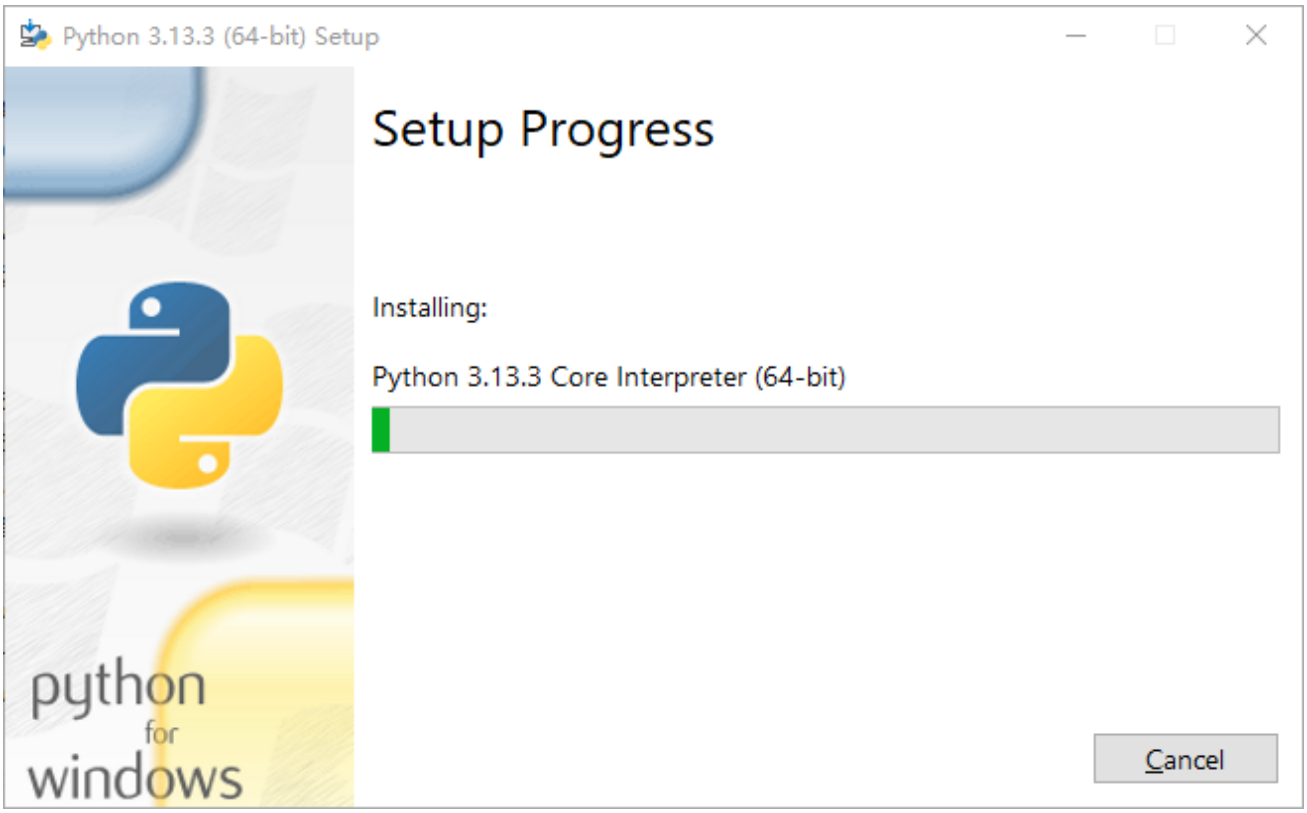
勾选所有选项后，点击 **“Next”**。



此处可设置 Python 的安装路径。我们将其安装在 **D 盘**。若您是新手，可直接选择默认路径。



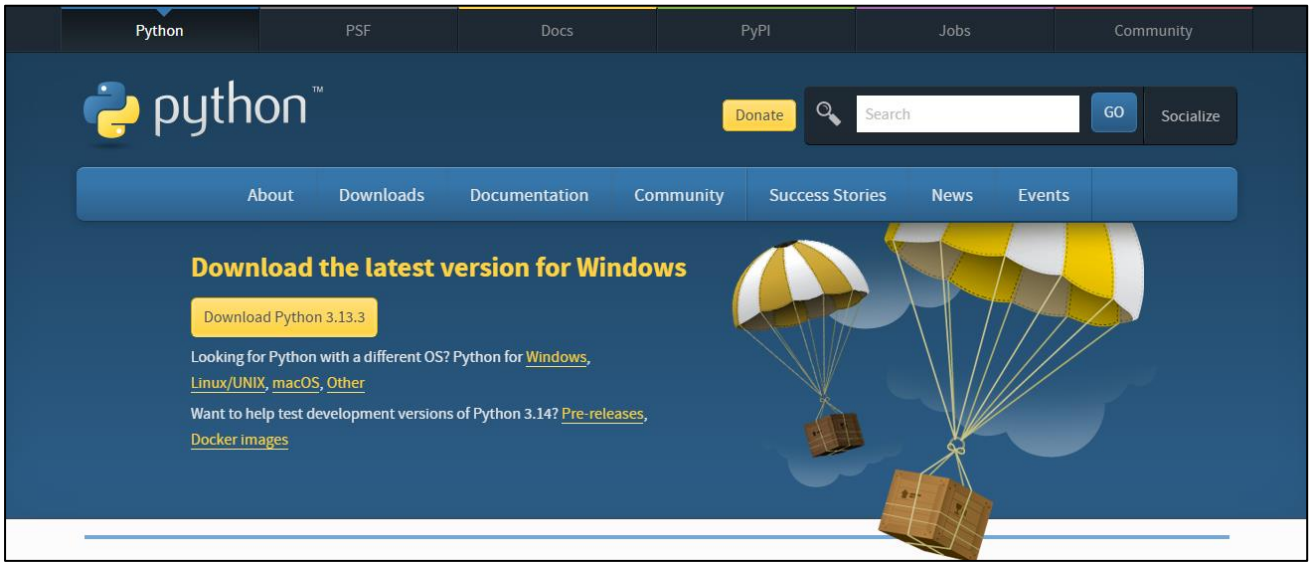
等待安装完成



现在安装已完成。

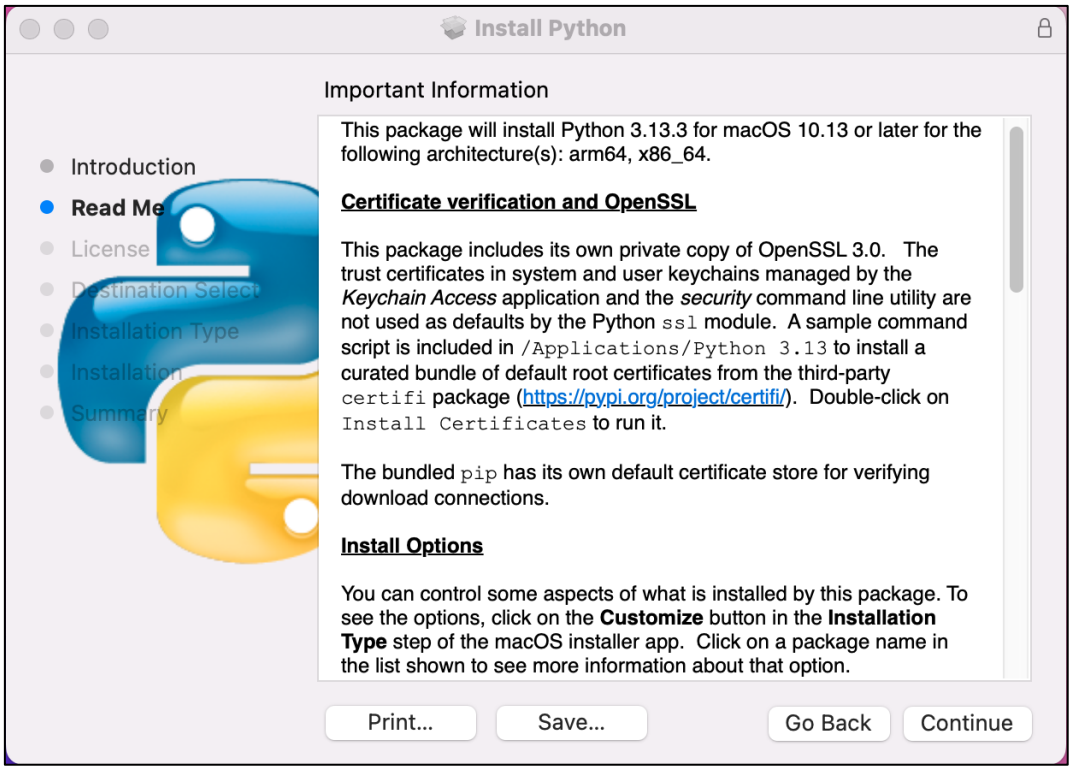
MAC

下载安装包（链接：https://www.python.org/downloads/）
点击下载 **Python 3.13.3**

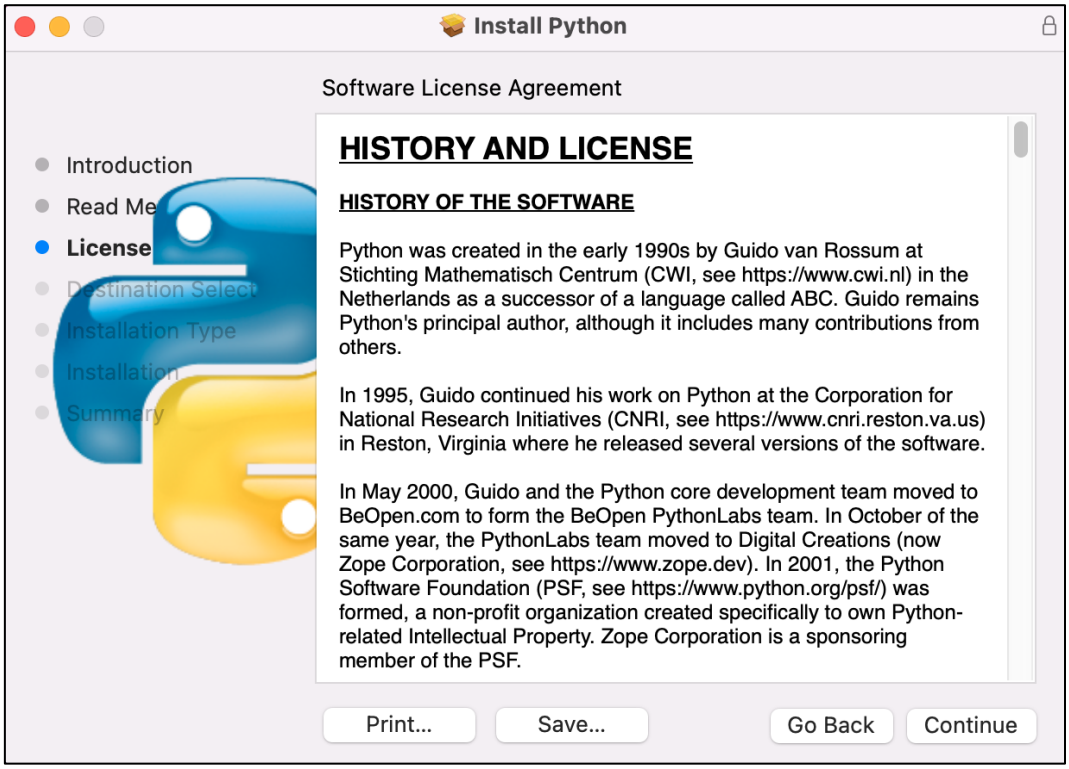


运行已下载的安装包，点击 **"Continue"** 按钮。

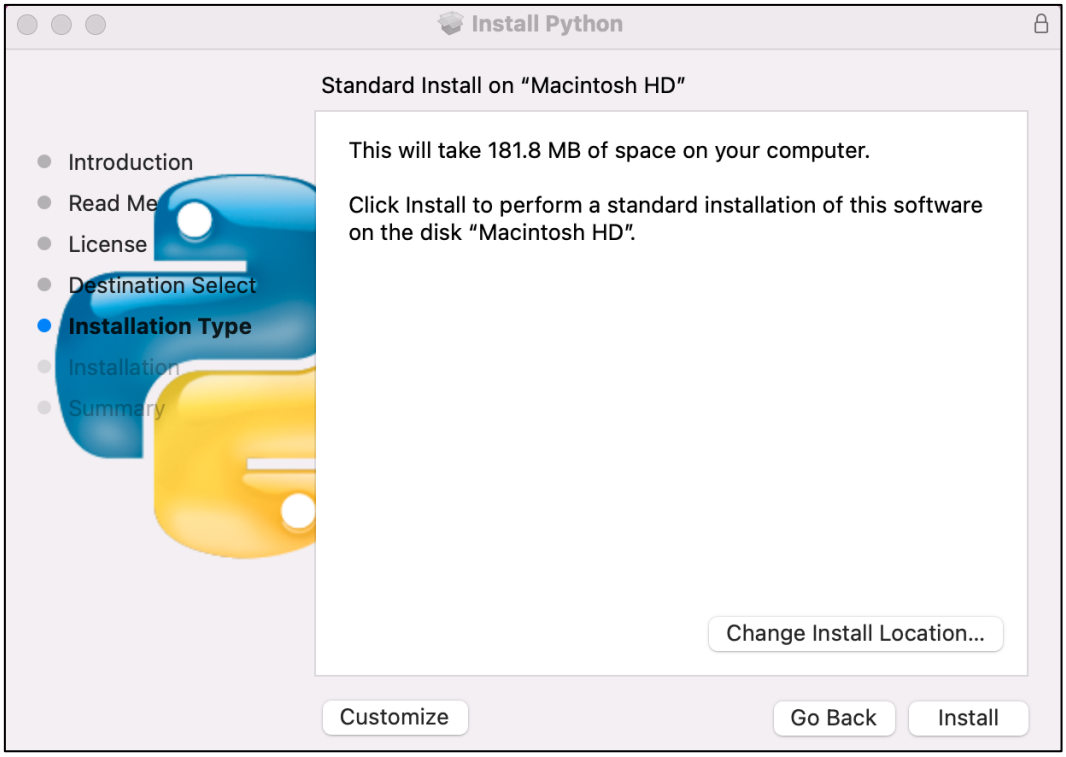
点击"Continue"



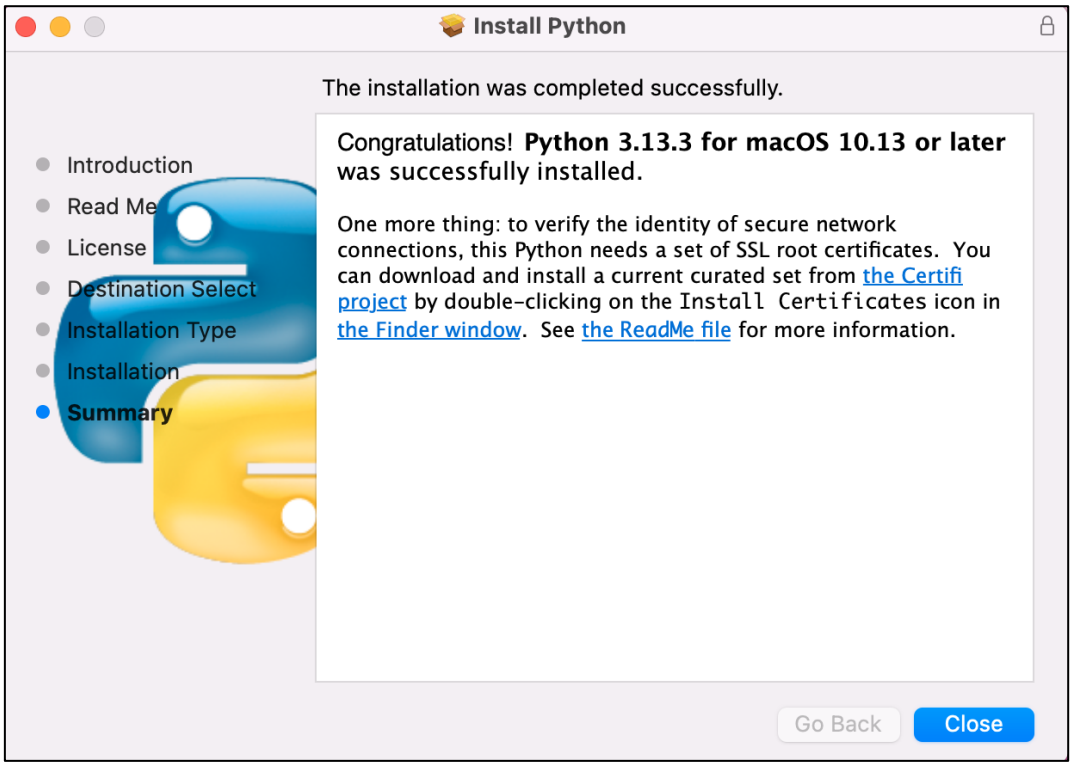
点击"Continue"



点击 **"Install"**。若电脑设有密码，请输入密码后继续安装。



安装完成



Linux

检查您的系统是否已经安装了 Python3， Python 要求 Python3.10 以上的版本。

```
python –version
python3 –version
```

```
lin@ubuntu:~$ python --version
python: command not found
lin@ubuntu:~$ python3 --version
bash: /usr/bin/python3: No such file or directory
lin@ubuntu:~$
```

安装 python3，默认安装最新版本。

```
sudo apt install python3
```

```
lin@ubuntu: ~
python: command not found
lin@ubuntu:~$ python3 --version
python3: command not found
lin@ubuntu:~$ sudo apt install python3
Installing:
  python3
```

将 python 链接到 python3.

```
sudo rm /usr/bin/python
sudo ln -s /usr/bin/python3 /usr/bin/python
```

```
lin@ubuntu: ~
lin@ubuntu:~$ sudo rm /usr/bin/python
lin@ubuntu:~$ sudo ln -s /usr/bin/python3 /usr/bin/python
lin@ubuntu:~$ python --version
Python 3.13.3
```

安装 python3.13-venv 虚拟环境。

```
sudo apt install python3-venv
```

```
lin@ubuntu: ~/Upload_Xiaozhi_Bin
lin@ubuntu:~/Upload_Xiaozhi_Bin$ sudo apt install python3-venv
```

安装 pip。

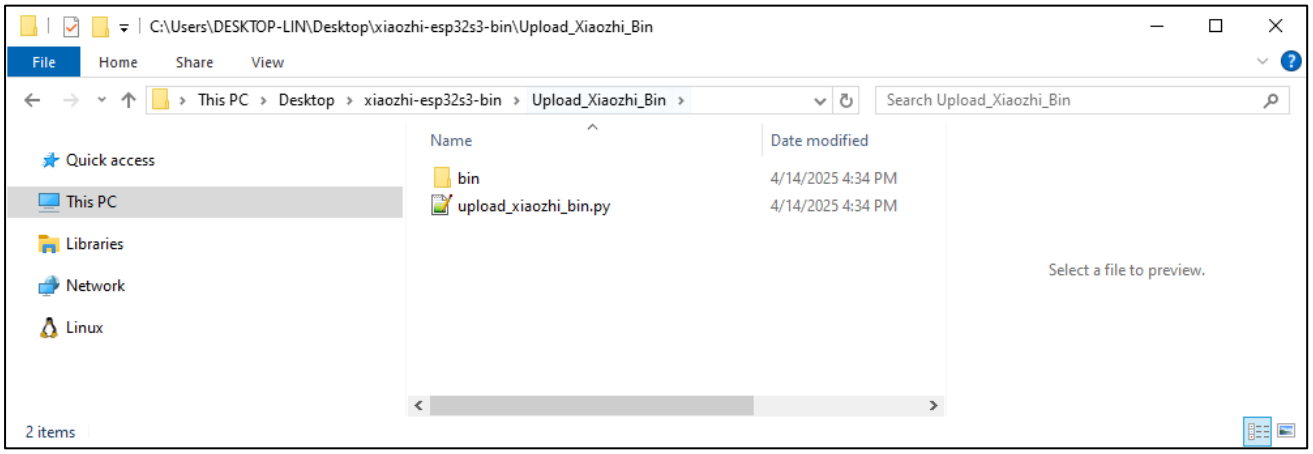
```
sudo apt install python3-pip
```

```
lin@ubuntu: ~
lin@ubuntu:~$ sudo apt install python3-pip
python3-pip is already the newest version (25.0+dfsg-1).
Summary:
  Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 0
lin@ubuntu:~$ pip --version
pip 25.0 from /usr/lib/python3/dist-packages/pip (python 3.13)
lin@ubuntu:~$
```

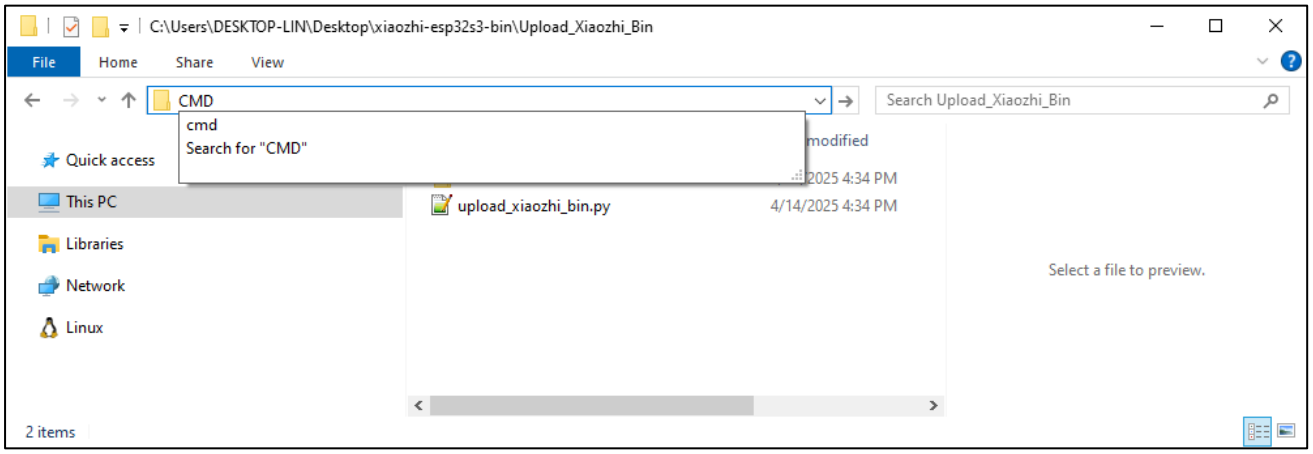
上传固件

Windows

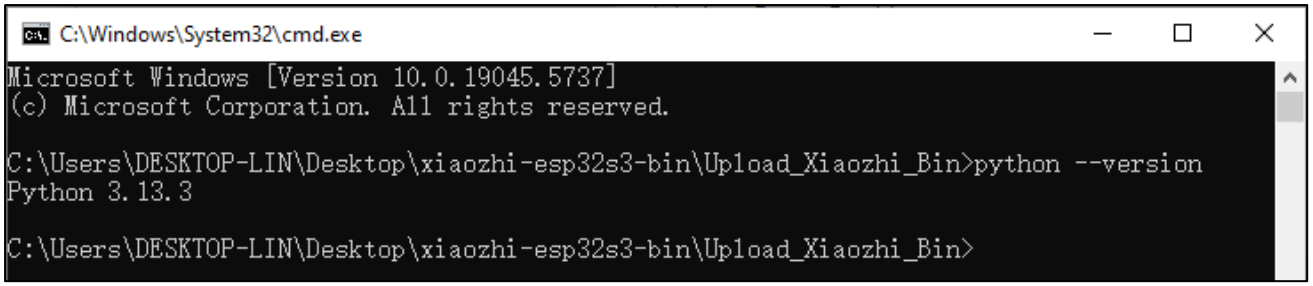
进入 Upload_Xiaozhi_Bin 文件夹。



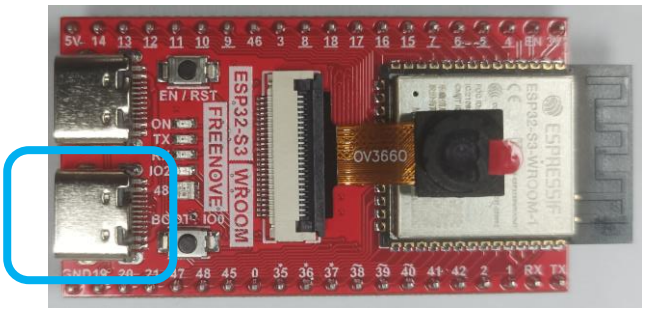
在文件栏输入“CMD”，并按下回车键。



输入“python –version“，查看是否已经安装 Python 环境，如果没有打印 Python 的版本信息，说明 Python 没有正确安装环境，请重新安装。



使用数据线连接电脑和 ESP32 S3 WROOM，请注意，不要连接错 Type C 接口。



输入“python upload_xiaozhi_bin.py”，并按下回车。
如果您的电脑没有安装 esptool 及其相关的软件库，它会自动安装这些库。

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19045.5737]
(c) Microsoft Corporation. All rights reserved.

C:\Users\DESKTOP-LIN\Desktop\xiaozhi-esp32s3-bin\Upload_Xiaozhi_Bin>python --version
Python 3.13.3

C:\Users\DESKTOP-LIN\Desktop\xiaozhi-esp32s3-bin\Upload_Xiaozhi_Bin>python upload_xiaozhi_bin.py
esptool is not installed. Installing now...
Looking in indexes: https://mirrors.aliyun.com/pypi/simple/
Collecting esptool
  Using cached https://mirrors.aliyun.com/pypi/packages/5c/6b/3ce9bb7f36bdef3d6ae71646a1d3b7d59826a4
78f3ed8a783a93a2f8f537/esptool-4.8.1.tar.gz (409 kB)
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
Collecting bitstring!=4.2.0,>=3.1.6 (from esptool)
  Downloading https://mirrors.aliyun.com/pypi/packages/75/2d/174566b533755ddf8efb32a5503af61c756a983
de379f8ad3aed6a982d38/bitstring-4.3.1-py3-none-any.whl (71 kB)
Collecting cryptography>=2.1.4 (from esptool)
  Downloading https://mirrors.aliyun.com/pypi/packages/33/cf/1f7649b8b9a3543e042d3f348e398a061923ac0
5b507f3f4d95f11938aa9/cryptography-44.0.2-cp39-abi3-win_amd64.whl (3.2 MB)
     ---------------------------------------- 3.2/3.2 MB 2.6 MB/s eta 0:00:00
```

然后，它会调用 esptool 将 bin 文件夹中的文件上传到 ESP32 S3 WROOM 中。

```
C:\Windows\System32\cmd.exe
SHA digest in image updated
Compressed 16352 bytes to 11342...
Wrote 16352 bytes (11342 compressed) at 0x00000000 in 0.2 seconds (effective 802.0 kbit/s)...
Hash of data verified.
Compressed 3561632 bytes to 2079901...
Wrote 3561632 bytes (2079901 compressed) at 0x00100000 in 22.8 seconds (effective 1247.5 kbit/s)...
Hash of data verified.
Compressed 3072 bytes to 141...
Wrote 3072 bytes (141 compressed) at 0x00008000 in 0.0 seconds (effective 1025.9 kbit/s)...
Hash of data verified.
Compressed 8192 bytes to 31...
Wrote 8192 bytes (31 compressed) at 0x0000d000 in 0.0 seconds (effective 1812.3 kbit/s)...
Hash of data verified.
Compressed 873228 bytes to 644882...
Wrote 873228 bytes (644882 compressed) at 0x00010000 in 6.4 seconds (effective 1090.4 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
esptool command executed successfully.

C:\Users\DESKTOP-LIN\Desktop\xiaozhi-esp32s3-bin\Upload_Xiaozhi_Bin>
```

ESP32 S3 WROOM 显示如下。

MAC

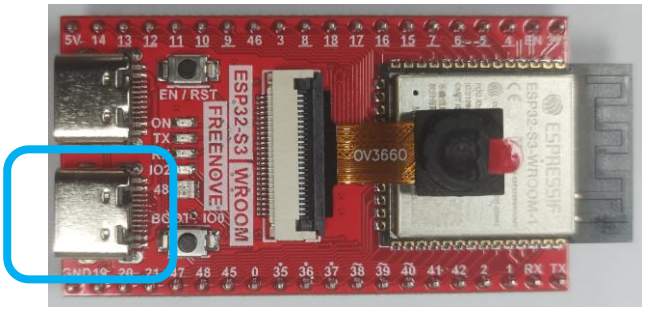
进入 Upload_Xiaozhi_Bin 文件夹。

```
Upload_Xiaozhi_Bin — -zsh — 91×24
freenove@PandeMacBook-Air ~ % cd Desktop/xiaozhi-esp32s3-bin/Upload_Xiaozhi_Bin
freenove@PandeMacBook-Air Upload_Xiaozhi_Bin %
```

输入“**python –version**“，查看是否已经安装 Python 环境，如果没有打印 Python 的版本信息，说明 Python 没有正确安装环境，请重新安装。

```
Upload_Xiaozhi_Bin — -zsh — 91×24
freenove@PandeMacBook-Air Upload_Xiaozhi_Bin % python3 --version
Python 3.13.3
freenove@PandeMacBook-Air Upload_Xiaozhi_Bin %
```

使用数据线连接电脑和 ESP32 S3 WROOM，请注意，不要连接错 Type C 接口。



输入“**python upload_xiaozhi_bin.py**”，并按下回车。

```
Upload_Xiaozhi_Bin — -zsh — 91×24
freenove@PandeMacBook-Air Upload_Xiaozhi_Bin % python3 upload_xiaozhi_bin.py
```

然后，它会调用 esptool 将 bin 文件夹中的文件上传到 ESP32 S3 WROOM 中。

```
Upload_Xiaozhi_Bin — Python ◂ Python upload_xiaozhi_bin.py — 91×24
Serial port /dev/cu.wchusbserial5A4E1051341
Connecting....
Chip is ESP32-S3 (QFN56) (revision v0.2)
Features: WiFi, BLE, Embedded PSRAM 8MB (AP_3v3)
Crystal is 40MHz
MAC: 30:ed:a0:20:bd:9c
Uploading stub...
Running stub...
Stub running...
Changing baud rate to 2000000
Changed.
Configuring flash size...
Flash will be erased from 0x00000000 to 0x00003fff...
Flash will be erased from 0x00100000 to 0x00465fff...
Flash will be erased from 0x00008000 to 0x00008fff...
Flash will be erased from 0x0000d000 to 0x0000efff...
Flash will be erased from 0x00010000 to 0x000e5fff...
```

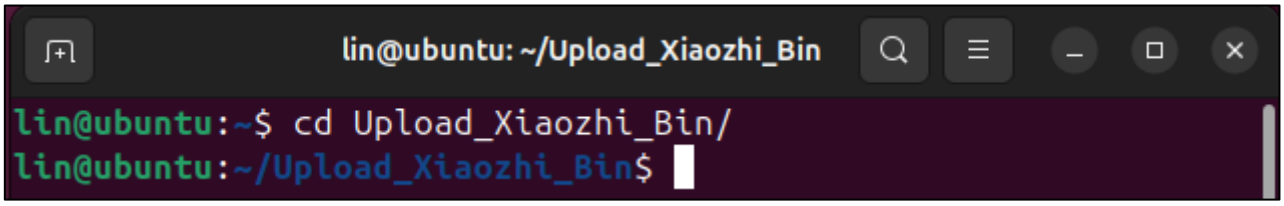
```
Upload_Xiaozhi_Bin — -zsh — 91×24
SHA digest in image updated
Compressed 16352 bytes to 11342...
Wrote 16352 bytes (11342 compressed) at 0x00000000 in 0.2 seconds (effective 775.3 kbit/s).
..
Hash of data verified.
Compressed 3561632 bytes to 2079901...
Wrote 3561632 bytes (2079901 compressed) at 0x00100000 in 22.8 seconds (effective 1247.2 kb
it/s)...
Hash of data verified.
Compressed 3072 bytes to 141...
Wrote 3072 bytes (141 compressed) at 0x00008000 in 0.0 seconds (effective 889.1 kbit/s)...
Hash of data verified.
Compressed 8192 bytes to 31...
Wrote 8192 bytes (31 compressed) at 0x0000d000 in 0.0 seconds (effective 1663.8 kbit/s)...
Hash of data verified.
Compressed 873228 bytes to 644882...
Wrote 873228 bytes (644882 compressed) at 0x00010000 in 6.4 seconds (effective 1089.5 kbit/
s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
esptool command executed successfully.
freenove@PandeMacBook-Air Upload_Xiaozhi_Bin % c
```

ESP32 S3 WROOM 显示如下。

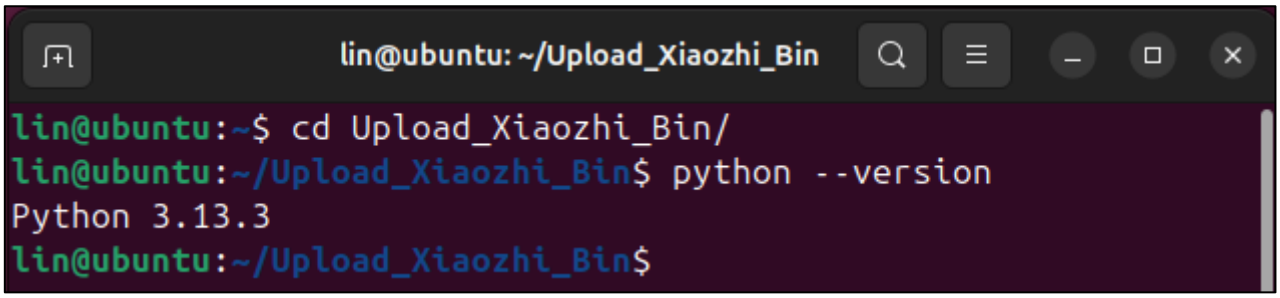
Linux

进入 Upload_Xiaozhi_Bin 文件夹。

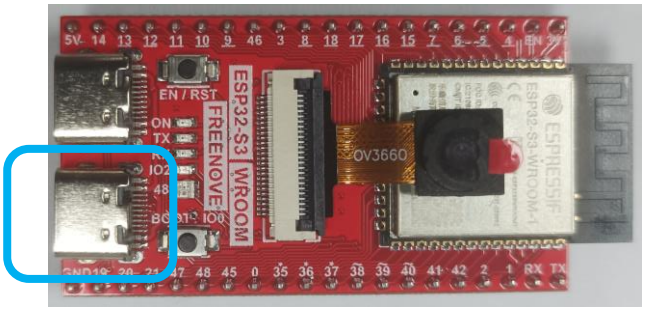
```
cd Upload_Xiaozhi_Bin
```



输入“**python –version**“，查看是否已经安装 Python 环境，如果没有打印 Python 的版本信息，说明 Python 没有正确安装环境，请重新安装。

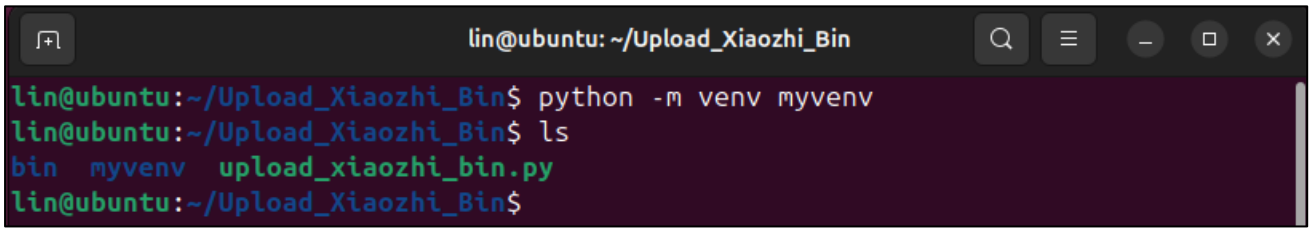


使用数据线连接电脑和 ESP32 S3 WROOM，请注意，不要连接错 Type C 接口。



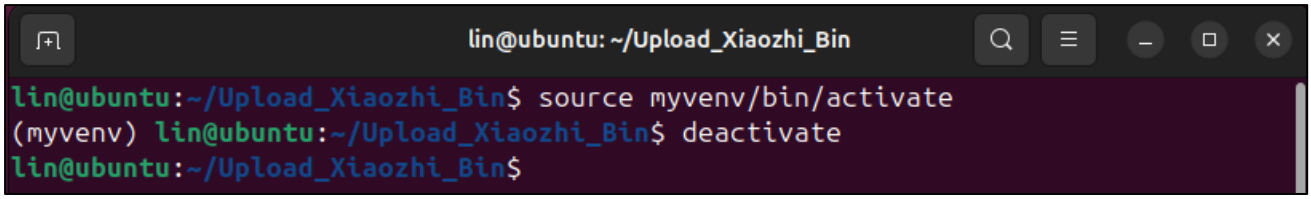
创建一个虚拟环境，并命名为“myvenv”。

```
python -m venv myvenv
```

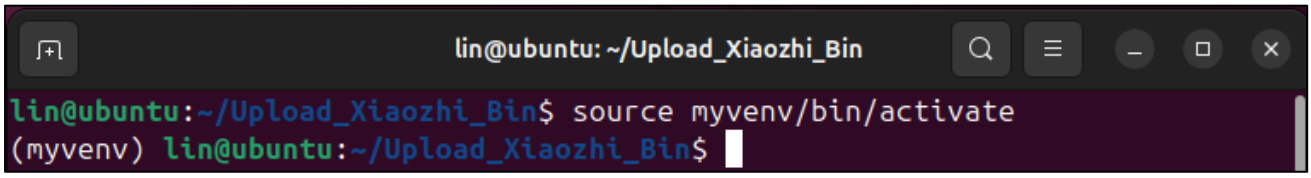


您可以使用下面的指令激活和关闭虚拟环境。

```
source myvenv/bin/activate
deactivate
```



激活虚拟环境。



使用指令查看 ESP32S3 的端口号。

```
ls /dev/tty*
```

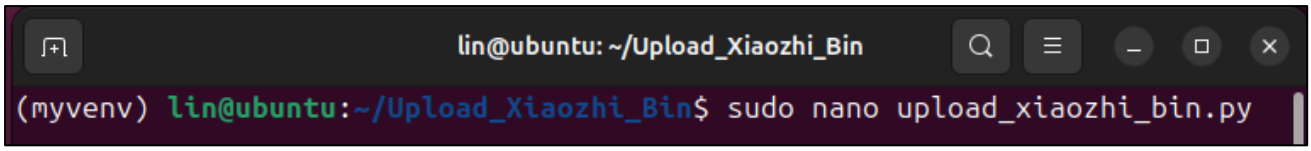
当 ESP32S3 没有连接到电脑时，使用指令后的显示内容如下图所示。

当将 ESP32S3 连接到电脑时，使用指令后的显示内容如下图所示。

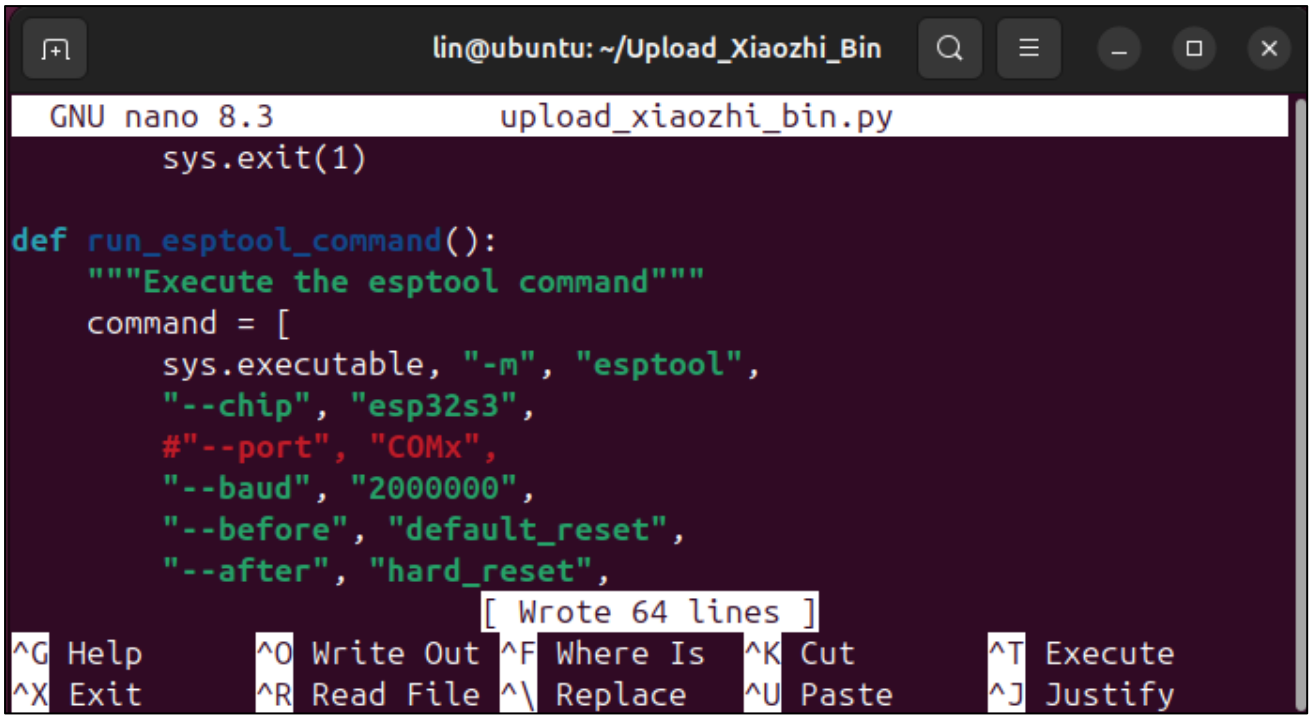
对比前后的区别，多出来的端口就是 ESP32S3 连接到电脑上的端口号。

在运行 python 文件之前，需要修改文件中的端口号。
使用指令打开 python 文件。

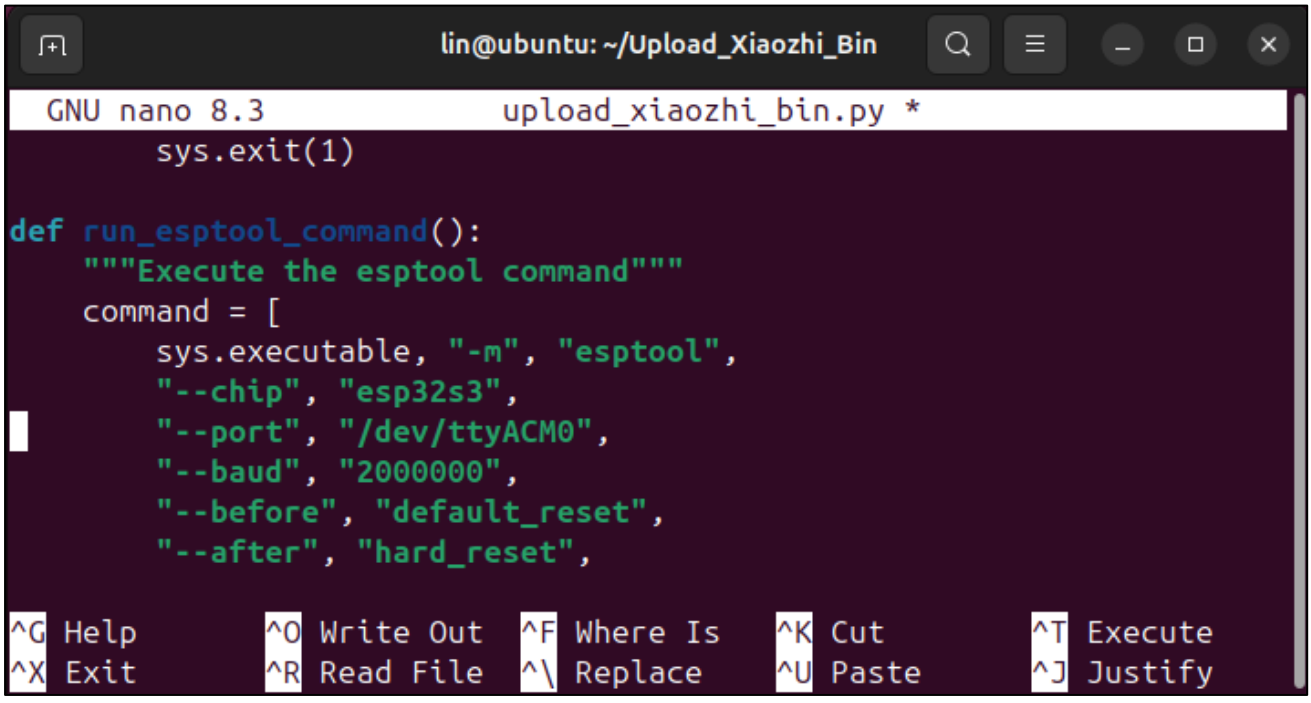
```
sudo nano upload_xiaozhi_bin.py
```



在文本编辑器中，找到'**“--port”, “COMx”**'这一行，将“COMx”修改为 ESP32S3 在电脑上的端口号。



修改后如下图所示。



使用 Crtl+O，保存文件。
使用 Ctrl+X，退出编辑器。

运行 python 文件。

```
python upload_xiaozhi_bin.py
```

```
lin@ubuntu: ~/Upload_Xiaozhi_Bin
(myvenv) lin@ubuntu:~/Upload_Xiaozhi_Bin$ python upload_xiaozhi_bin.py
esptool is already installed.
Executing esptool command...
esptool.py v4.8.1
Serial port /dev/ttyACM0
Connecting....
Chip is ESP32-S3 (QFN56) (revision v0.2)
Features: WiFi, BLE, Embedded PSRAM 8MB (AP_3v3)
Crystal is 40MHz
MAC: 30:ed:a0:20:bd:9c
Uploading stub...
Running stub...
```

代码上传完成，如下图所示。

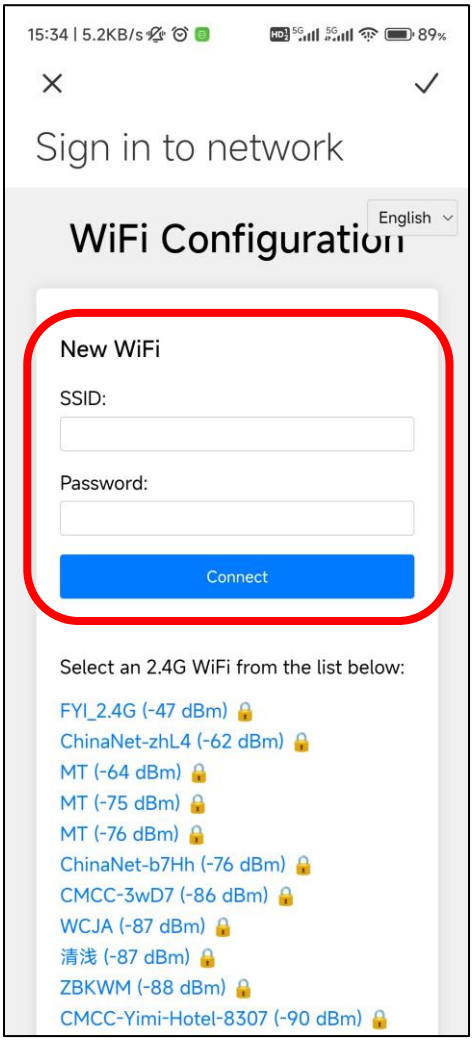
```
Wrote 8192 bytes (31 compressed) at 0x0000d000 in 0.0 seconds (effective 18
43.6 kbit/s)...
Hash of data verified.
Compressed 873228 bytes to 644882...
Wrote 873228 bytes (644882 compressed) at 0x00010000 in 6.3 seconds (effect
ive 1103.4 kbit/s)...
Hash of data verified.

Leaving...
Hard resetting via RTS pin...
esptool command executed successfully.
(myvenv) lin@ubuntu:~/Upload_Xiaozhi_Bin$
```

ESP32 S3 WROOM 显示如下。

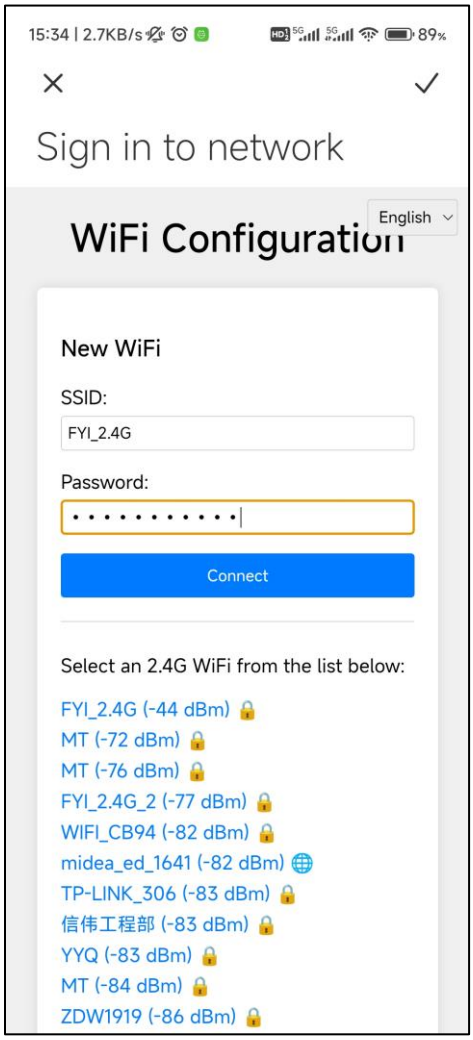
ESP32 S3 WROOM 配网

如果您的 ESP32 S3 WROOM 还没有集成小智 AI 固件，请跳转到小智 AI 固件。
如果您想学习小智 AI 的代码，请跳转到小智 AI 代码，请跳转到小智 AI 代码。
如果您的 ESP32 S3 WROOM 已经集成了小智 AI 的固件，请使用您的手机，打开 WiFi 功能，您可以搜索到一个叫“Xiaozhi-XXXX”的路由器 WiFi。请连接它，它是无密码的。

连接 WiFi 后，请按照提示点击它。它将会打开您的手机浏览器，并访问“192.168.4.1”这个网址。



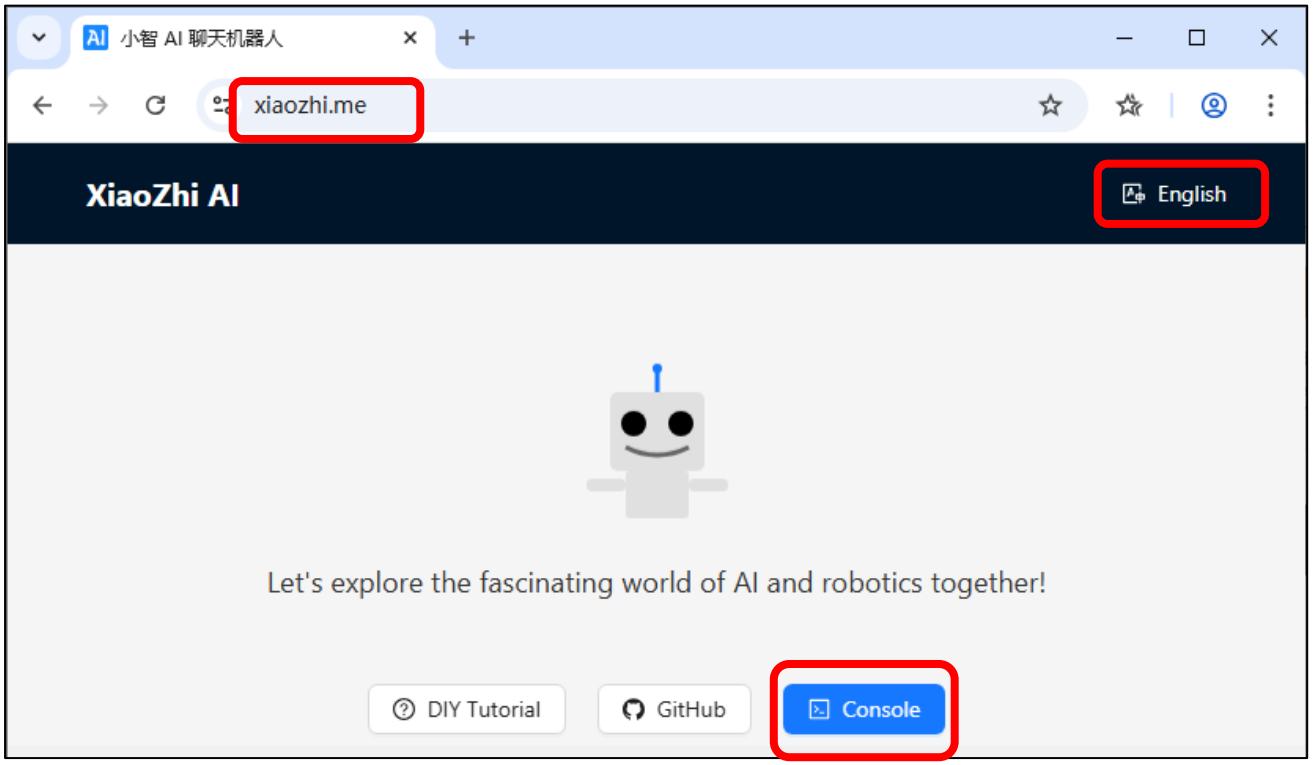
在 SSID 中输入您的家庭路由器 WiFi 名称，在 Password 中输入您的家庭路由器 WiFi 密码。然后点击 Connect。请注意，ESP32 S3 WROOM 只接收 2.4GHz 频段的路由器，如果您的路由器同时支持 2.4GHz 和 5GHz，请注意，不能让 ESP32 S3 WROOM 连接 5Ghz 频段。也不能将 2.4Ghz 和 5Ghz 设置为混合模式。这都会导致 ESP32 S3 WROOM 无法正常联网工作。



当您看到这个界面时，说明您已经成功让 ESP32 S3 Wroom 配网成功，它将会加入您的家庭路由器 WiFi 网络中。您可以看到 ESP32 S3 WROOM 自动连接 WiFi，然后屏幕显示如下图所示。

配置小智 AI 服务器

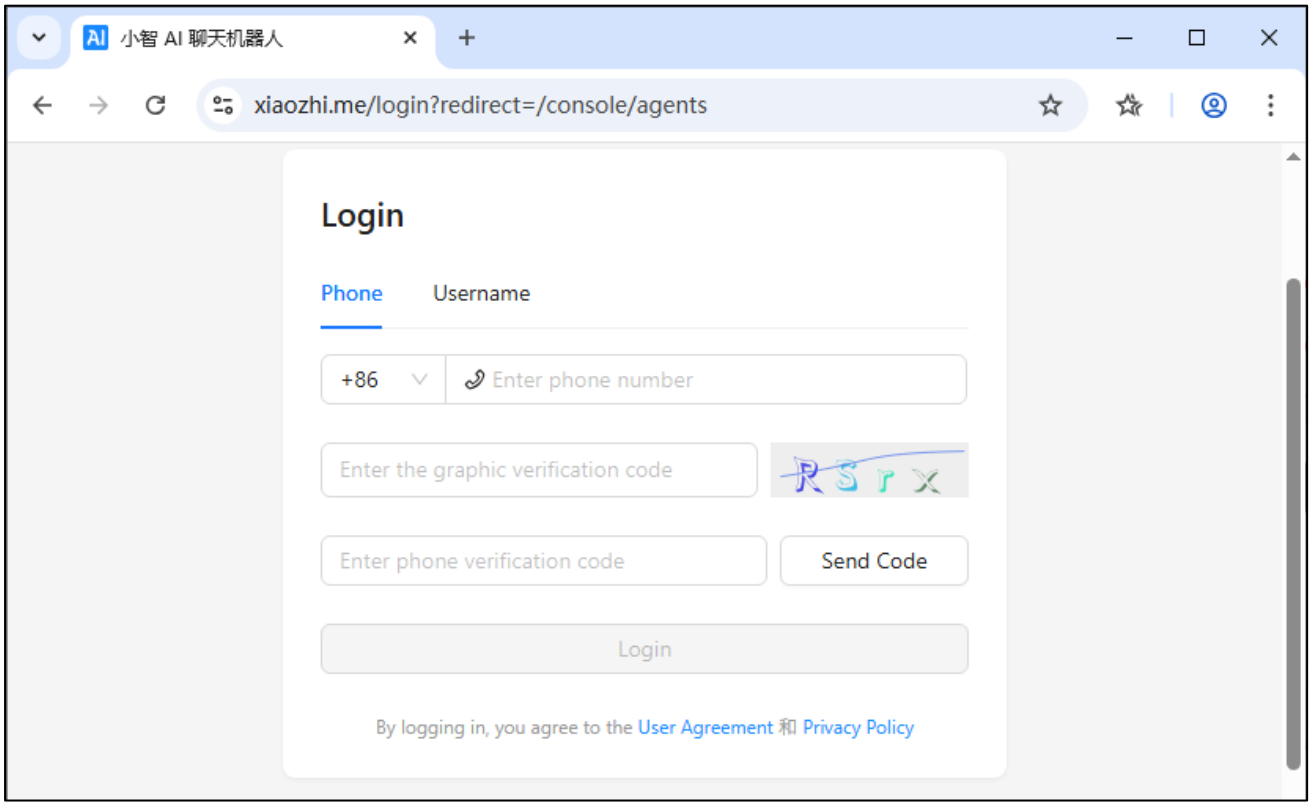
请确保您的手机或者电脑和 ESP32 S3 WROOM 连接到同一个路由器 WiFi 网络中。
打开手机或者电脑的浏览器功能，访问网址：https://xiaozhi.me/
请注意，由于不同国家的网络政策原因，可能会存在部分国家的用户无法正常访问网站。具体情况请查看相关国家网络政策。



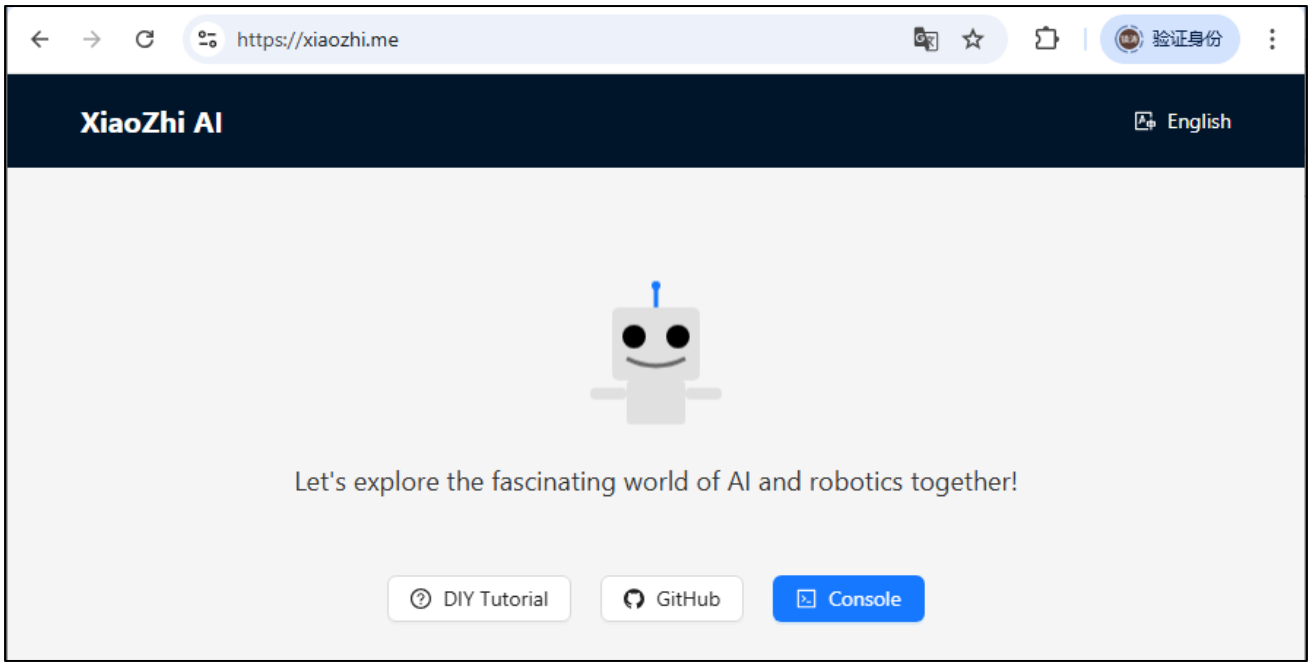
如果您还没有账号，请点击 Console，使用手机号进行注册。
请注意，目前小智 AI 服务器仅支持以下国家使用手机号注册账号。

Mainland China +86	Germany +49	Philippines +63	Pakistan +92
Hong Kong +852	Plland +48	New Zealand +64	Nigeria +234
Macau +853	Switzerland +41	Singapore +65	Bangladesh +880
Taiwan +886	Spain +34	Thailand +66	Saudi Arabia +966
United States/Canada +1	Denmark +45	Japan +81	United Arab Emirates +971
United Kingdom +44	Malaysia +60	South Korea +82	Brazil +55
France +33	Australia +61	Vietnam +84	Mexico +52
Italy +39	Indonesia +62	India +91	Chile +56
Argentina +54	Egypt +20	South Africa +27	Kenya +254
Tanzania +255	Kazakhstan +7		

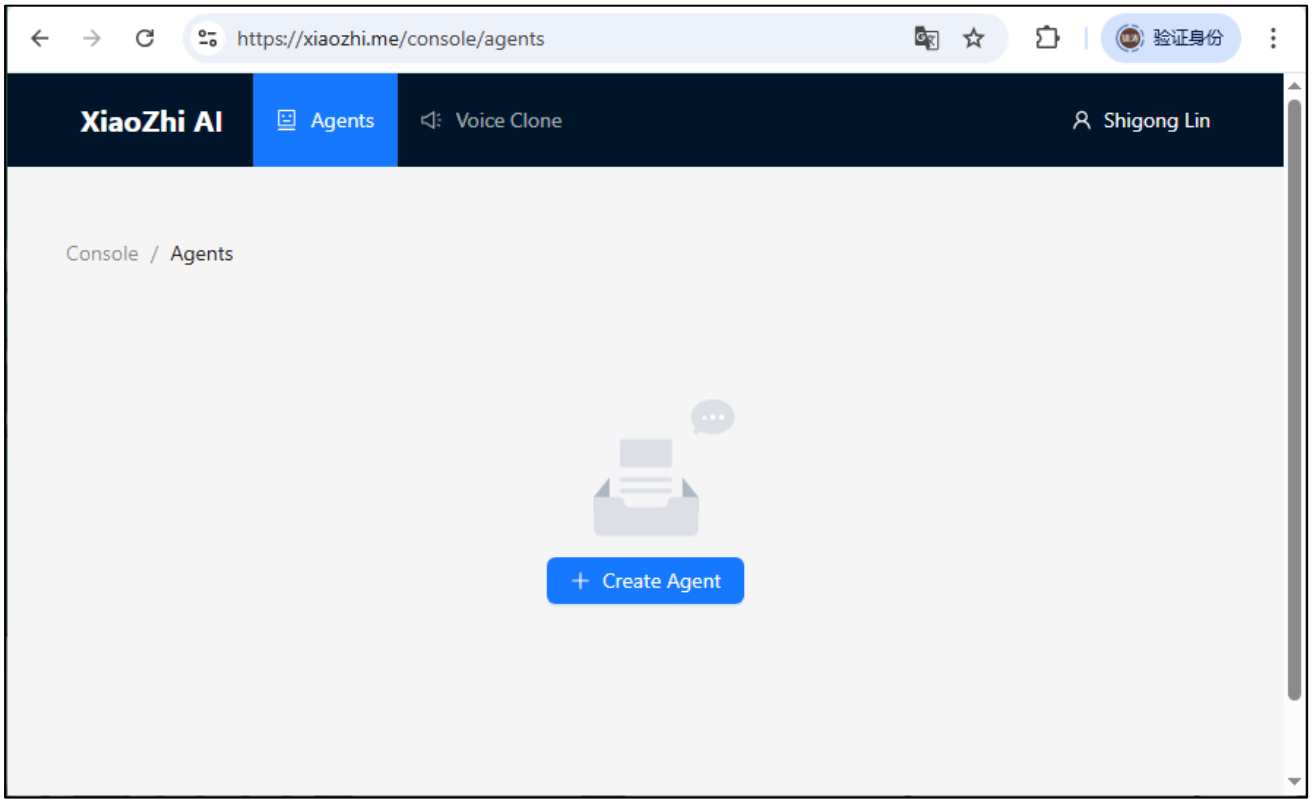
如果您还没有账号，请先注册一个账号，并登陆它。



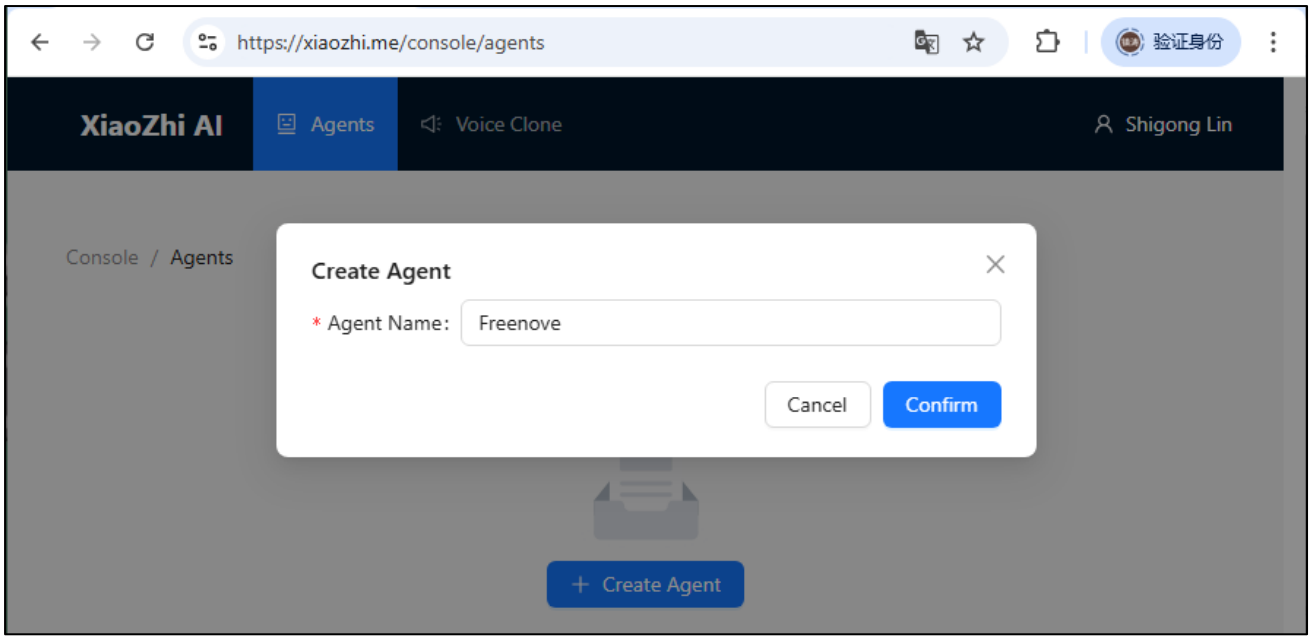
点击 Console，开始配置小智 AI 服务器。



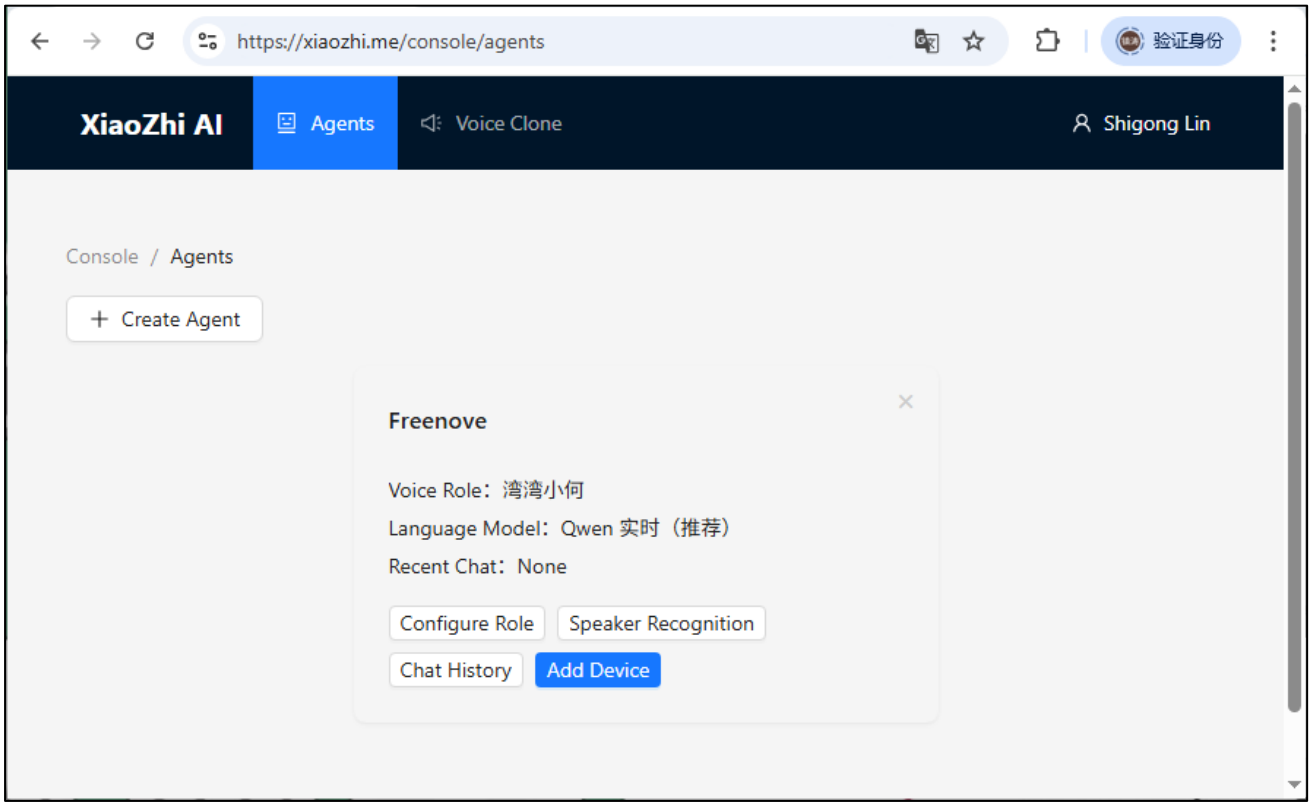
点击“Create Agent”，创建一个新的智能体。



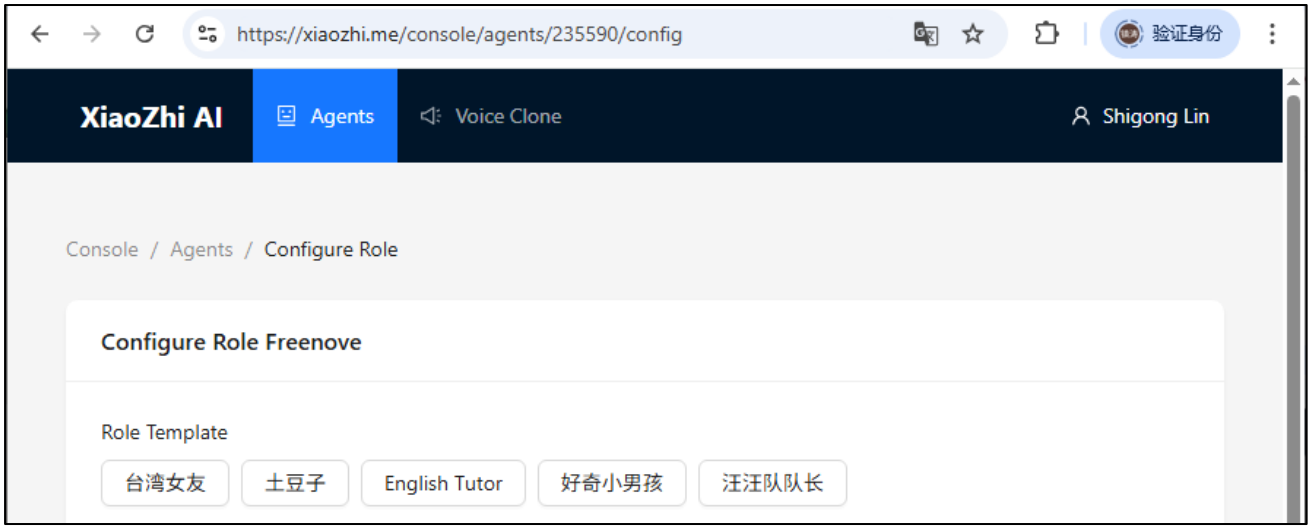
填写任意名称。点击“Confirm”。



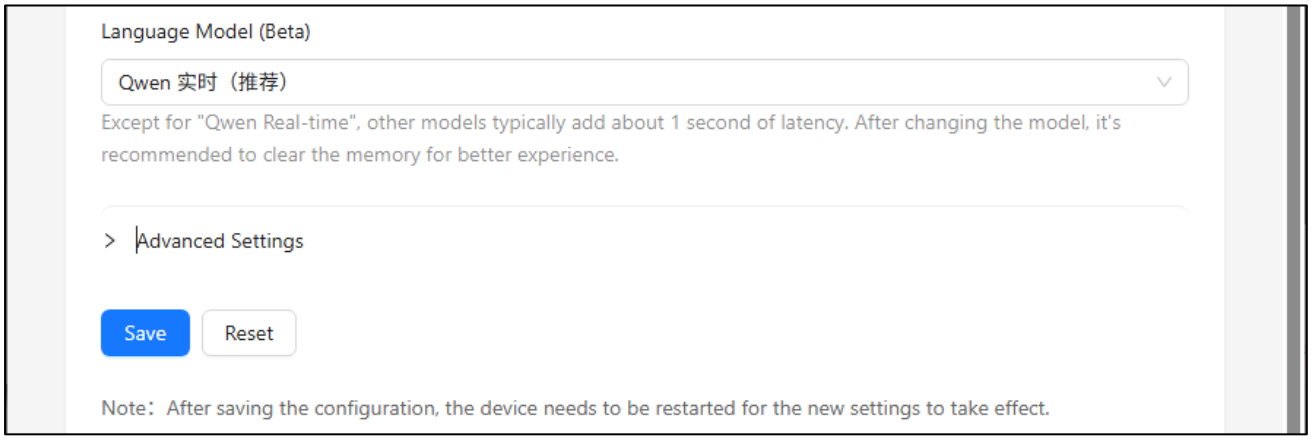
点击“Configure Role”，配置您的智能体。



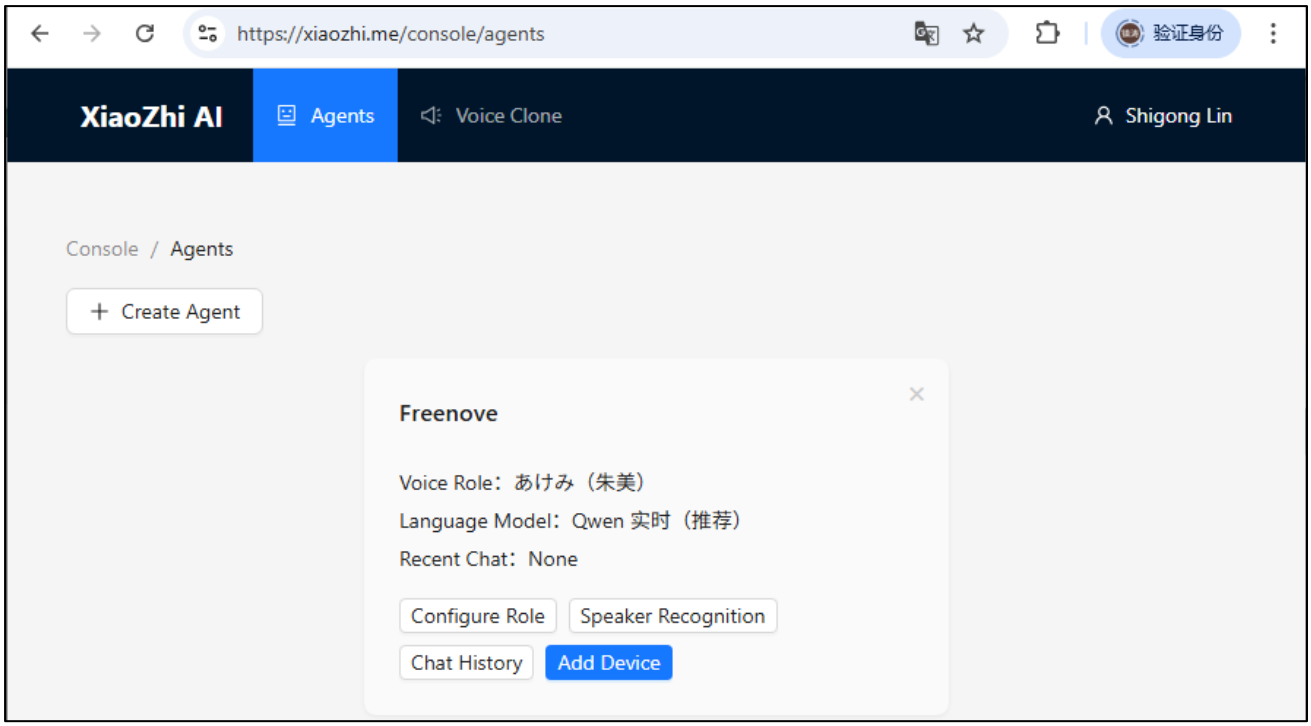
点击“English Tutor”，其他选项内容保持不变。



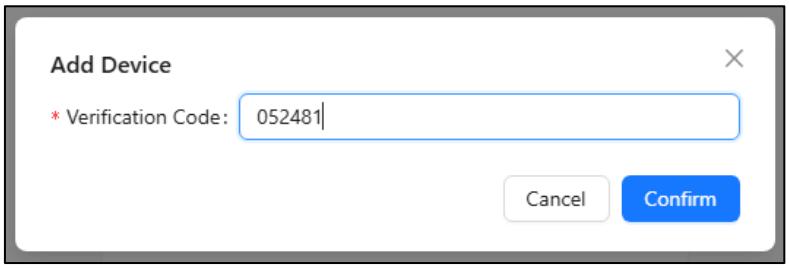
滚动鼠标，将界面移动到最底部，点击“Save”。



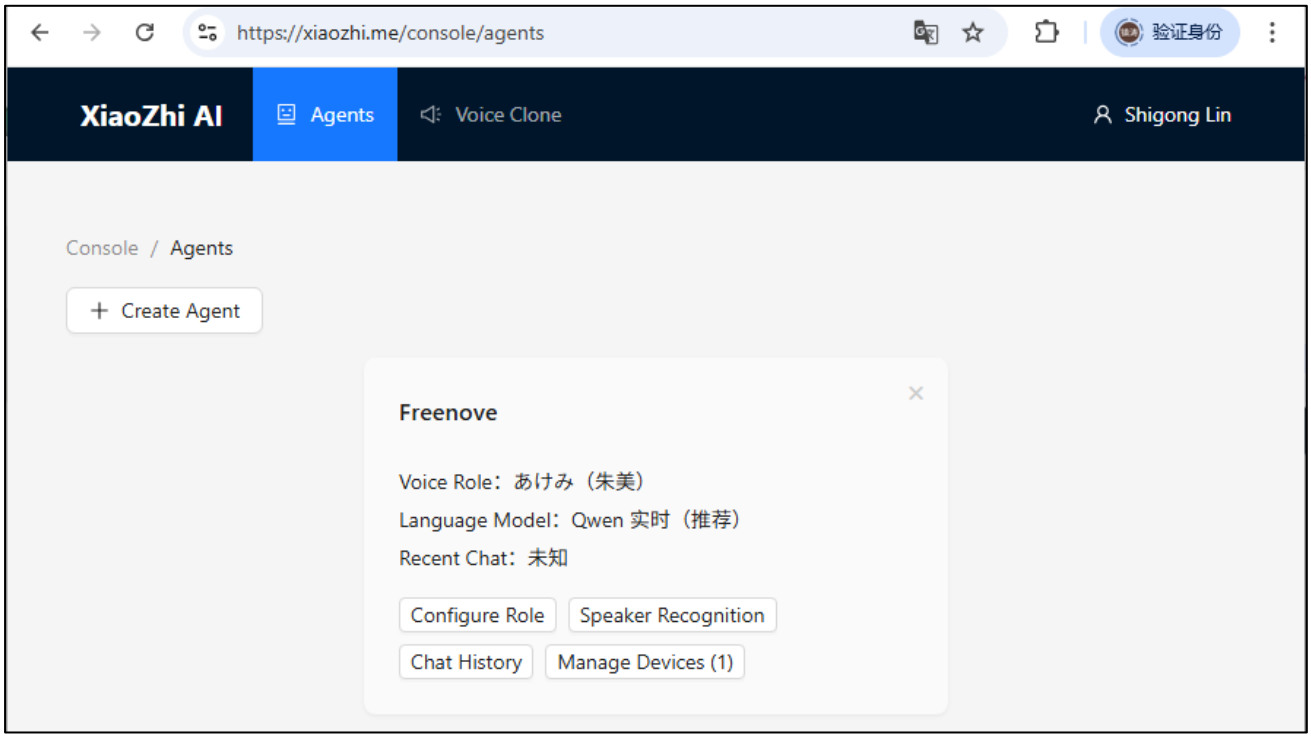
点击“Agents”回到智能体界面，然后点击”Add Device”。



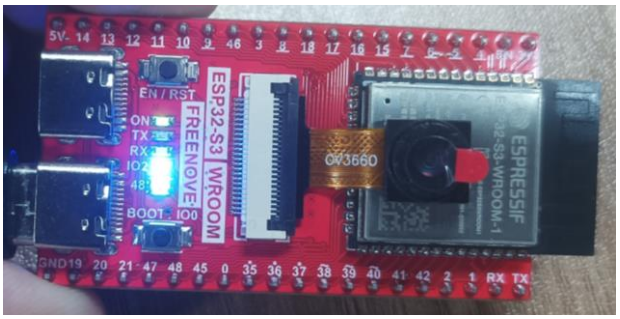
在新弹出的界面中，填写 ESP32 S3 WROOM 屏幕的数字。然后点击“Confirm”。



添加完成后，界面如下。



点击 ESP32 S3 WROOM 上的 RST 按键。它将让 ESP32 S3 WROOM 重新启动。



至此，您已经完成小智 AI 的全部工作。对着麦克风说，“Hi, ESP”。

您可以和它进行中文，英文交流。

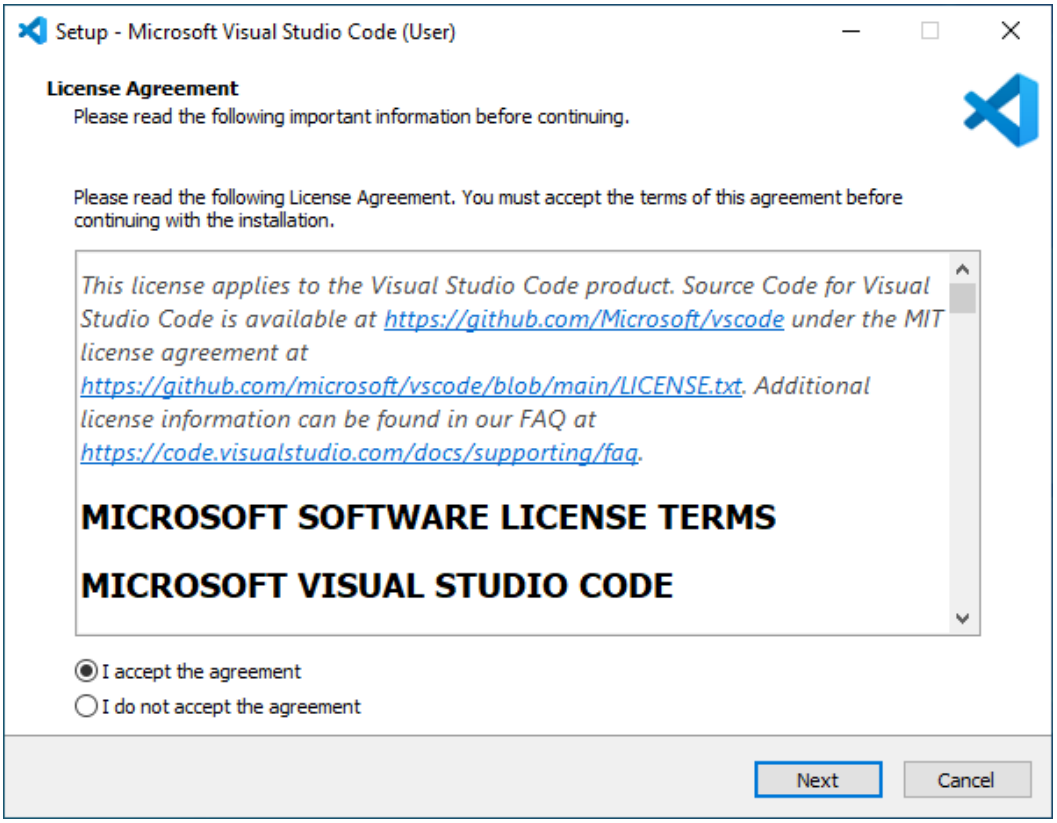
小智 AI 代码

Visual Studio Code

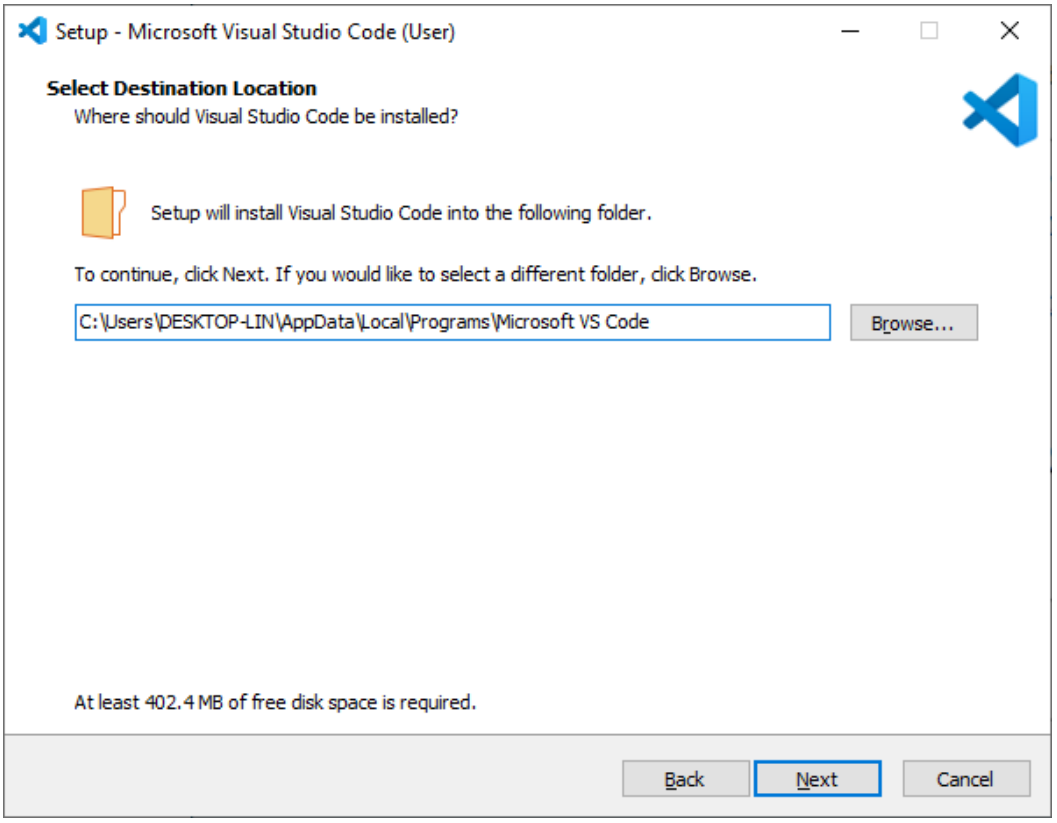
Window

首先，我们需要先下载 Visual Studio Code，请访问 https://code.visualstudio.com/Download。选择适合您电脑平台的版本，下载并安装它。

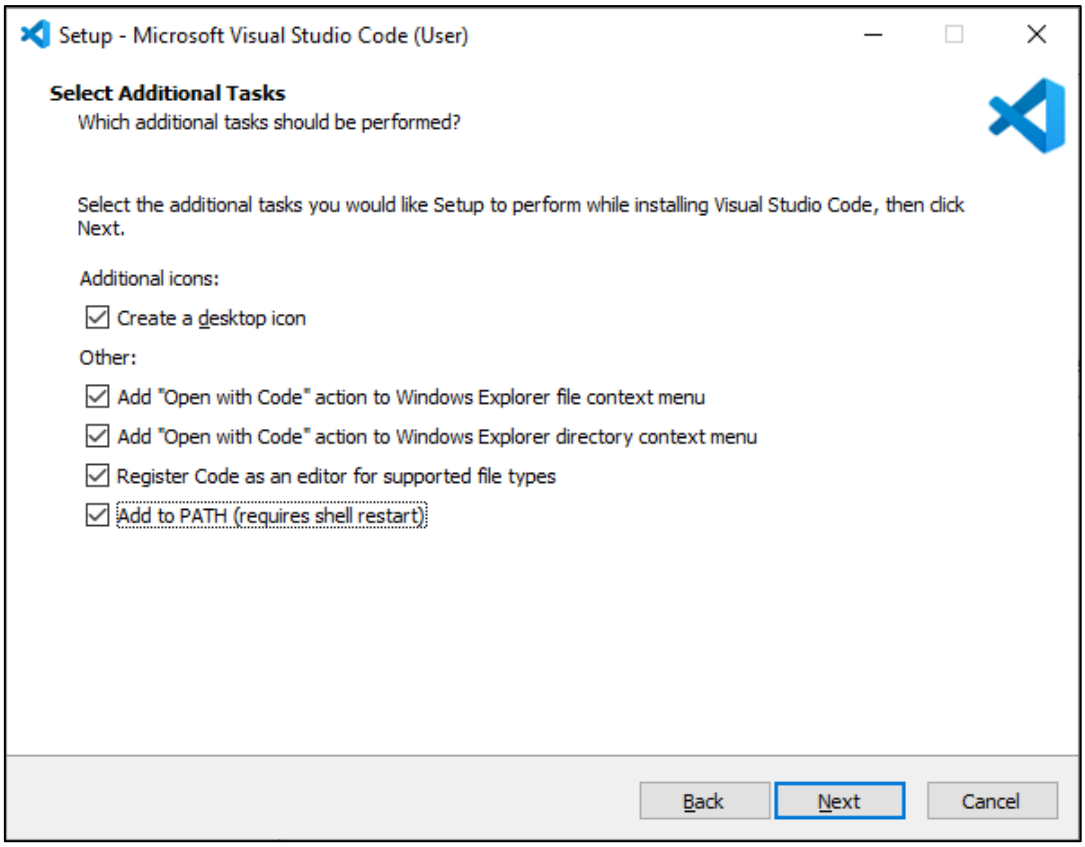
双击运行下载的 exe 文件。勾选"I accept the agreement"。然后点击 next.



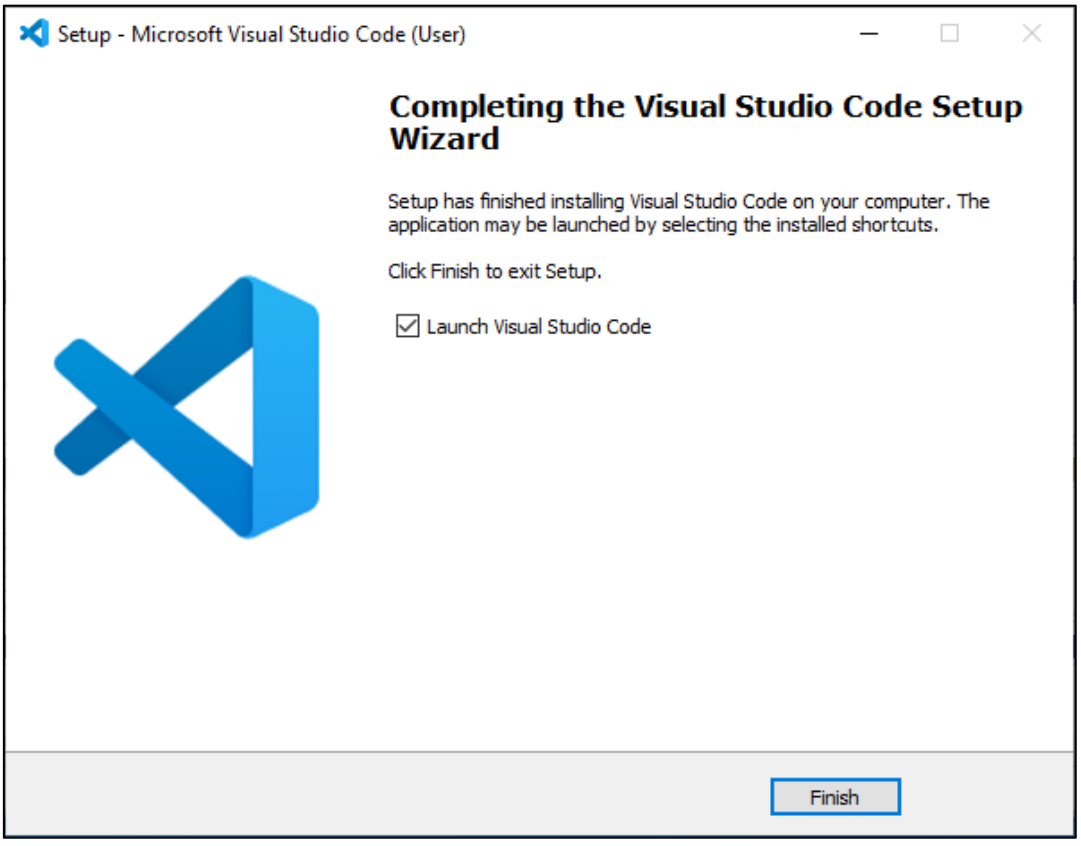
安装的位置可以保持默认选项，也可以自行修改到合适的位置。然后一直点击 Next。



在这个界面时，请注意查看“Add to PATH”是否勾选中，如果没有，请勾选它。然后一直点击 Next，直到软件安装完成。

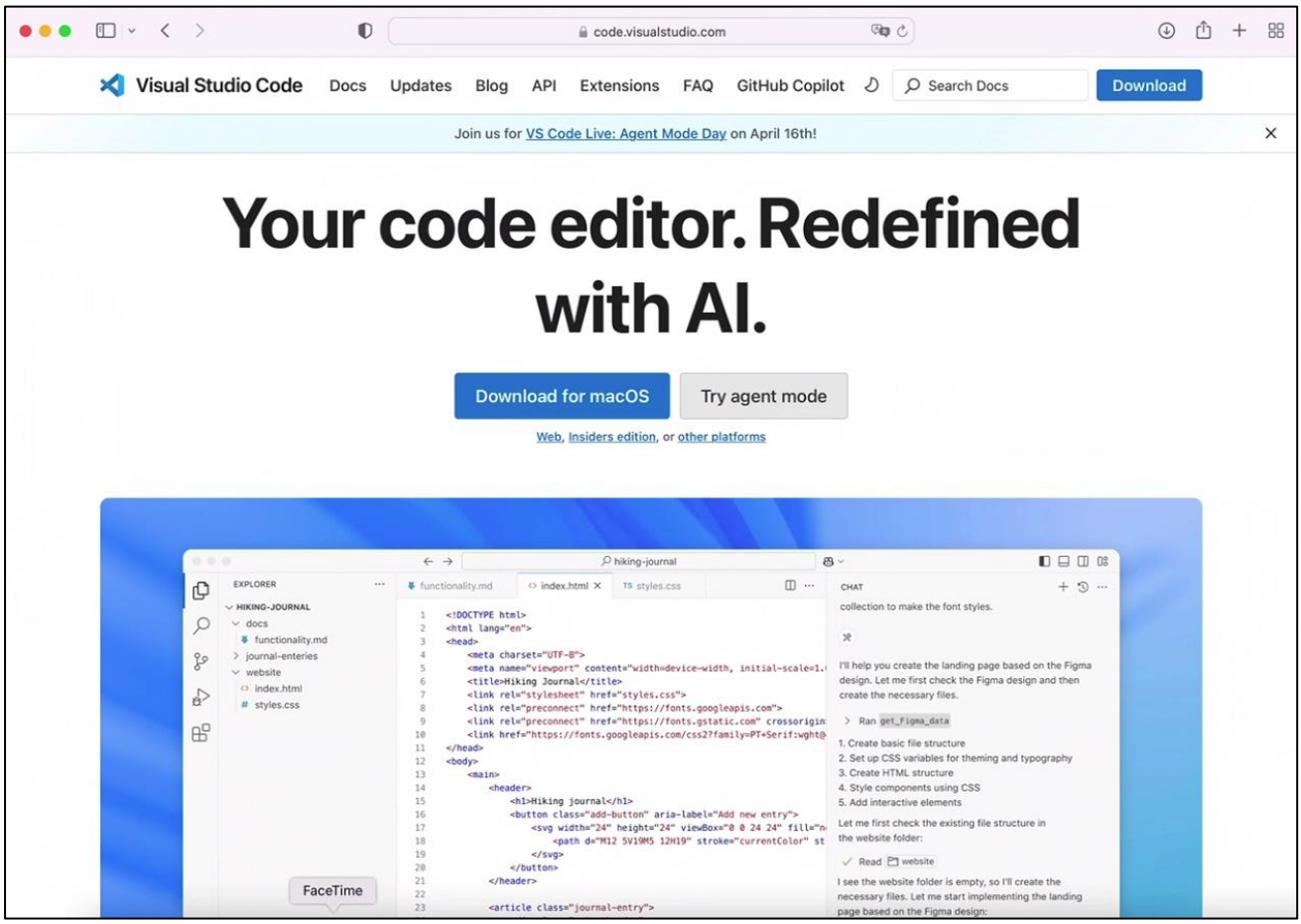


安装完成如下图所示。

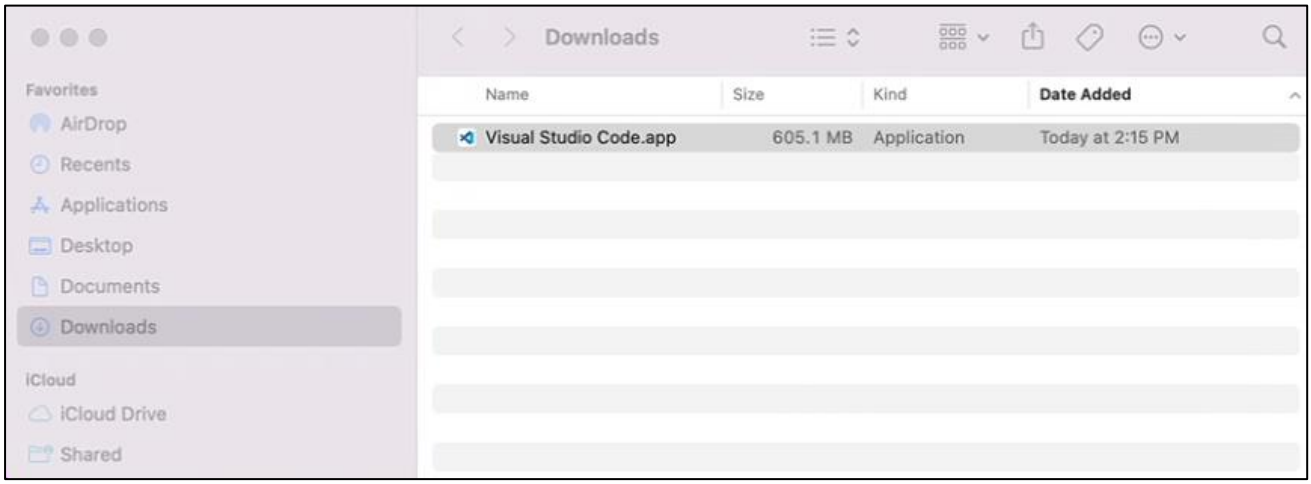


MAC

通常，MAC 系统自带 Visual Studio Code，如果您的电脑没有 Visual Studio Code，请先安装它。
请访问 https://code.visualstudio.com 并点击“Download for macOS”.

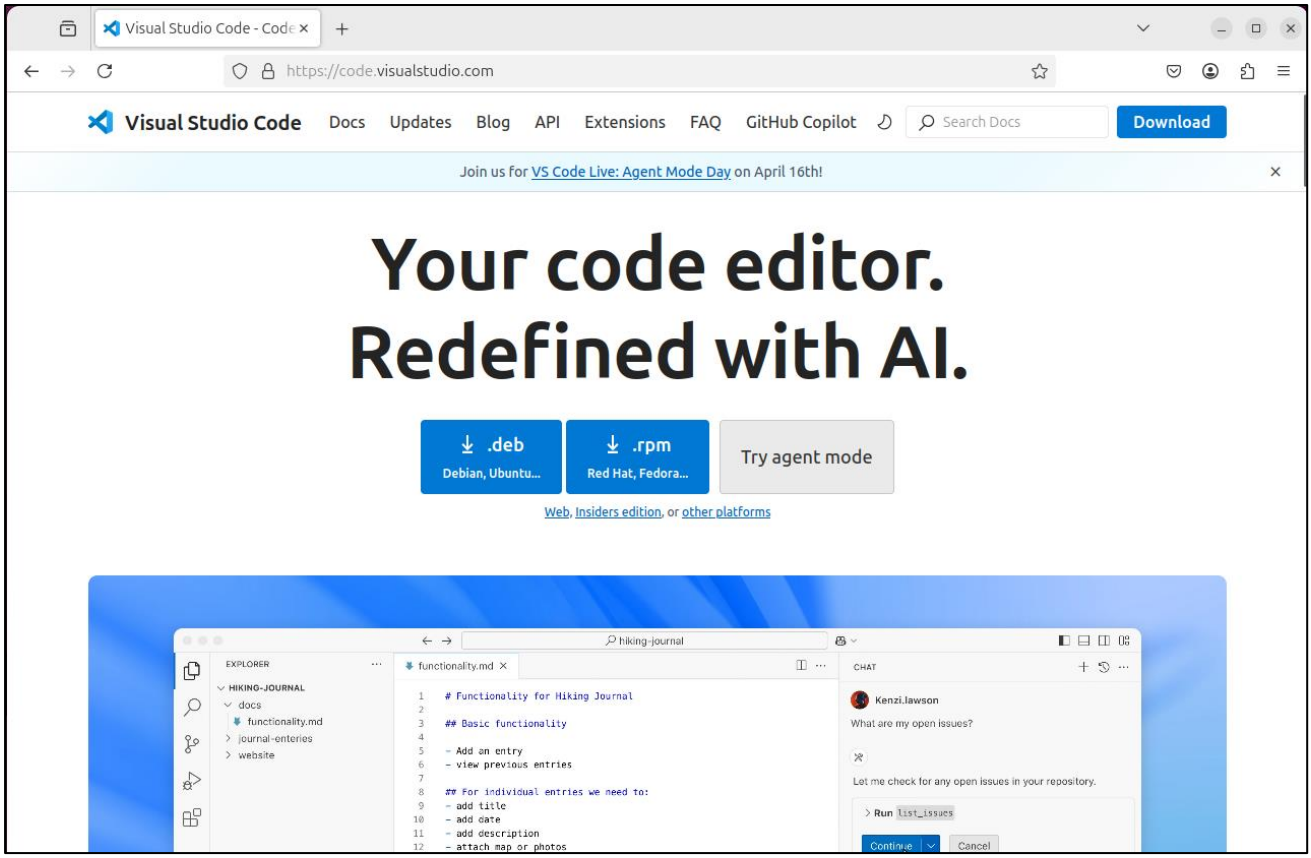


双击运行它。

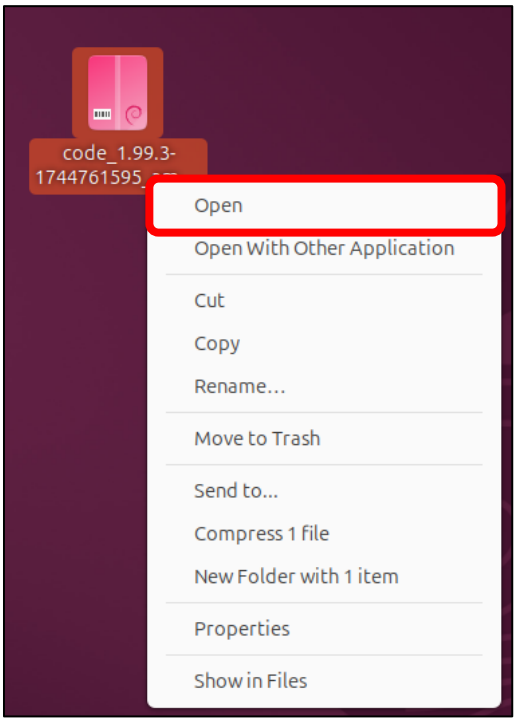


Linux

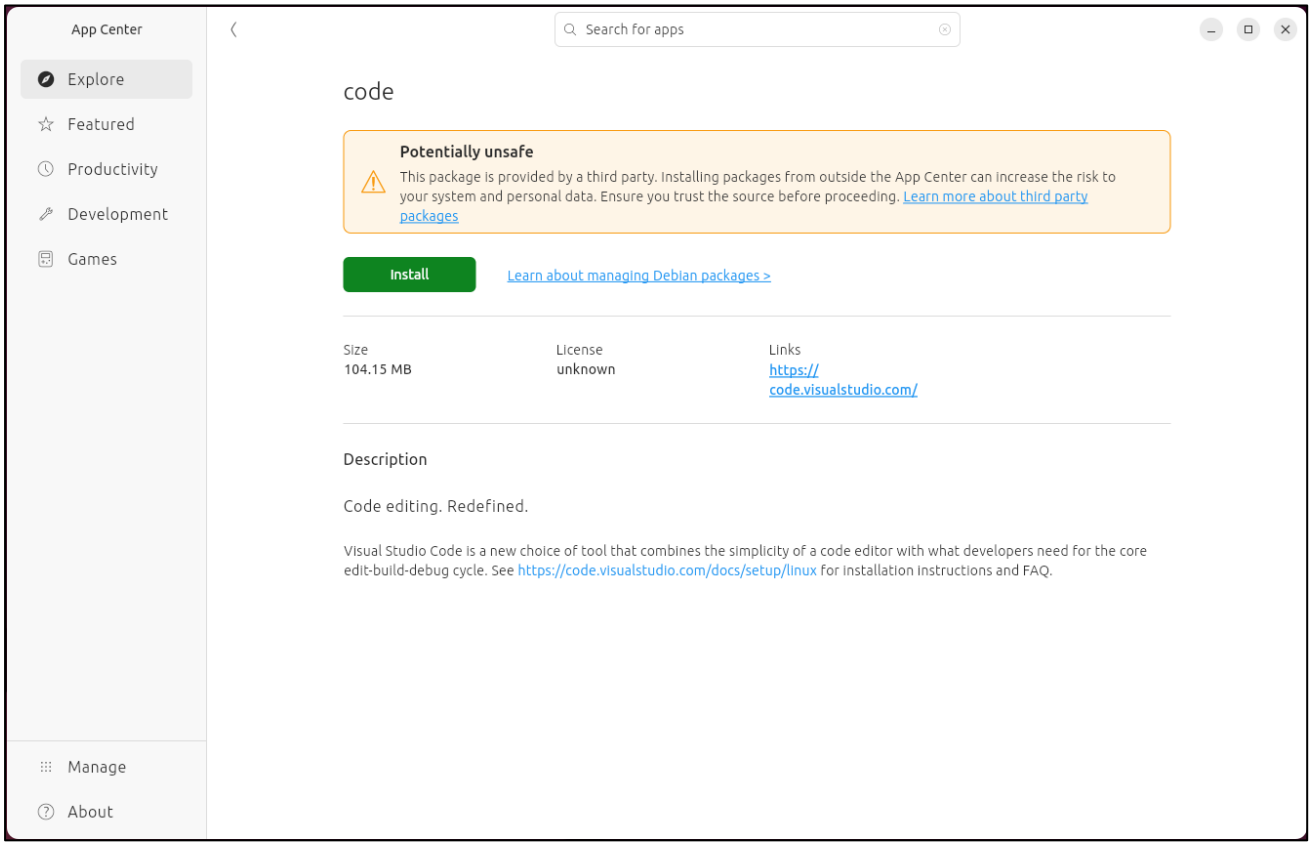
如果您的电脑没有 Visual Studio Code，请先安装它。
请访问 https://code.visualstudio.com。并点击“.deb”.



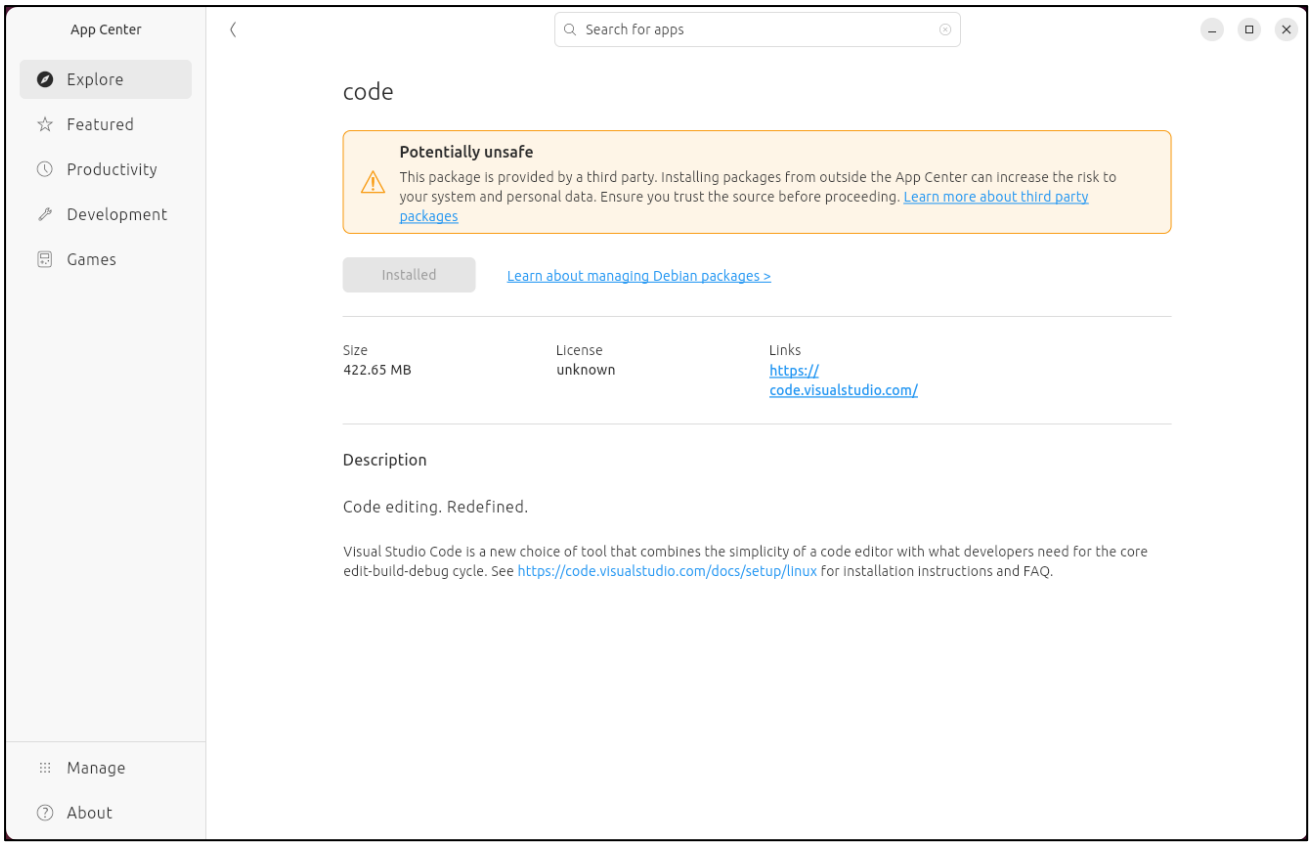
打开下载的“code_xxx.deb”文件。



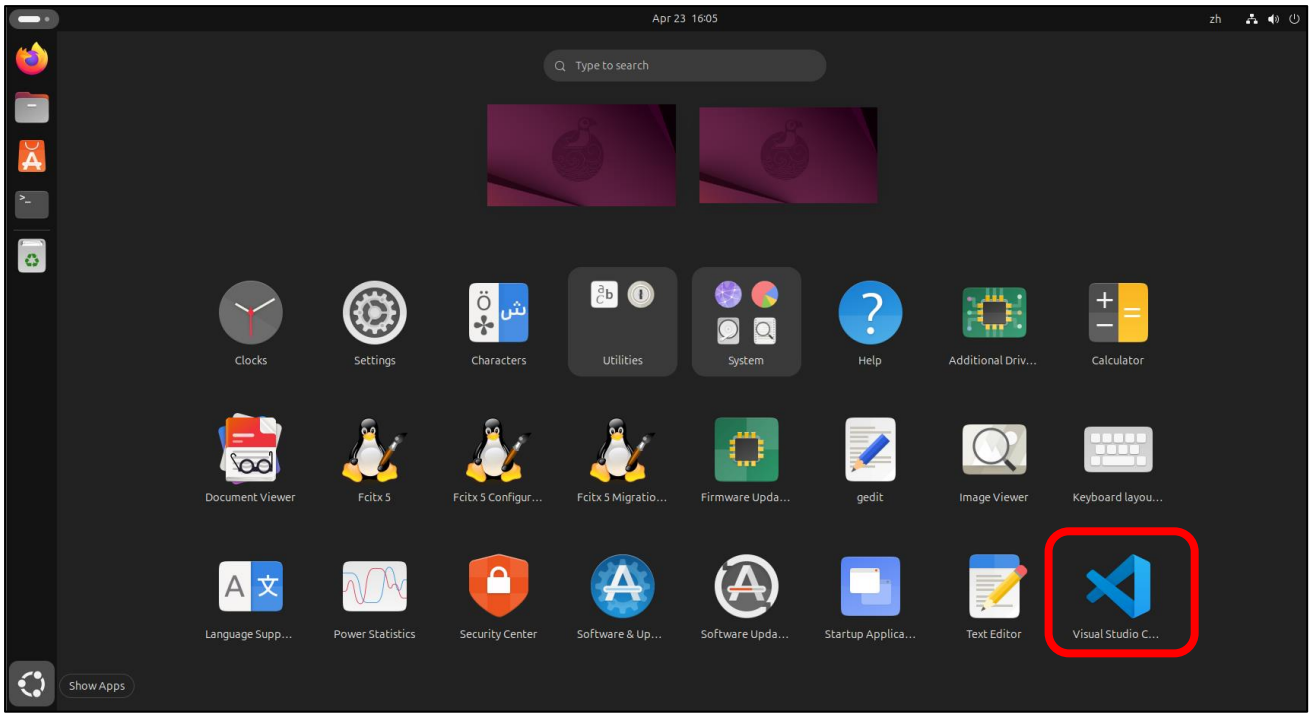
点击“Install”，安装 Visual Studio Code.



等待安装完成，安装完成如下图所示。



点击 Show Apps，可以看到，Visual Studio Code 已经出现在系统中。

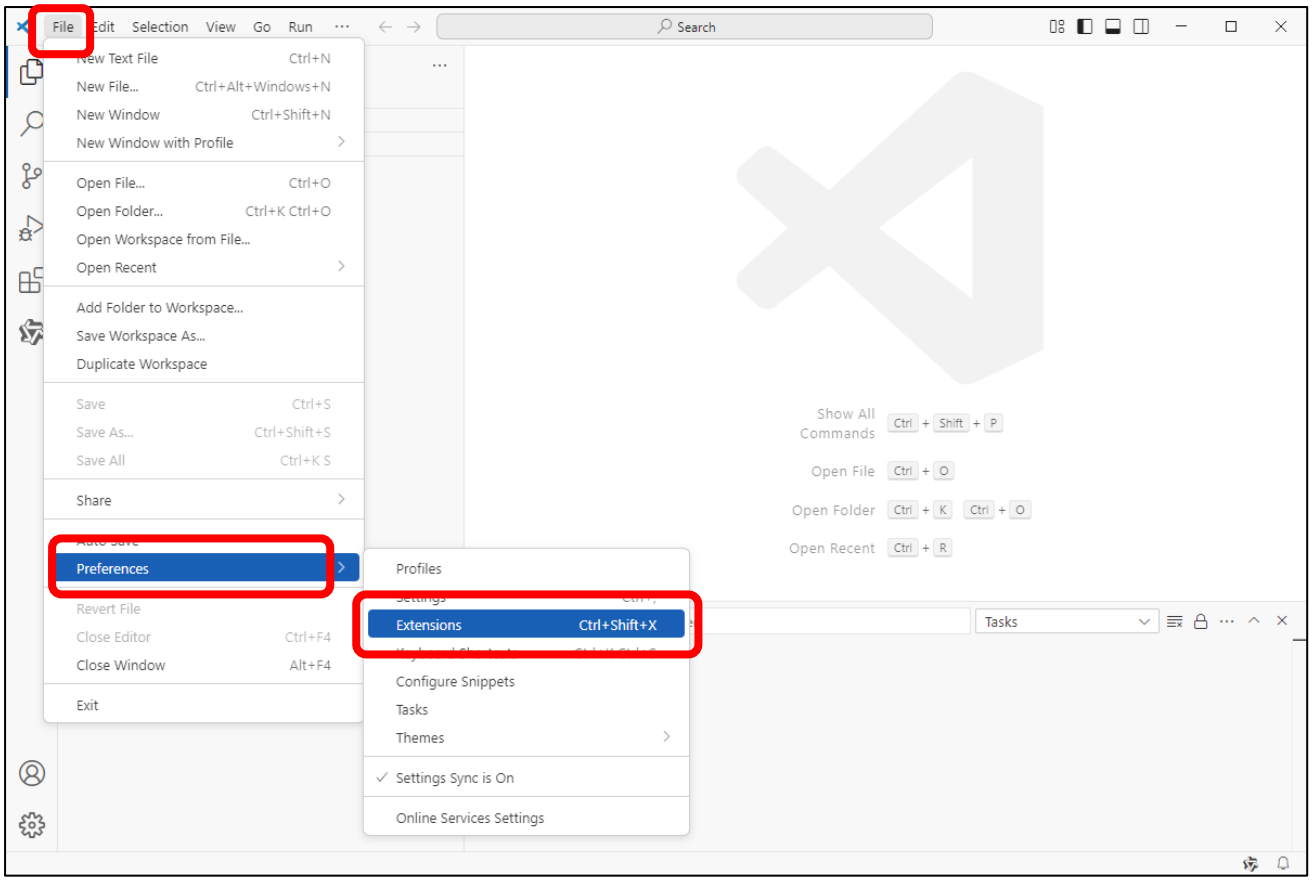


安装 ESP-IDF V5.3.2

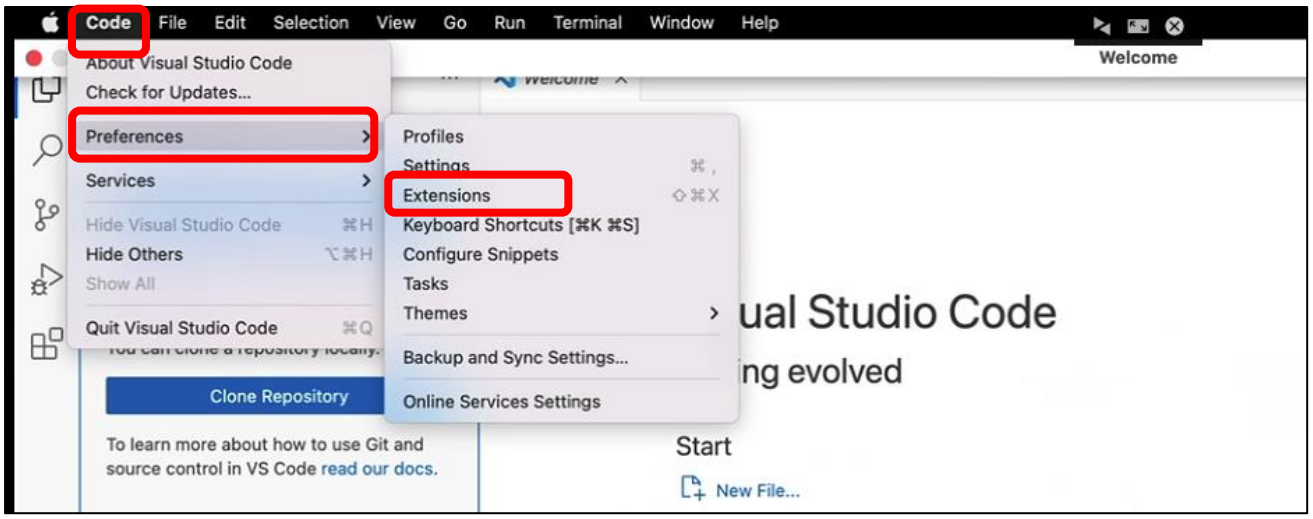
Visual Studio Code 是一个通用的代码编辑器，为了编程 ESP-IDF 的 SDK，我们需要给 Visual Studio Code 安装一个 ESP-IDF 插件。

打开 Visual Studio Code。

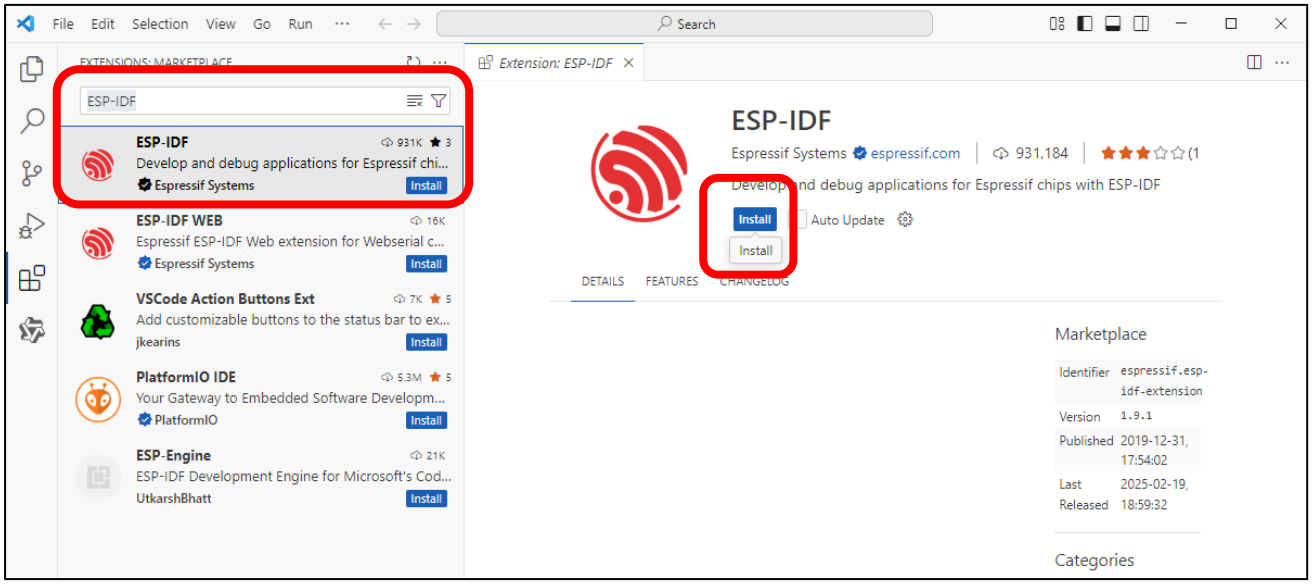
Window 系统和 Linux 系统：点击菜单栏的“File”->”Preferences”->”Extensions”.



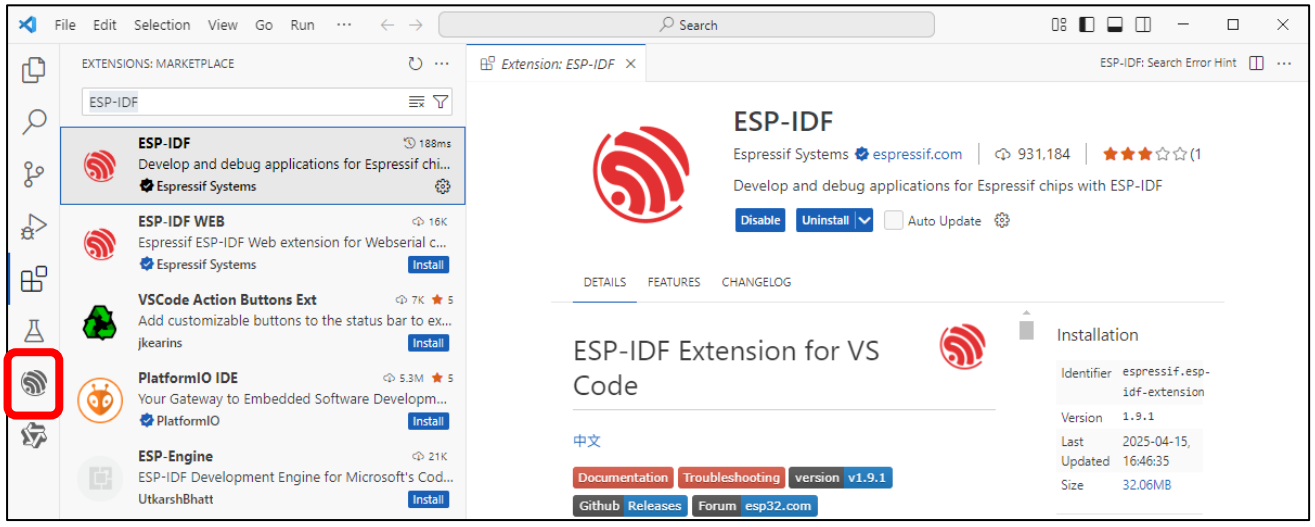
Mac 系统：点击屏幕左上方的“Code”->”Preferences”->”Extensions”.



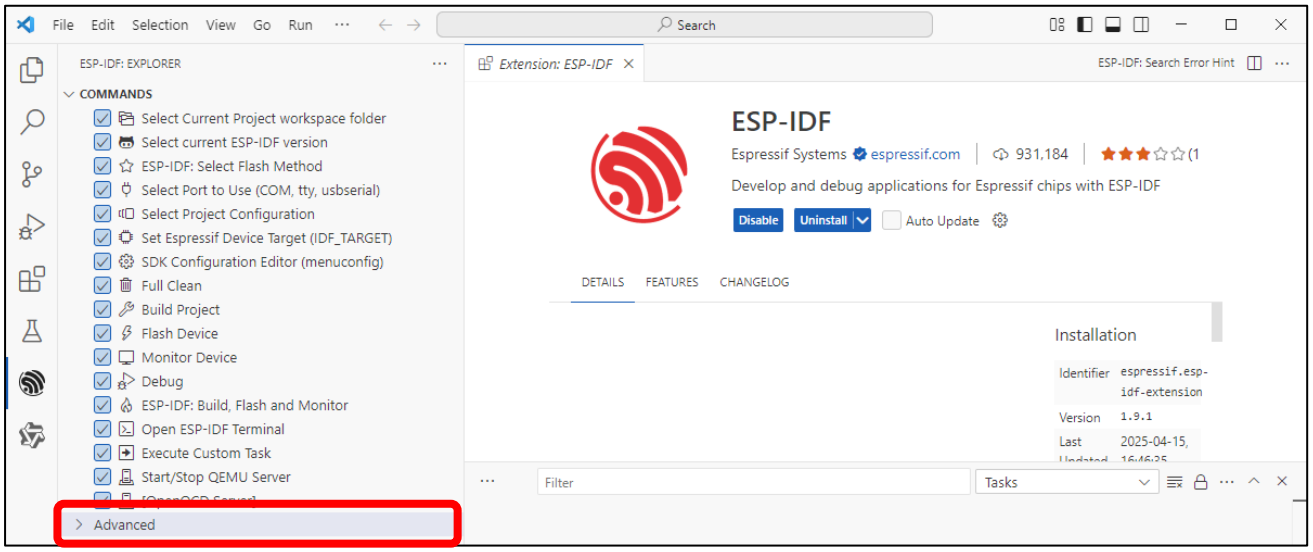
输入“ESP-IDF”，点击搜索出来的“ESP-IDF”，然后点击右边的“Install”。



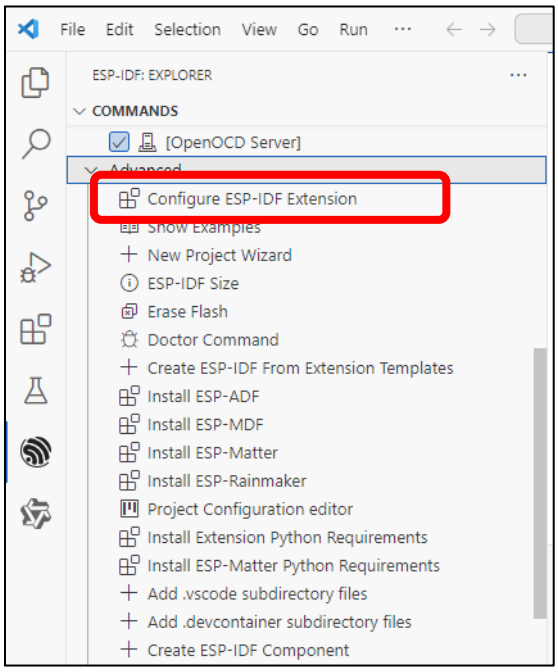
在左边可以看到出现了一个“ESP-IDF”的图标。点击它。



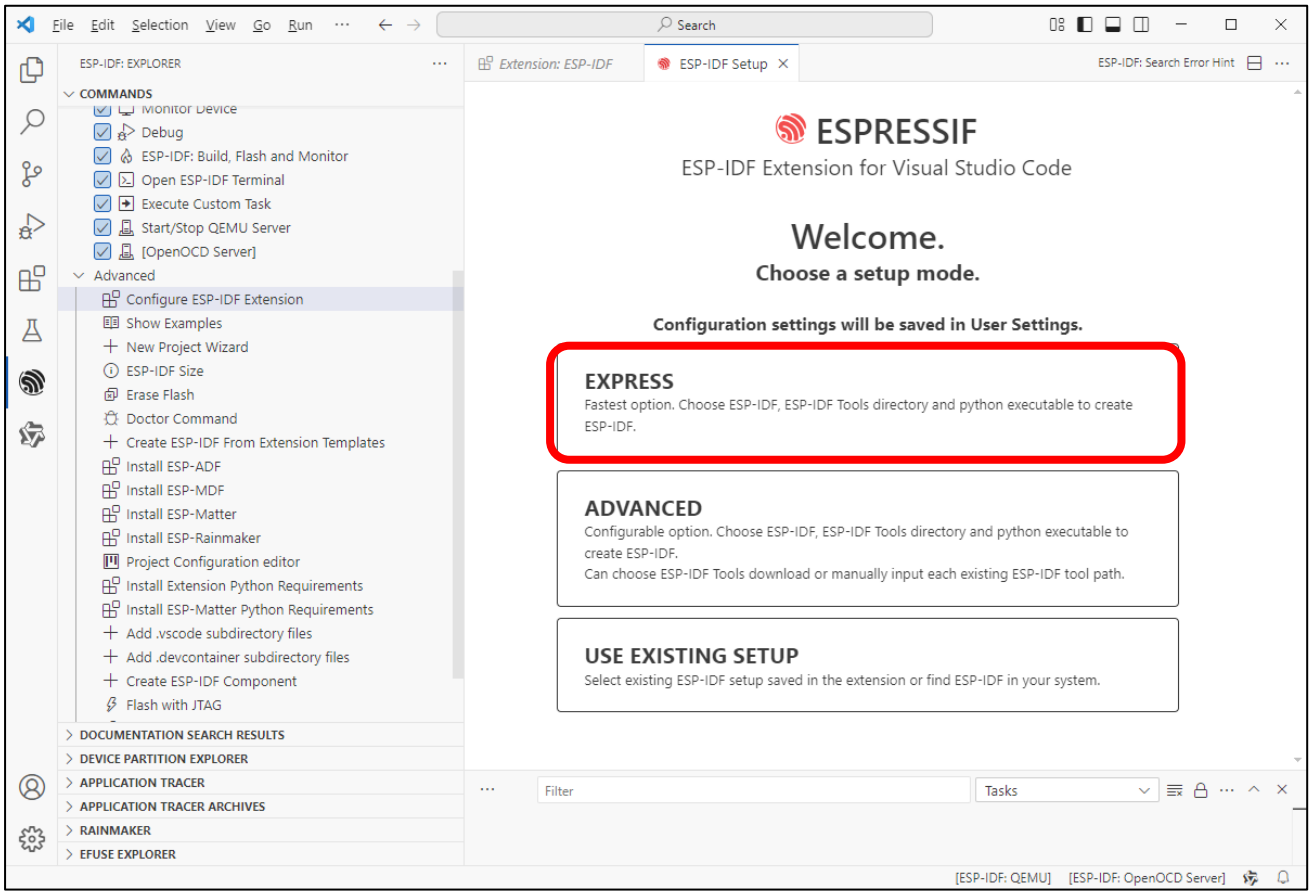
滚动鼠标，找到并点击“Advanced”。



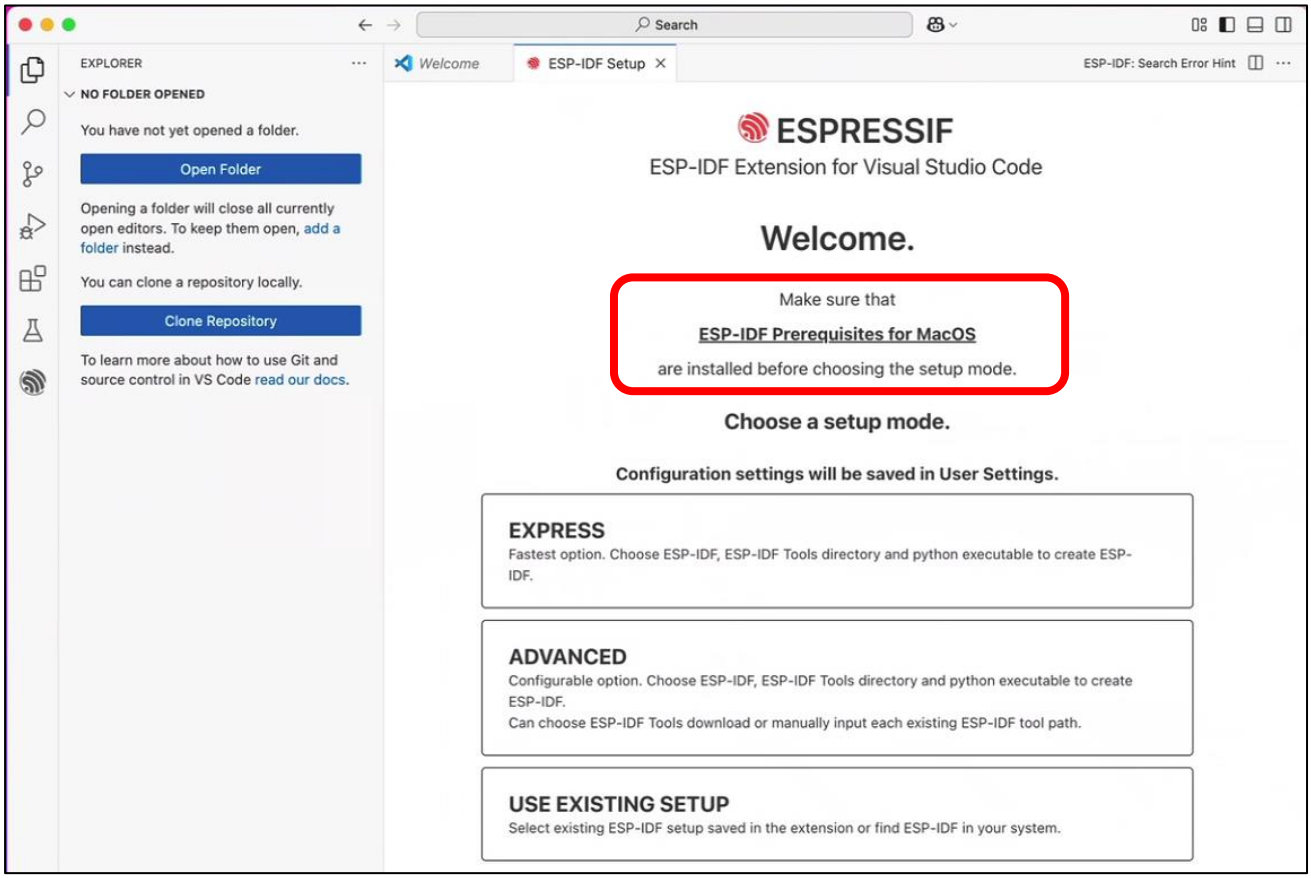
点击第一个选项，“Configure ESP-IDF Extension”。

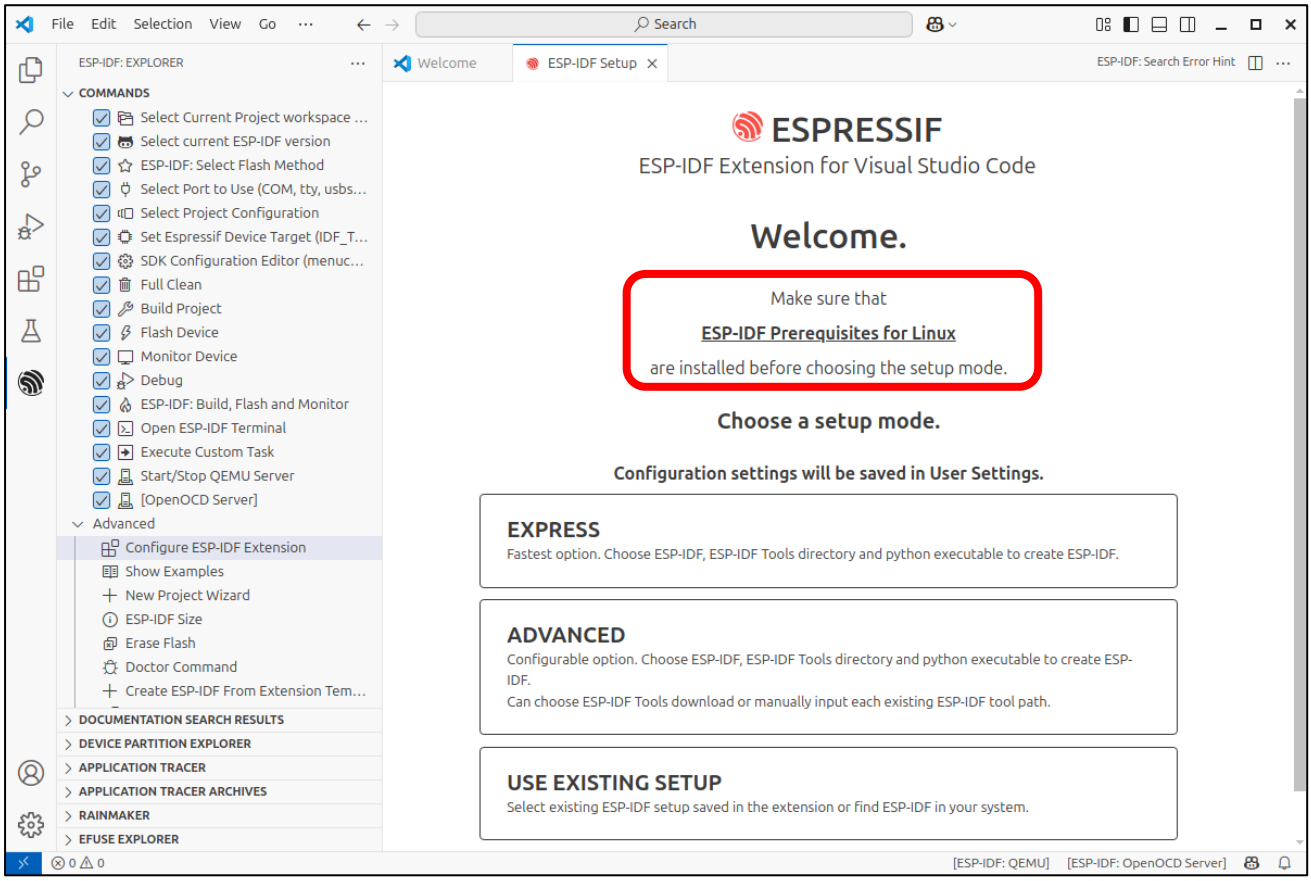


在右边选择“EXPRESS”。

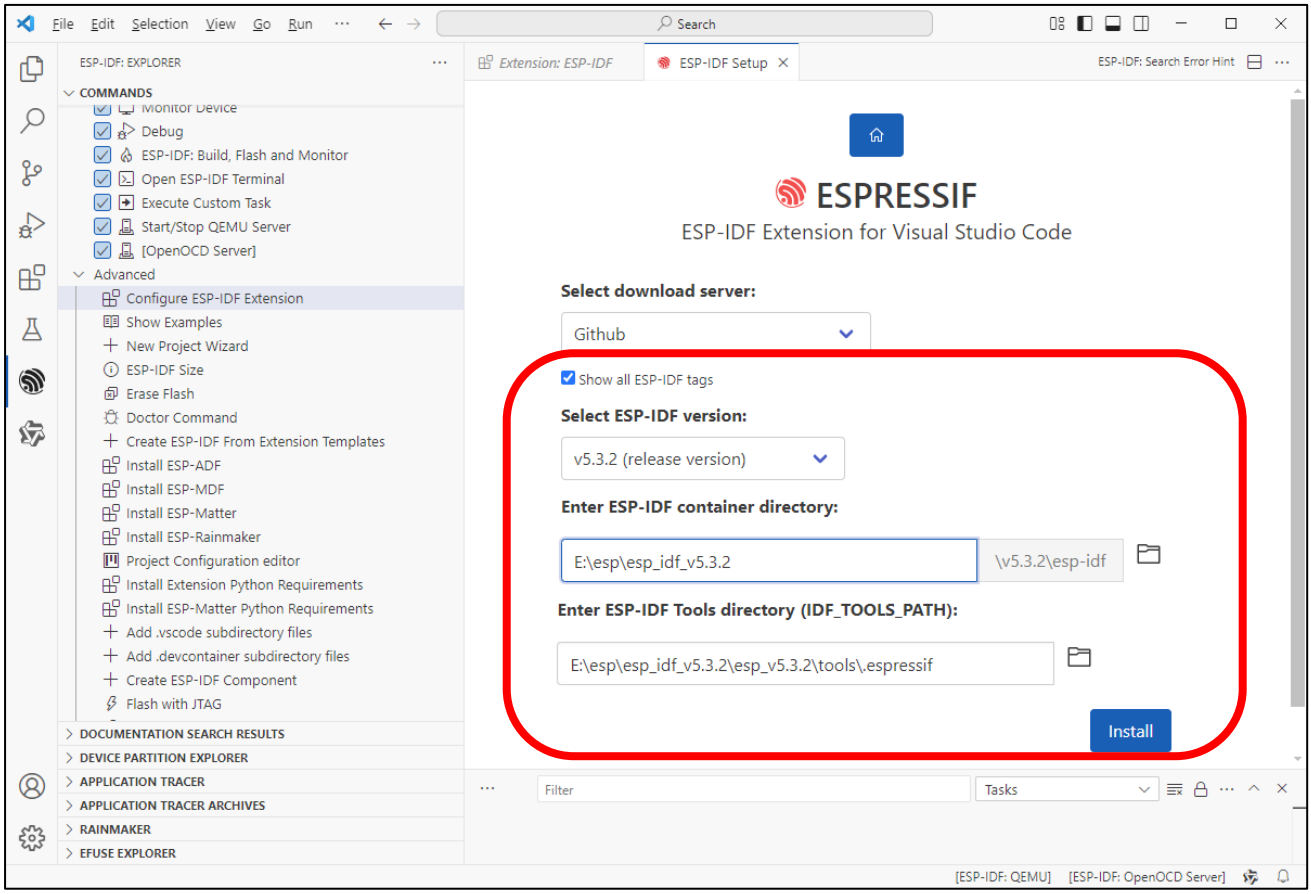


注意：如果您是 MAC 系统或者 Ubuntu 系统，请根据提示做好准备工作再进行安装。

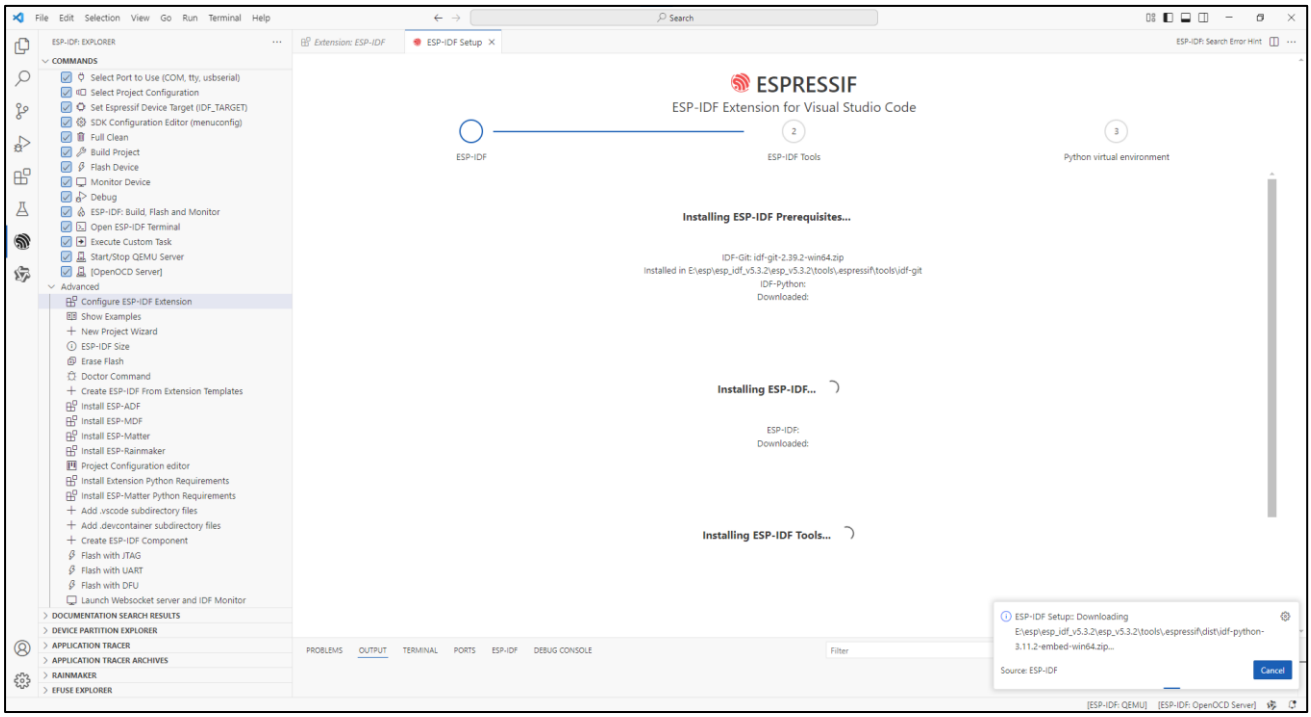




勾选“Show all ESP-IDF tags”，选择”v5.3.2 (release version)”，并选择您的 ESP-IDF 环境将要保存的位置。然后点击“Install”。不同的系统保存的路径不同，请记住这些存放路径。



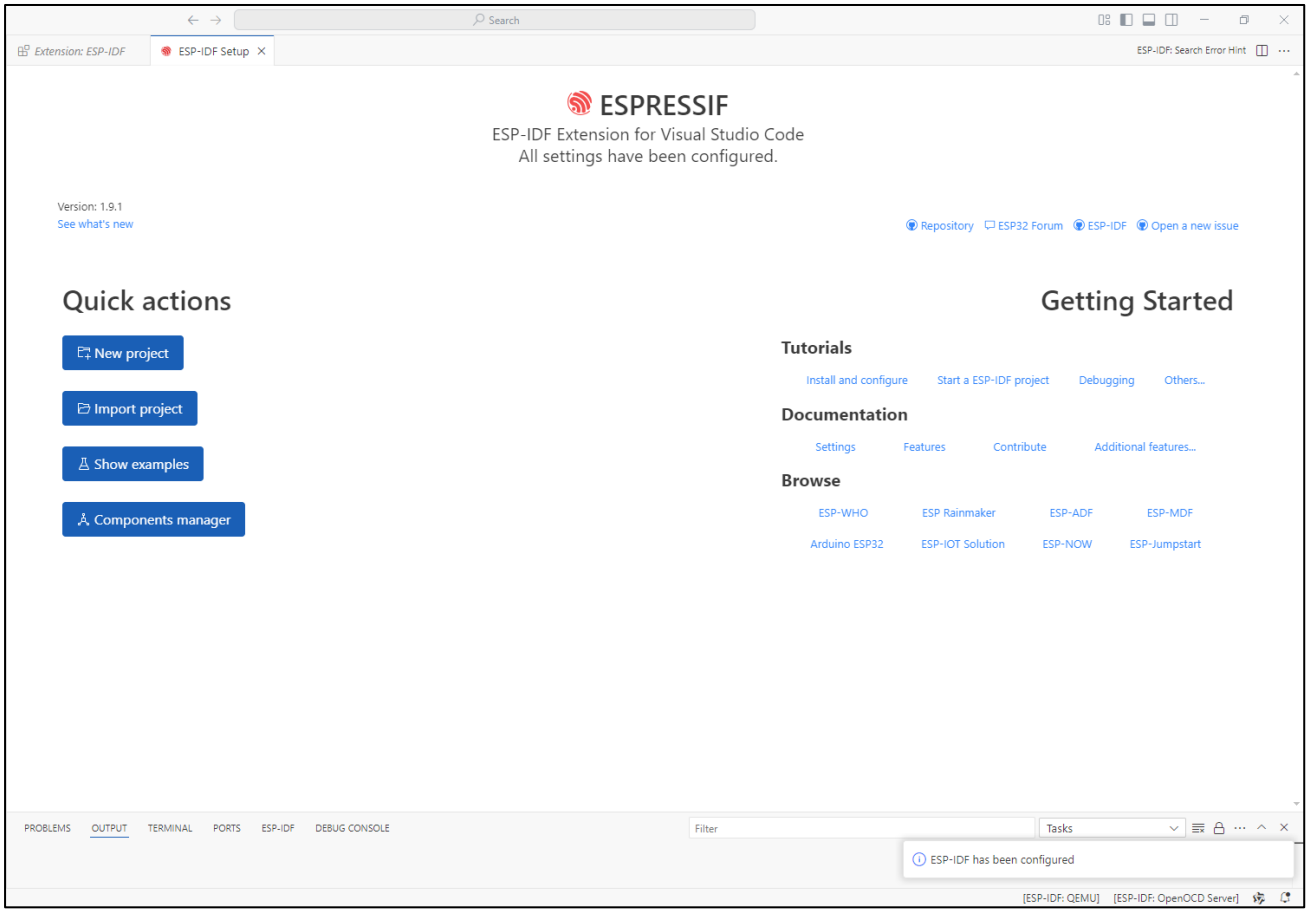
等待安装完成即可。如果您安装失败了，请找到上一步中的路径，删除对应的文件夹，并重新开始安装。



这一步需要等待一段较长的时间，请确保您的网络良好，且网速较快。

如果您始终无法正常安装，根据您的电脑系统，查看对应的链接：
Window: https://docs.espressif.com/projects/esp-idf/en/latest/esp32/get-started/windows-setup.html
Mac & Linux: https://docs.espressif.com/projects/esp-idf/en/latest/esp32/get-started/linux-macos-setup.html

插件安装完成如下图所示。

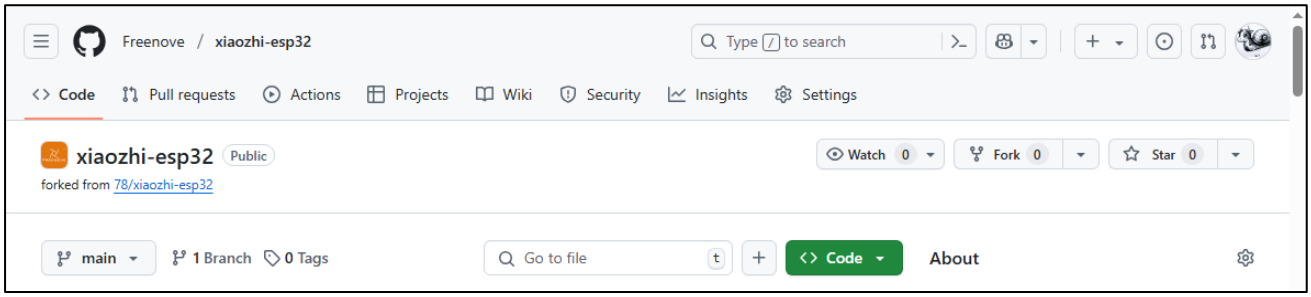


更多关于 ESP-IDF 的消息，请访问：
https://docs.espressif.com/projects/vscode-esp-idf-extension/en/latest/installation.html

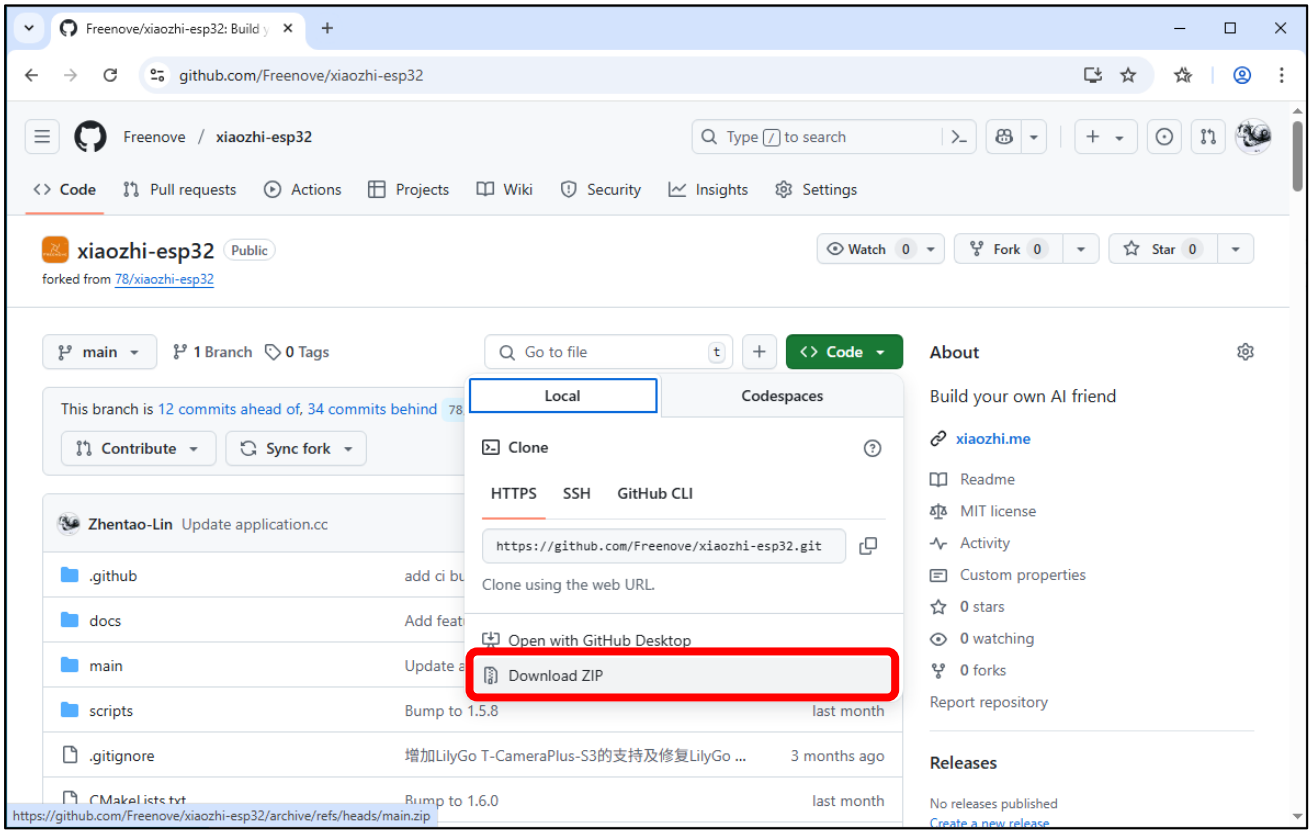
下载代码

Window

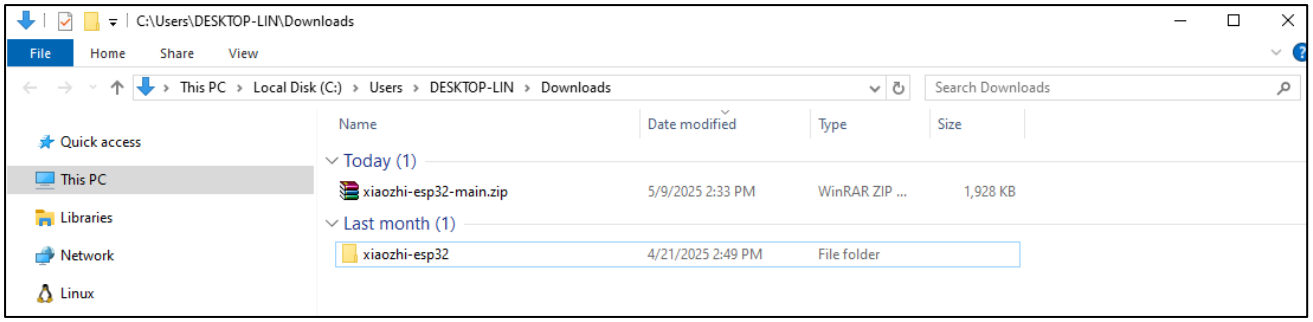
打开浏览器，输入“https://github.com/Freenove/xiaozhi-esp32”。



点击“Code”，然后点击“Dowmload ZIP”，将代码下载到本地。



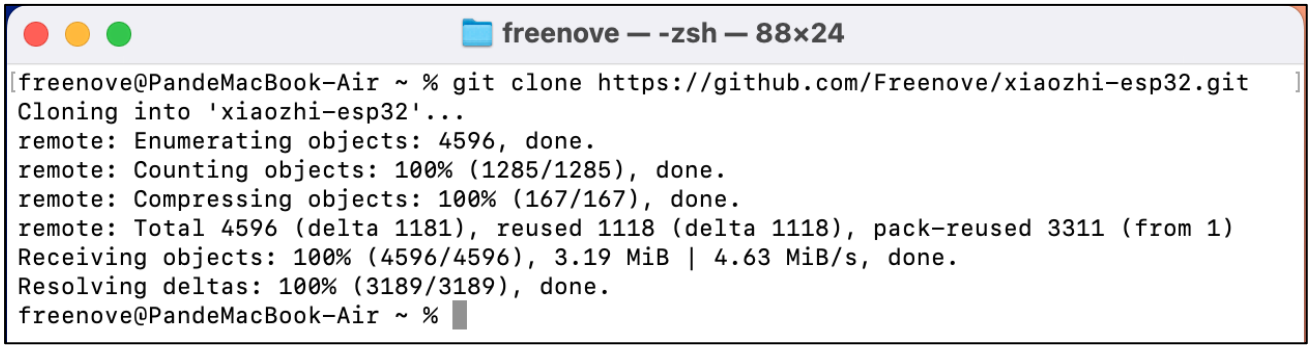
将下载的压缩文件解压到本地。**请注意，将解压后的文件夹重命名为“xiaozhi-esp32”。**



MAC

打开终端，使用 git 下载代码。

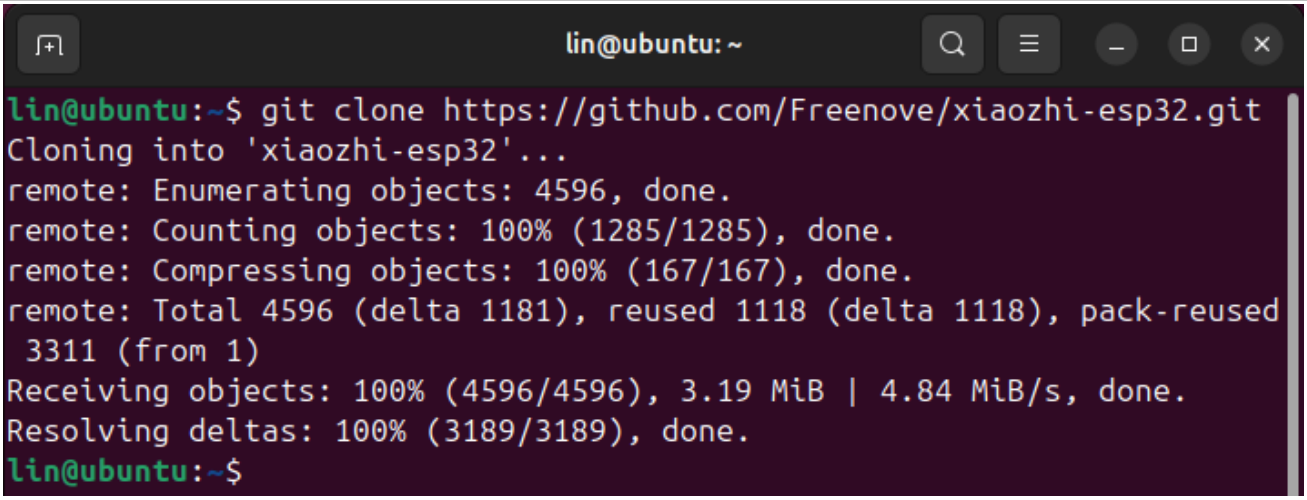
```
git clone https://github.com/Freenove/xiaozhi-esp32.git
```



Linux

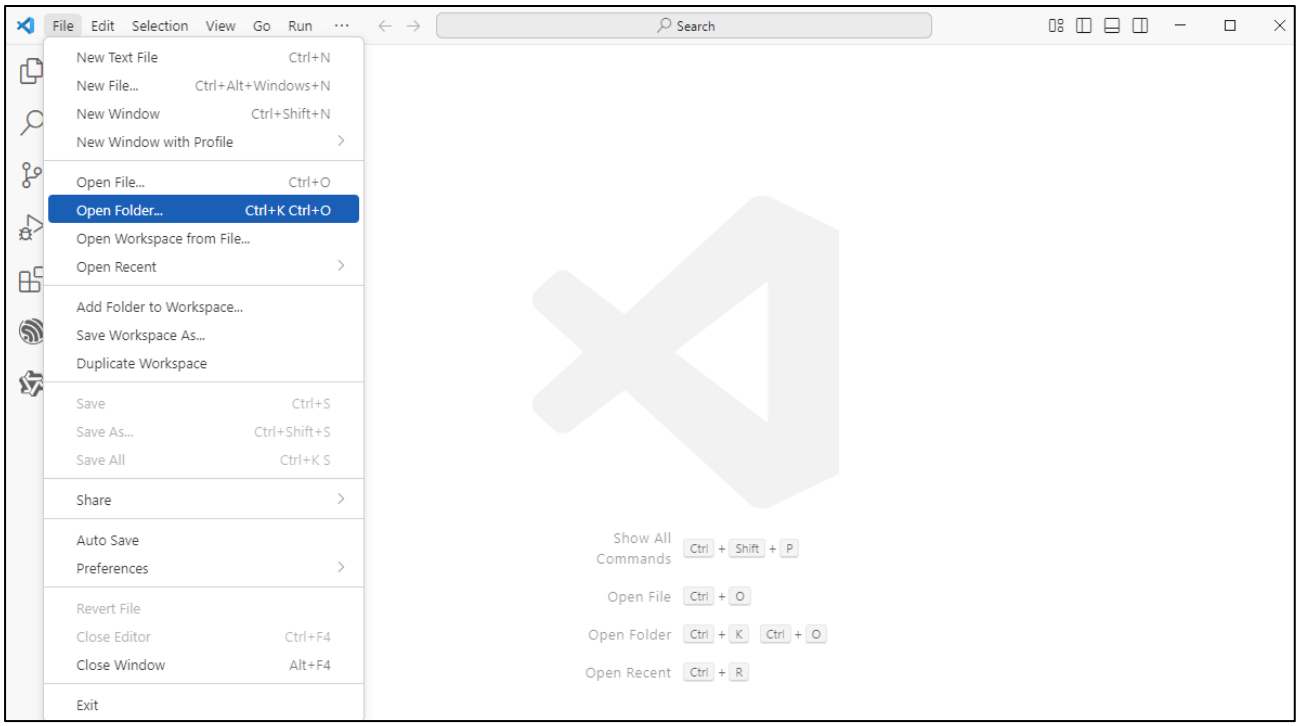
打开终端，使用 git 下载代码。

```
git clone https://github.com/Freenove/xiaozhi-esp32.git
```

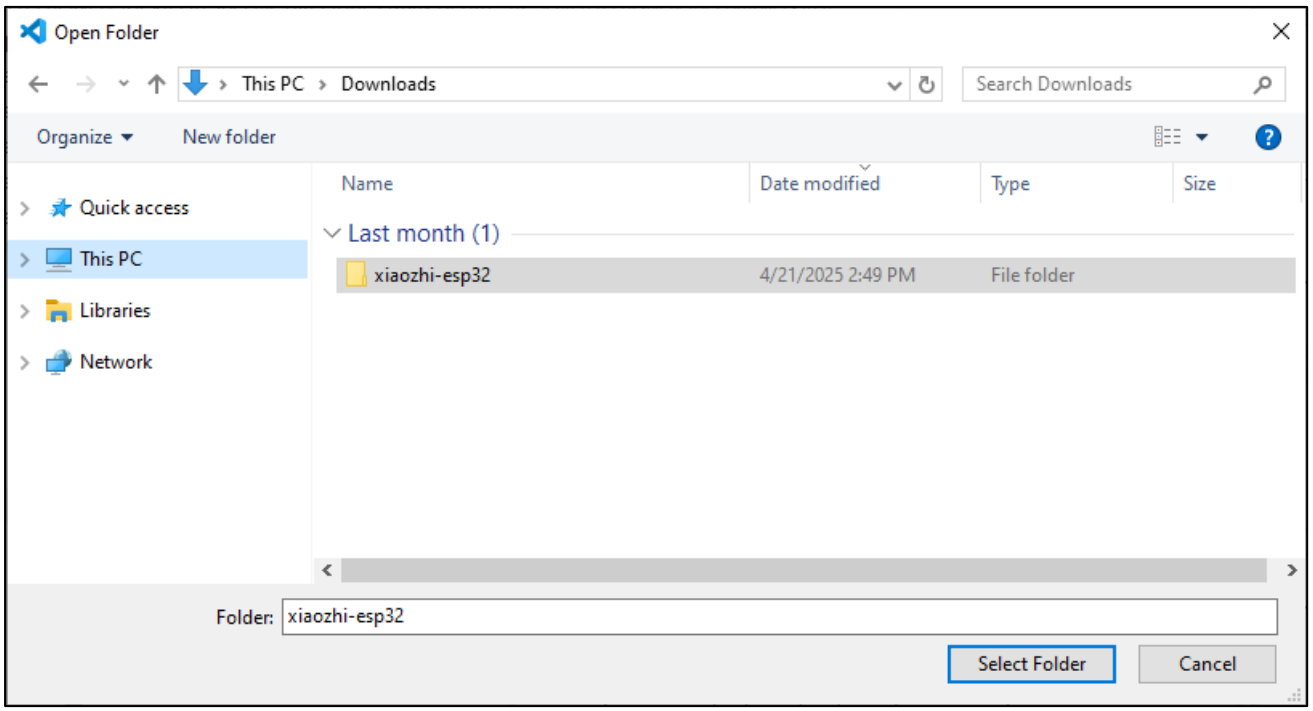


配置代码环境

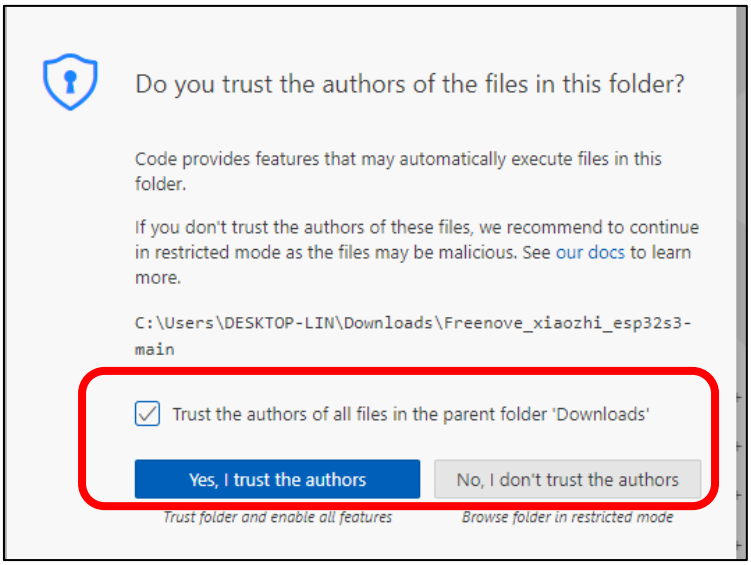
使用 Visual Studio Code，点击“File”->”Open Folder...”。



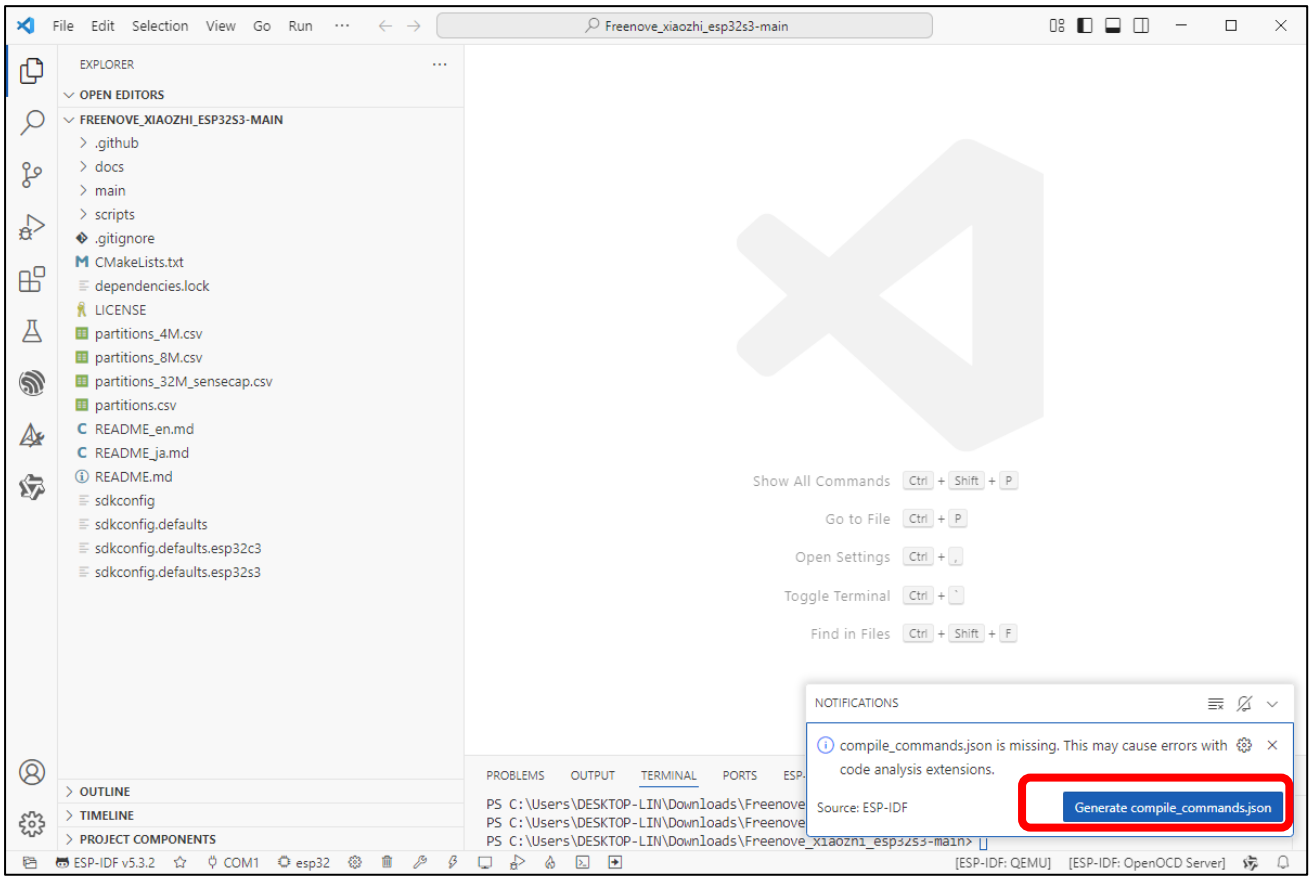
选择 xiaozhi-esp32 文件夹。这里以 Window 系统举例，在 MAC 系统和 Ubuntu 系统上的操作类似。



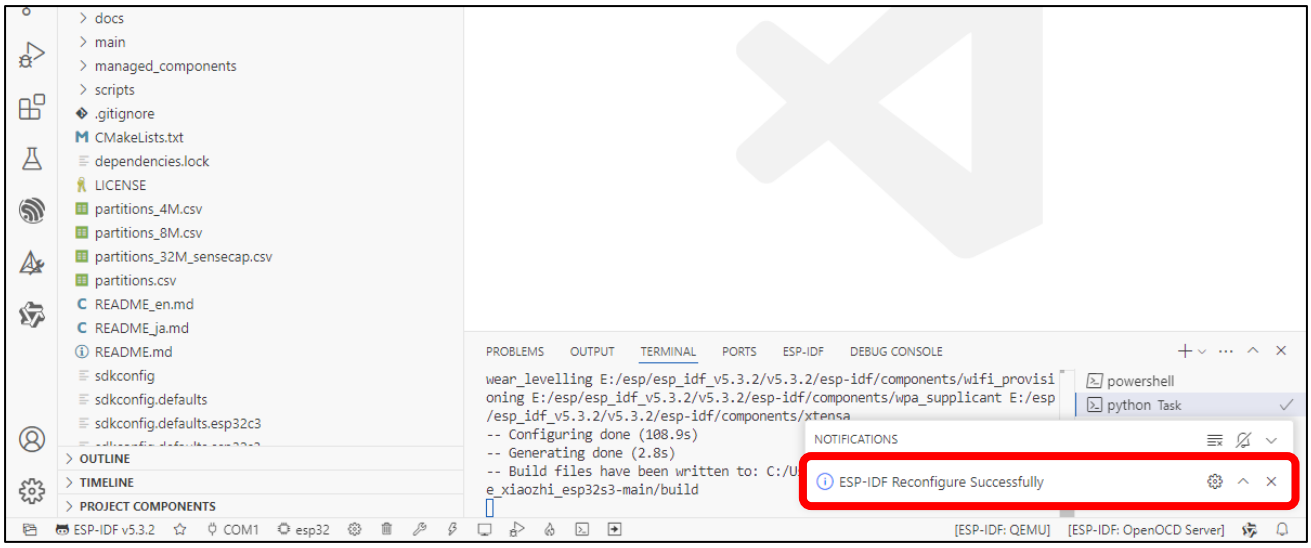
勾选复选框，并点击"Yes，I trust the authors of all files in the parent floder ‘Downloads’"。



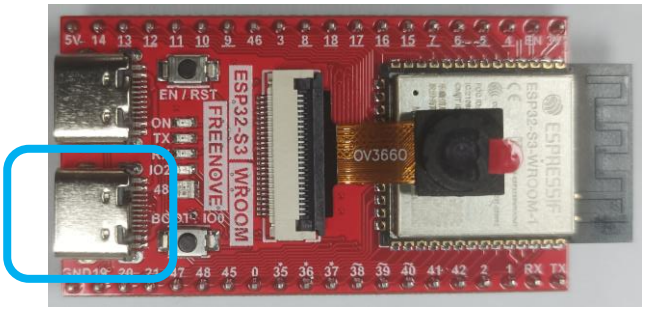
请注意，右下角会弹出一个提示框，请点击“Generate comple_commands.json”，它将根据文件下载对应的组件模块代码。



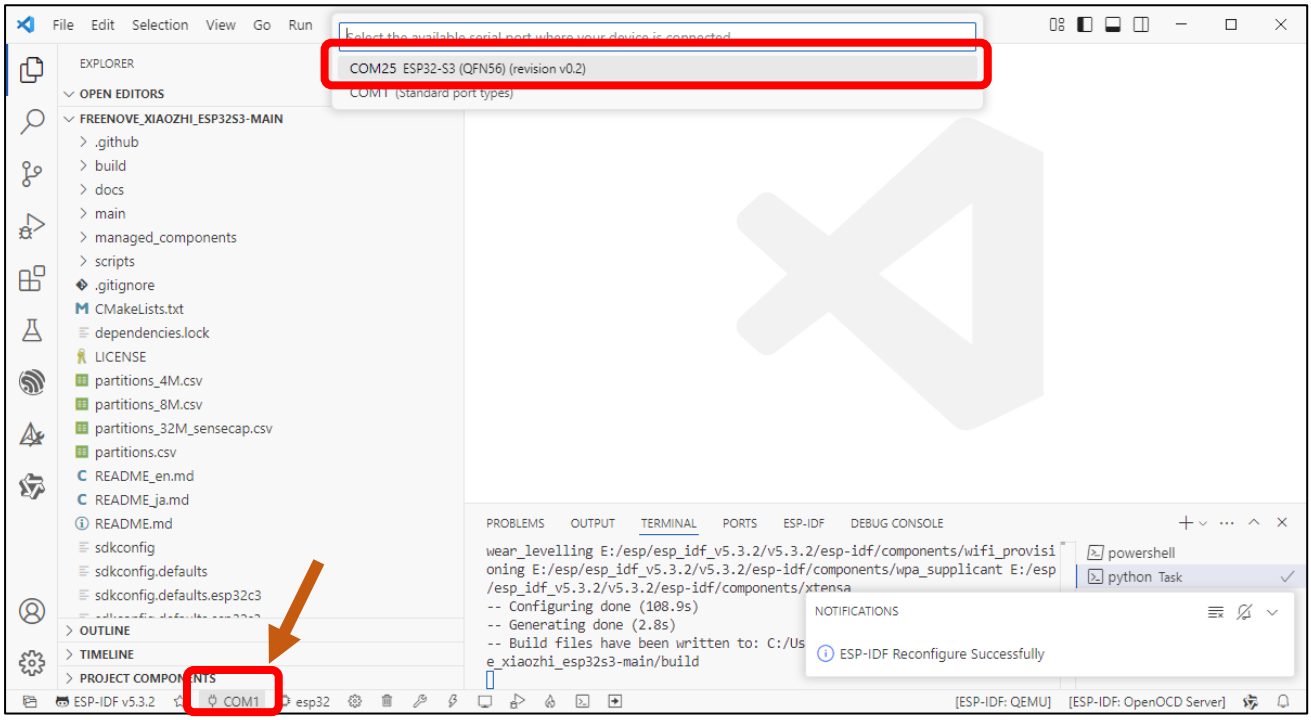
组件安装需要一些时间，请注意等待，不要进行其他操作。组件安装完成会在右下角打印提示。



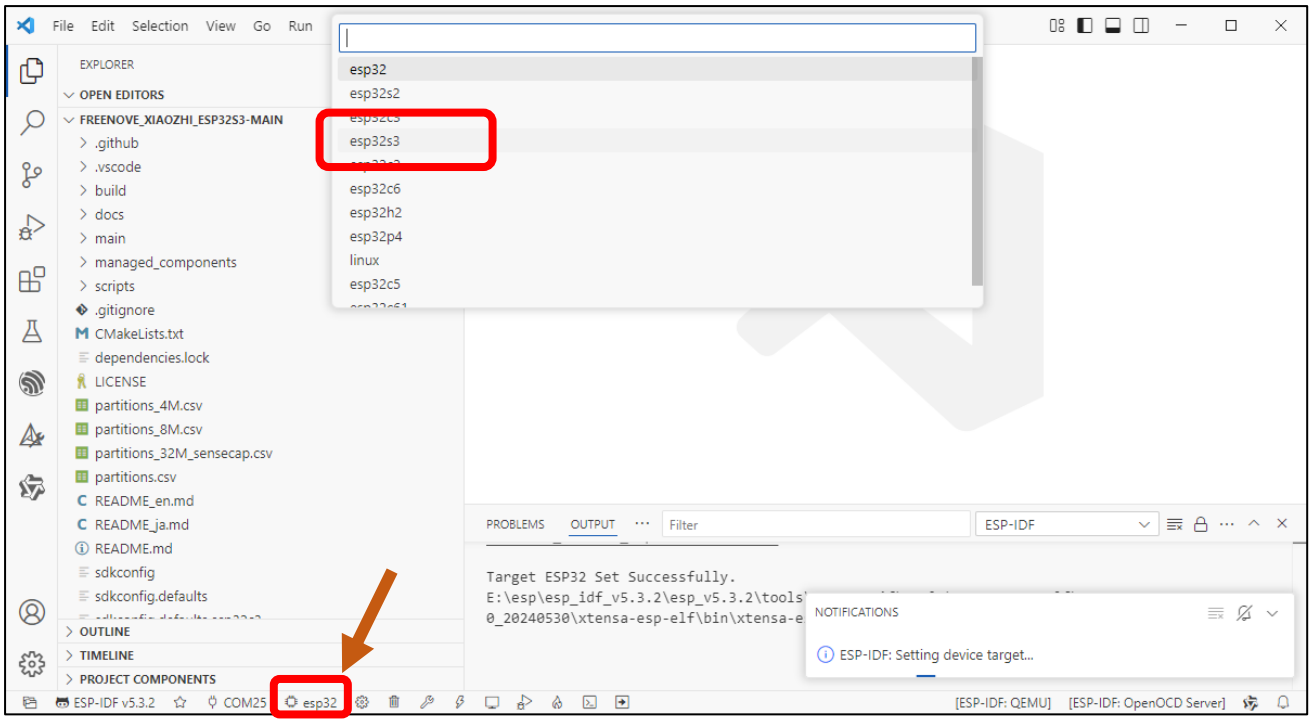
使用数据线连接电脑和 ESP32 S3 WROOM，请注意，不要连接错 Type C 接口。



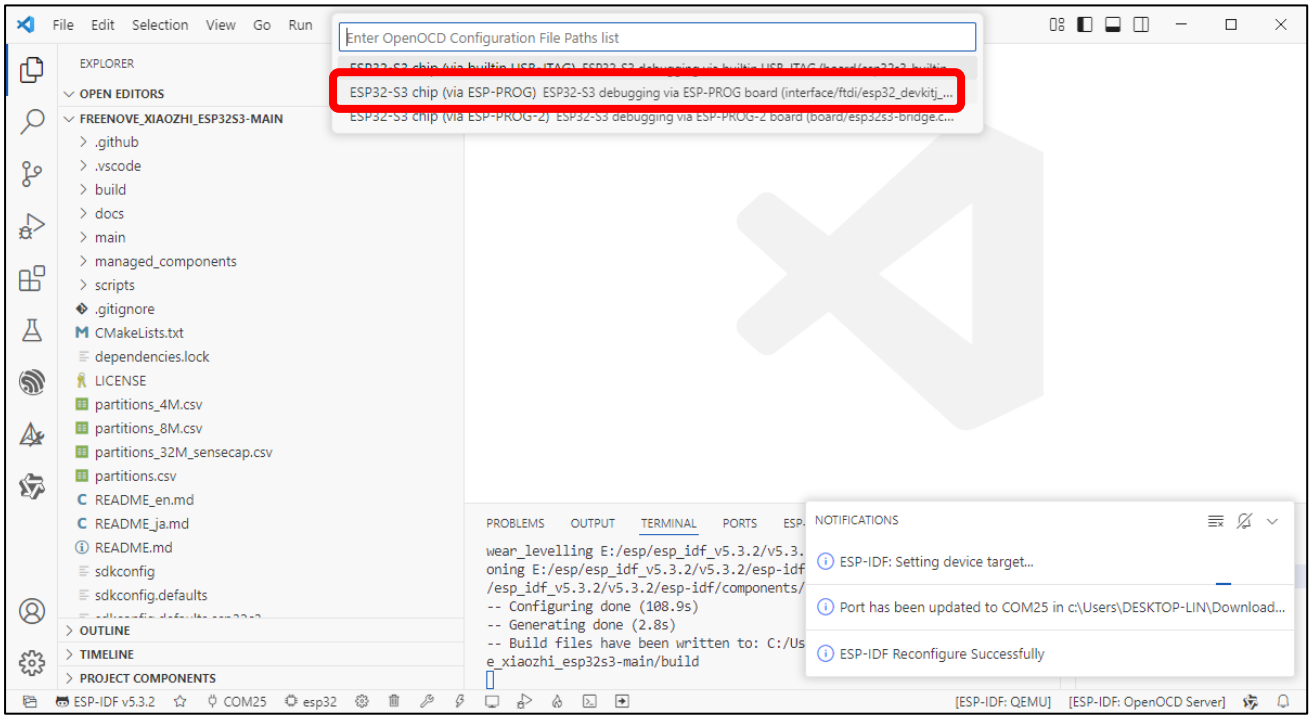
点击左下角的 COMx，在上方会出现电脑上所有的 COM 设备端口号。找到 ESP32-S3，并选择那一项。



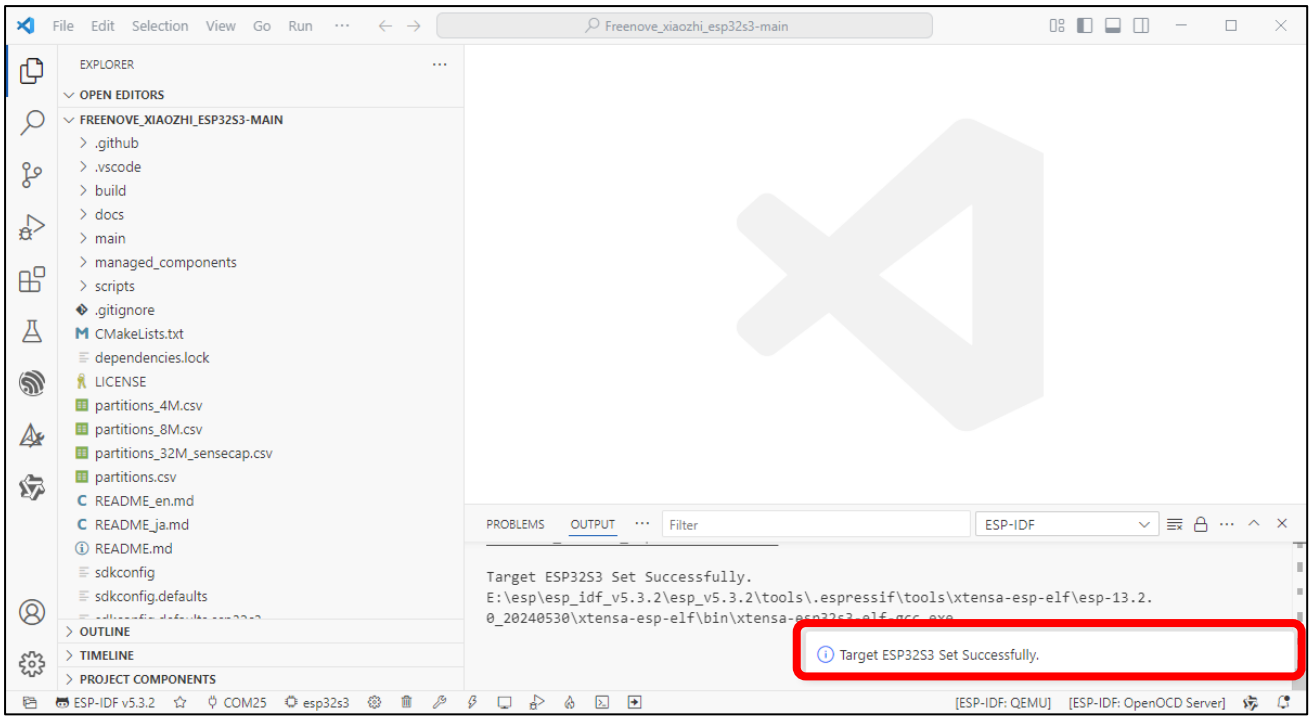
点击左下角的 ESP32，在上方会出现很多 ESP32 型号，选择 ESP32S3。



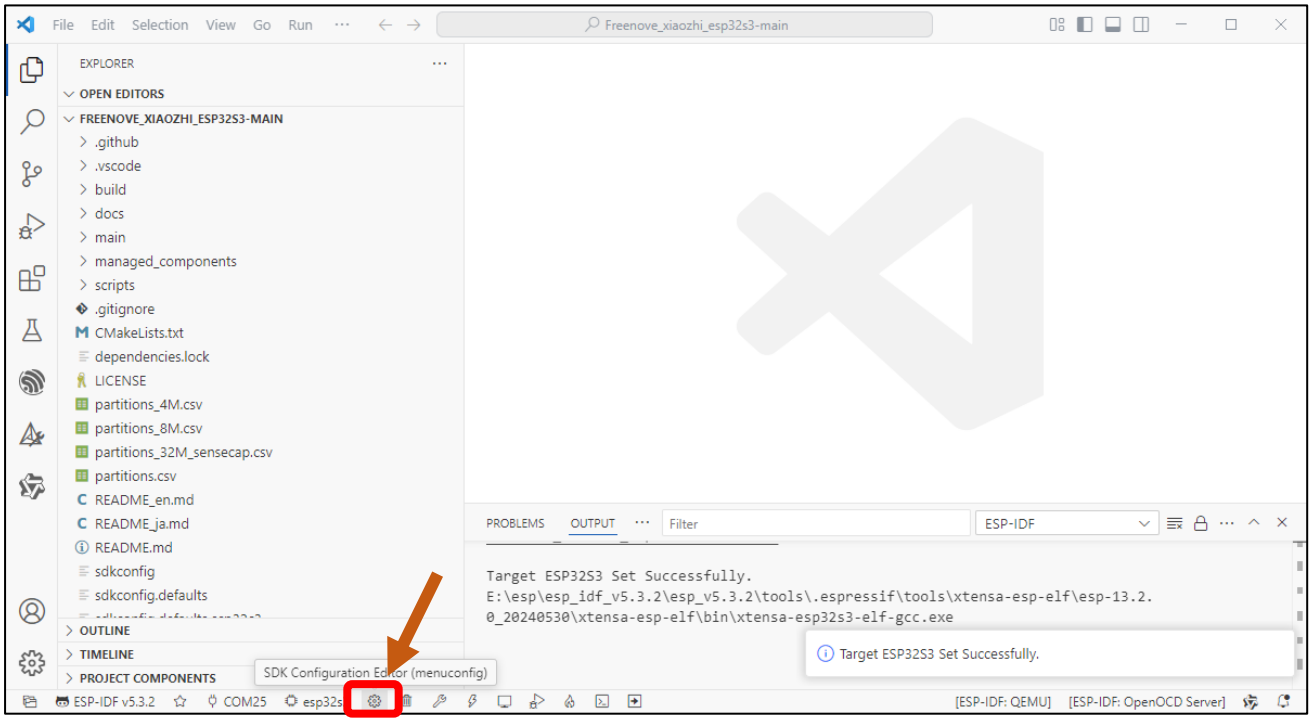
在新的选择框中，选择“ESP32-S3 Chip (via ESP-PROG) ESP32-S3 debugging via ESP-PROG Board ...”。



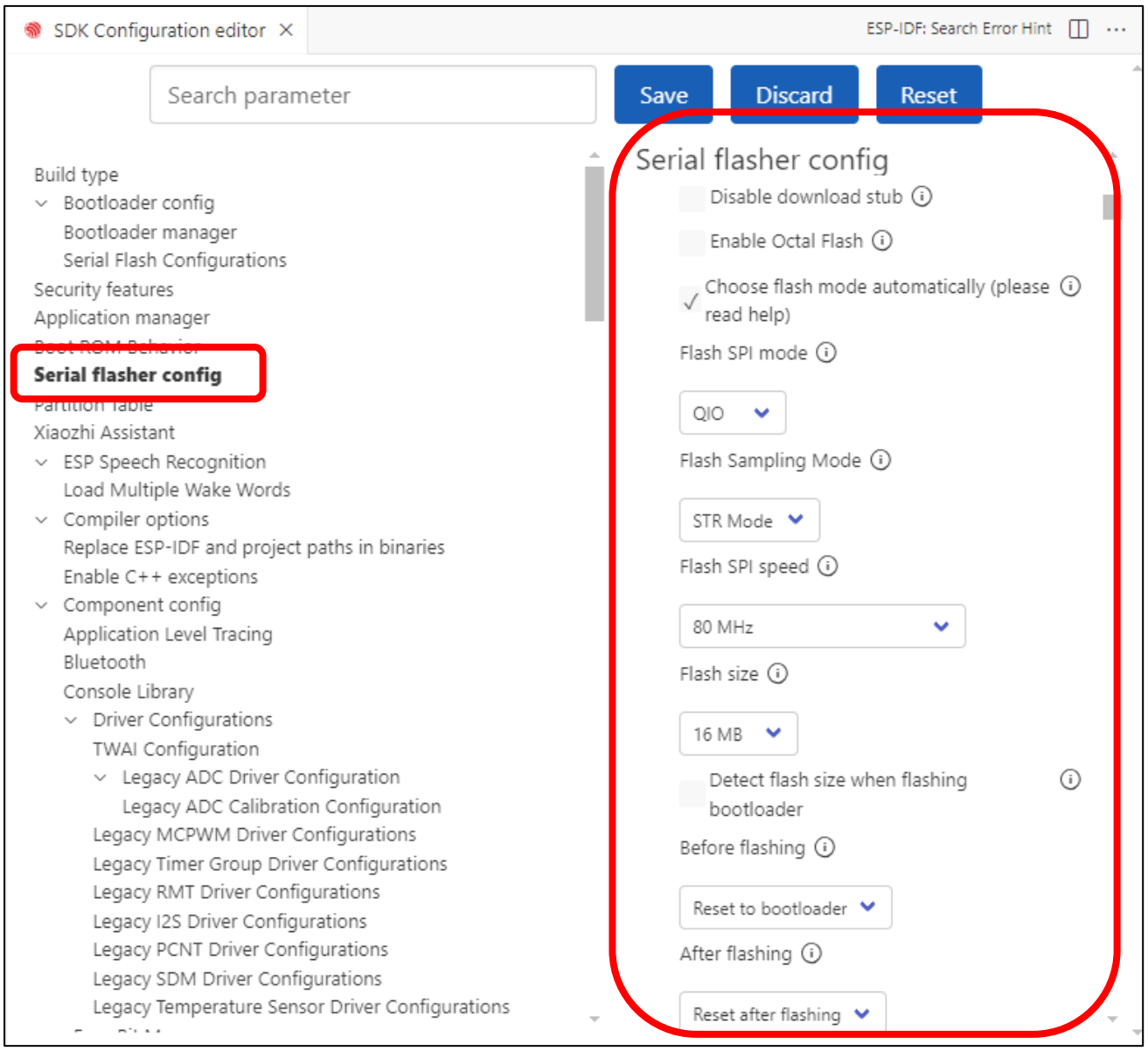
请等待一会，直到下方出现“Target ESP32S3 Set Successfully.”的提示。



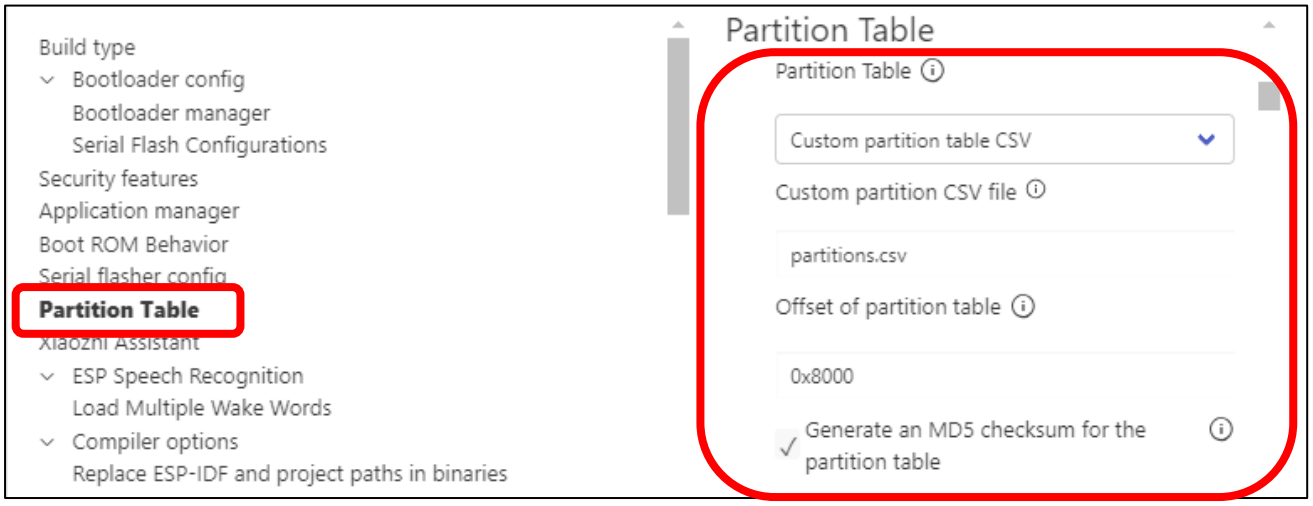
接下来点击 SDK Configuration Editor (menuconfig)选项。



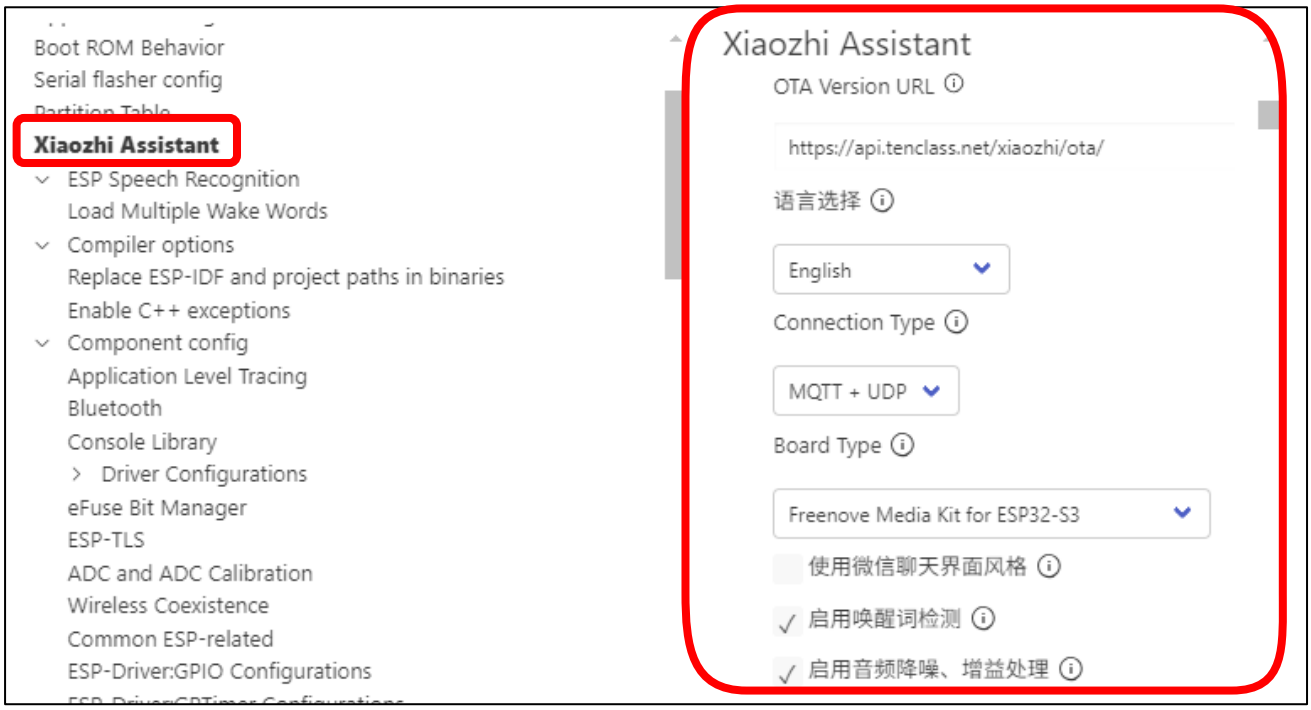
在新的界面中，点击“Serial flasher config”，并检查配置是否和下图一致。



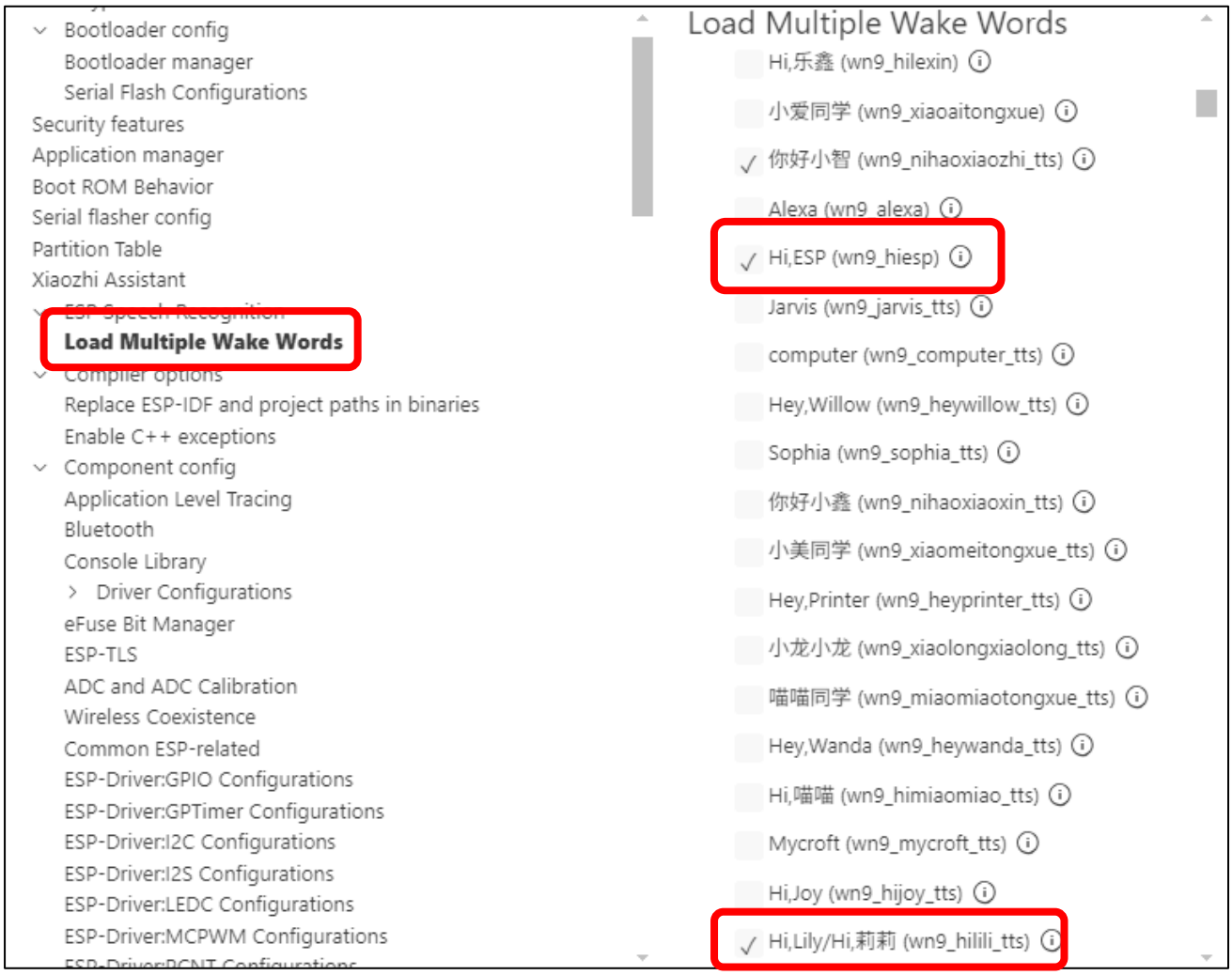
点击“Partition Table”，并检查配置是否和下图一致。



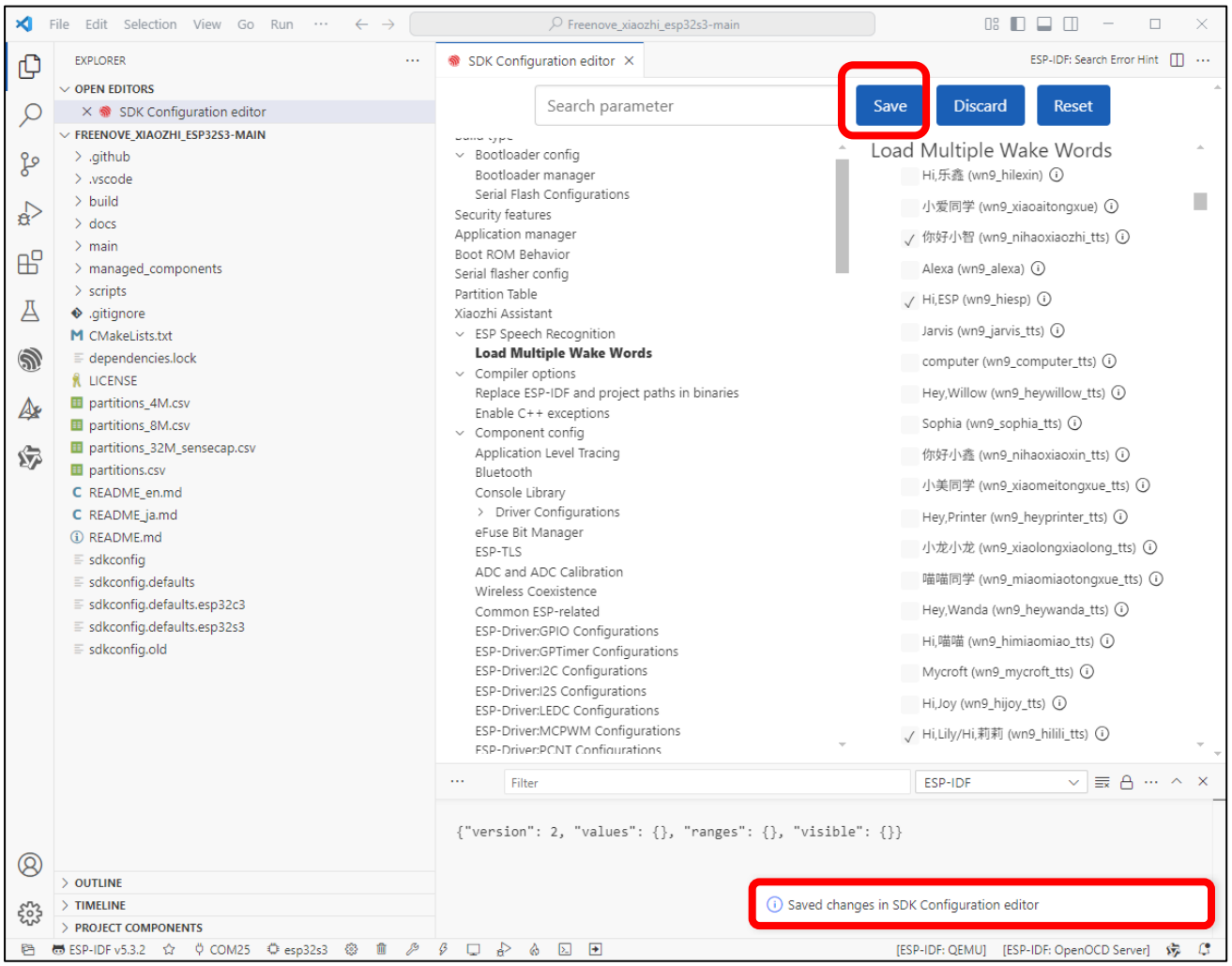
点击“Xiao Assistant”，并检查配置是否和下图一致。



点击 Load Multiple Wake Words”，并勾选“Hi, ESP”、“Hi, Lily”等选项。

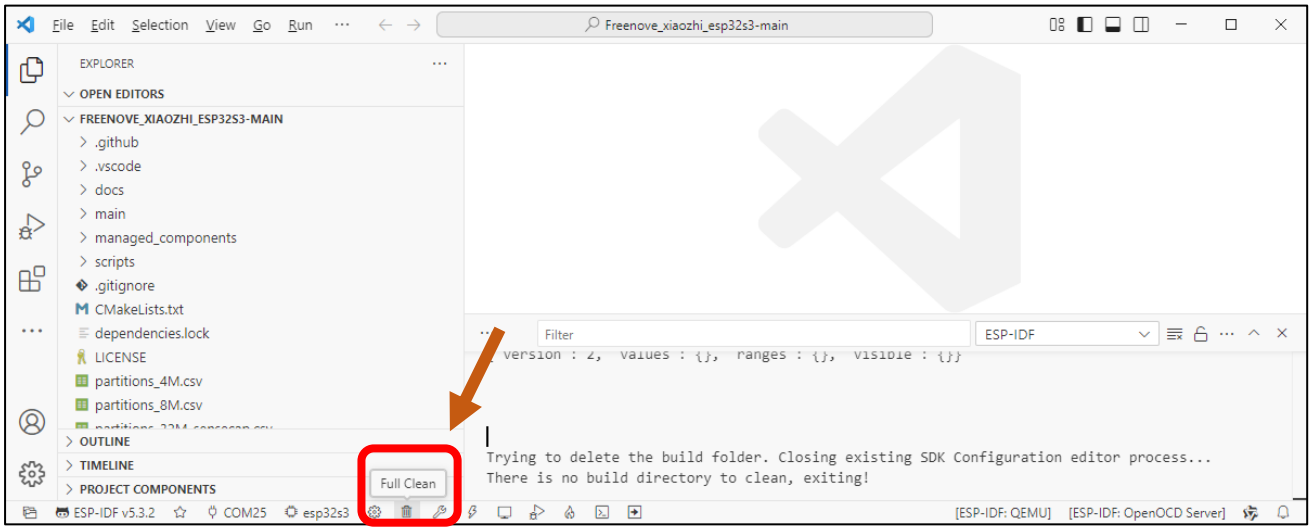


最后，点击"Save"，保存您的配置。保存成功，下方会给出提示信息。

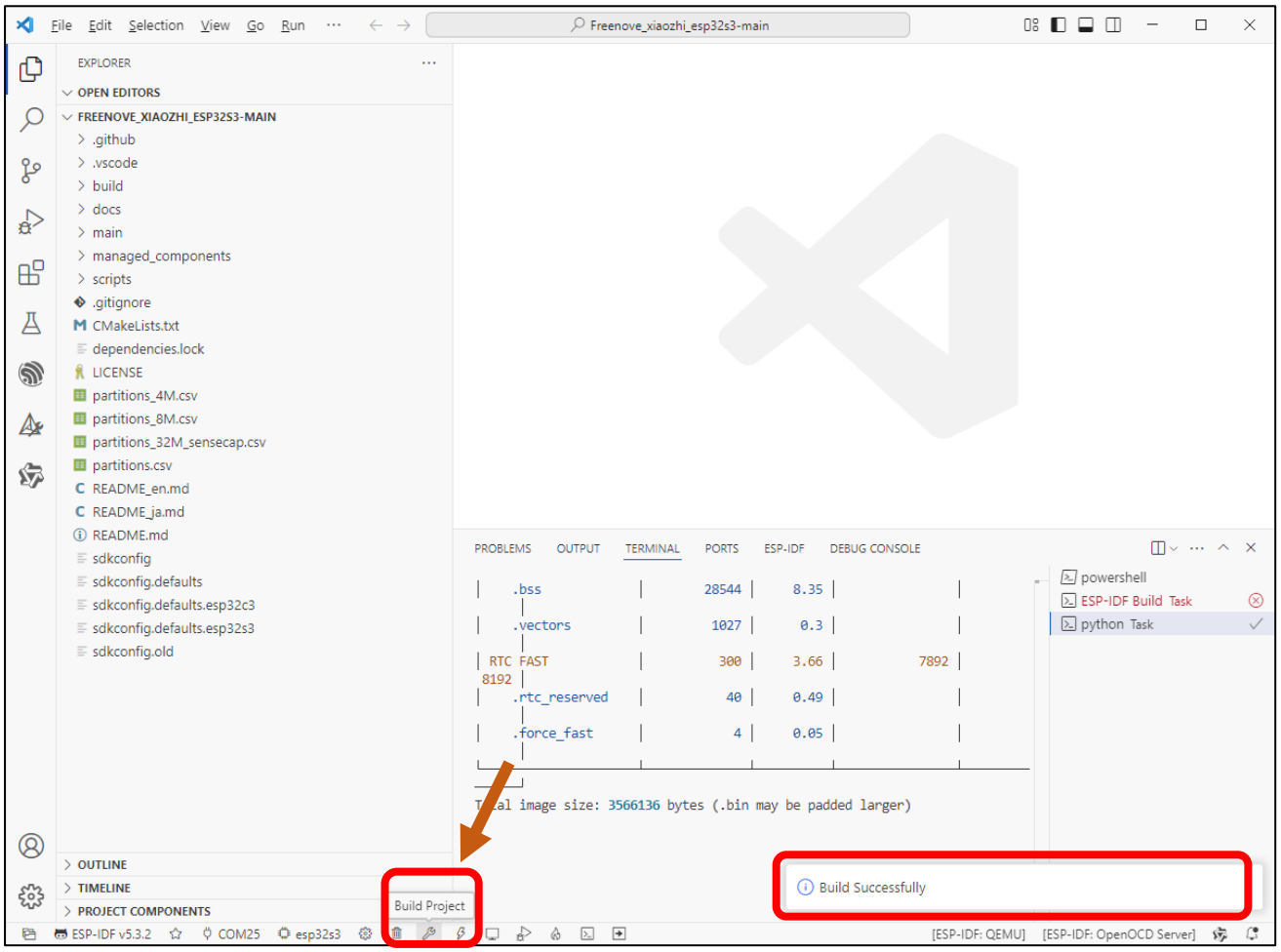


编译代码

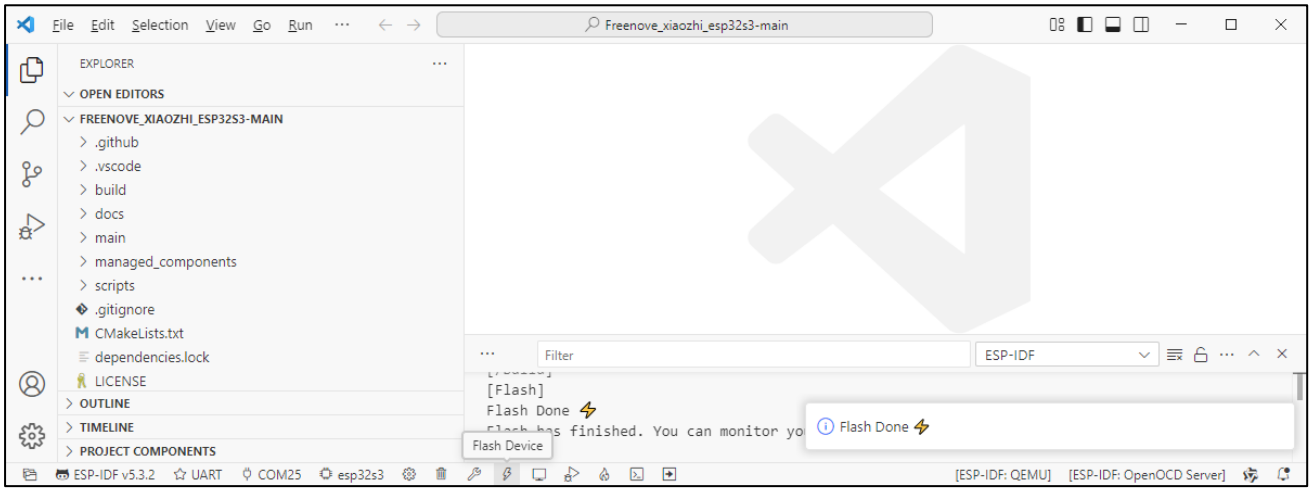
确保一切都配置完成之后，我们开始编译代码。
点击下方的“Full Clean”，它将会清除之前的所有编译信息。



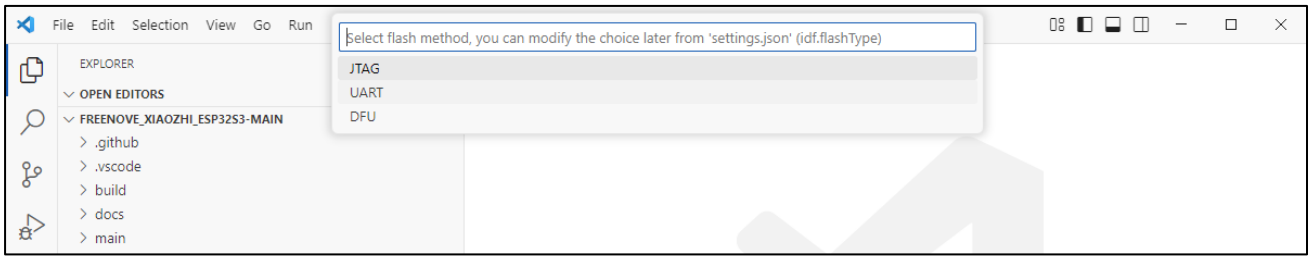
点击下方的“Build Project”，开始编译整个工程代码。首次编译需要等待的时间较长，请耐心等待，直到下方出现编译成功的提示。



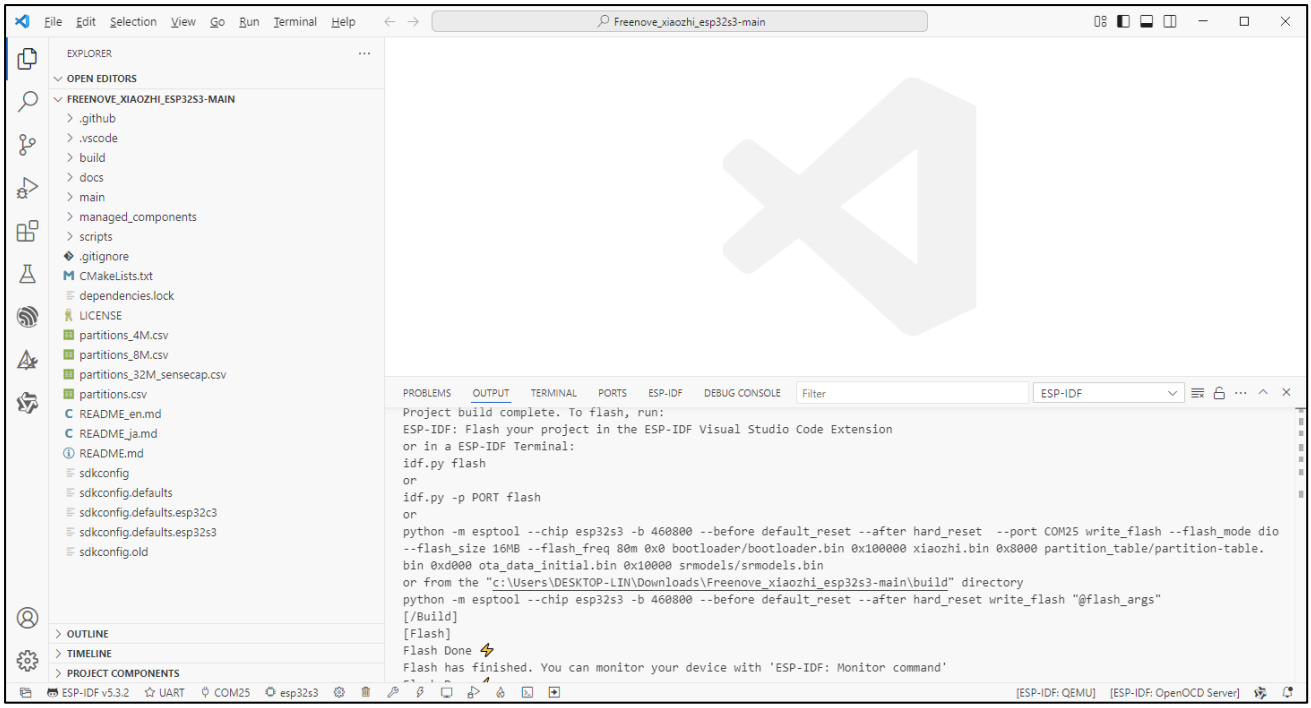
点击下方的“Flash Device”。准备开始上传代码到 ESP32 S3 Wroom 中。



在新出现的选项中，选择“UART”，然后等待代码上传完成即可。



看到“Flash has finished. You can monitor your device with 'ESP-IDF: Monitor command'”的提示，说明您已经将小智 AI 的代码上传到 ESP32 S3 WROOM 中。



至此，您已经编译完成，可以进行二次创作了。

本地服务器

小智 AI 服务器使用声明

本项目基于网络开源项目 https://github.com/xinnan-tech/xiaozhi-esp32-server。该项目开源协议类型为 MIT 协议。我们仅在此基础上提供适配，用做第三方学习和 AI 功能试用，不做商业性质推广和应用。本教程仅给爱好者附加学习使用。

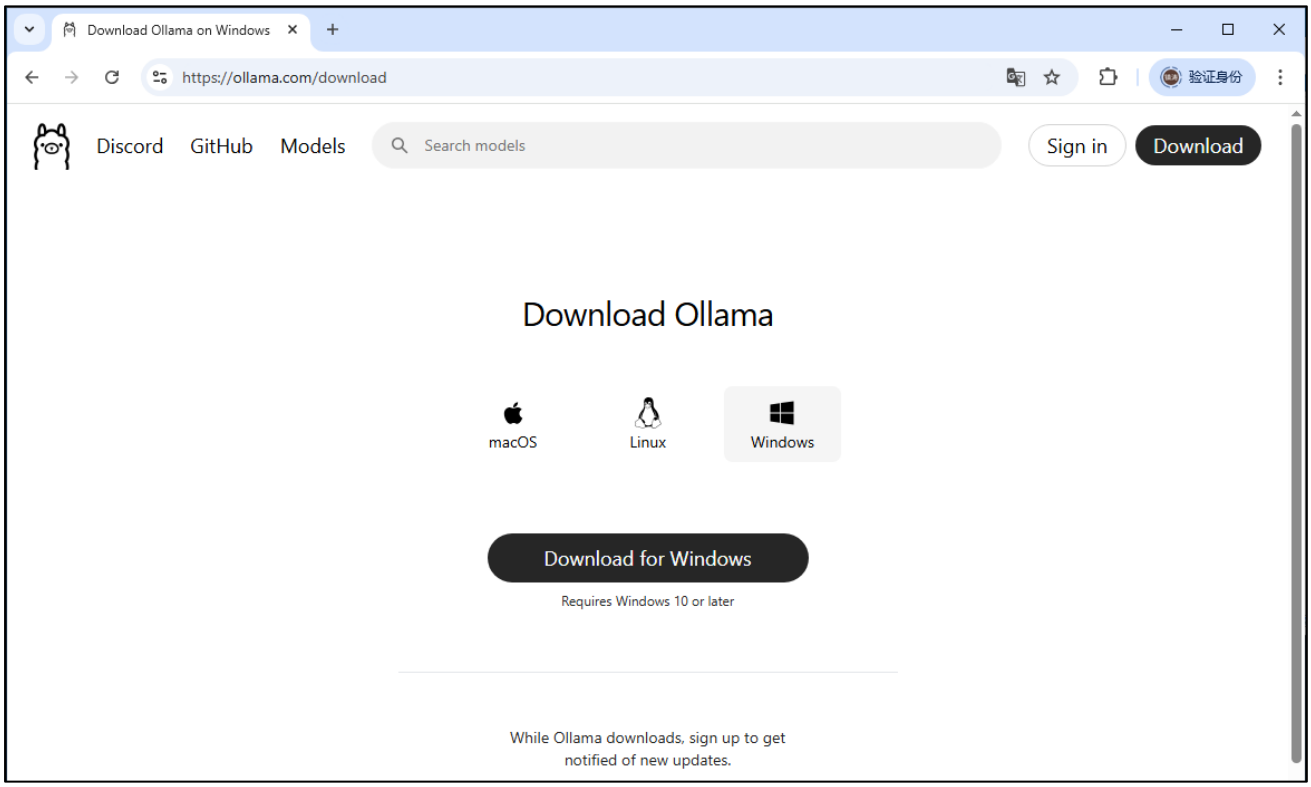
小智 AI 本地服务器部署

如果您不想使用小智 AI 服务器，您也可以使用自己的电脑搭建一个简易版本的服务器，这个章节我们将使用开源项目 https://github.com/xinnan-tech/xiaozhi-esp32-server 来部署一个本地服务器，并和 ESP32 S3 WROOM 建立连接。如果您在使用过程中发现代码存在 bug，请在 https://github.com/xinnan-tech/xiaozhi-esp32-server 上提交 issue，我们对此项目并不进入深入了解，无法为您提供太多帮助。

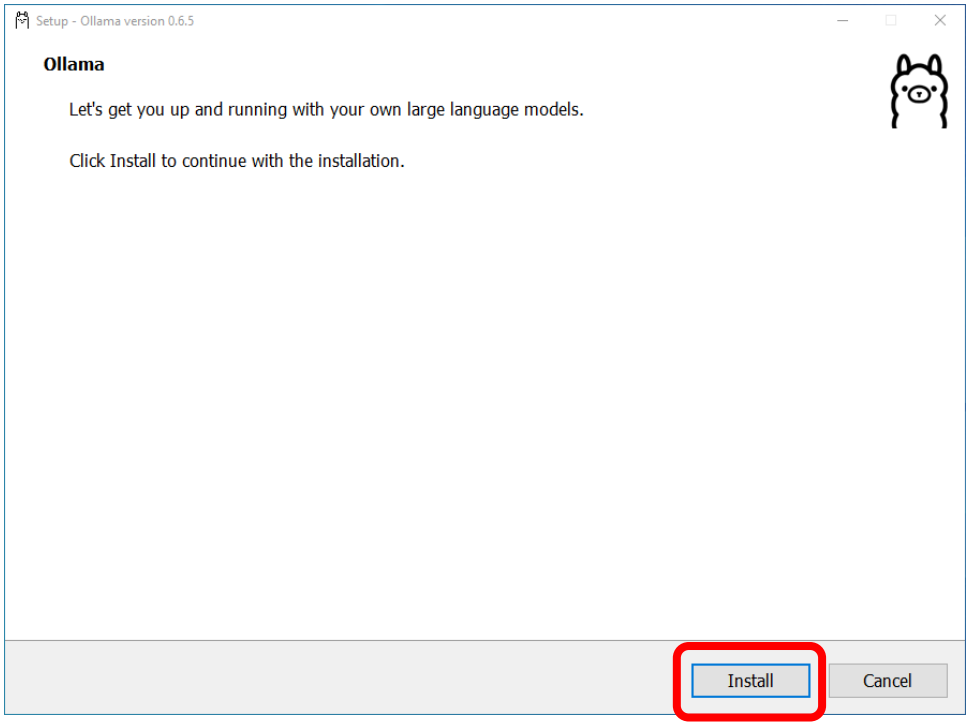
安装 Ollama

Window

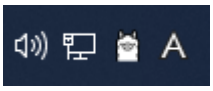
在开始之前，我们需要在本地先安装 Ollama 工具，它可以在我们的电脑上安装任意开源模型。
如果您还没有安装 Ollama，请访问 https://ollama.com/download 进行下载和安装。



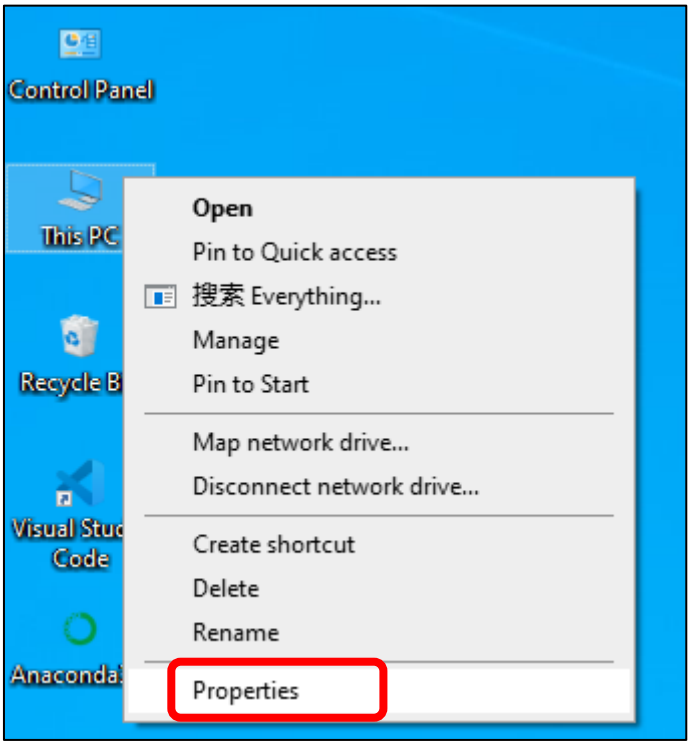
运行 Ollama 安装包，点击 Install.



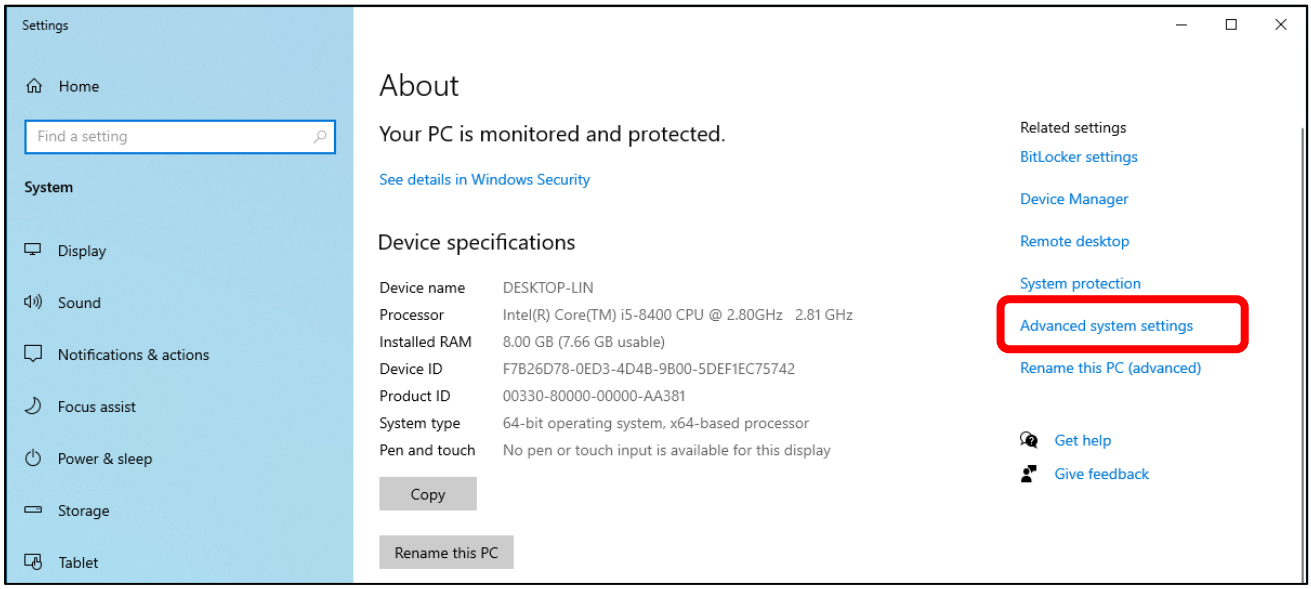
安装完成后，您可以在电脑的右下角看到图标。



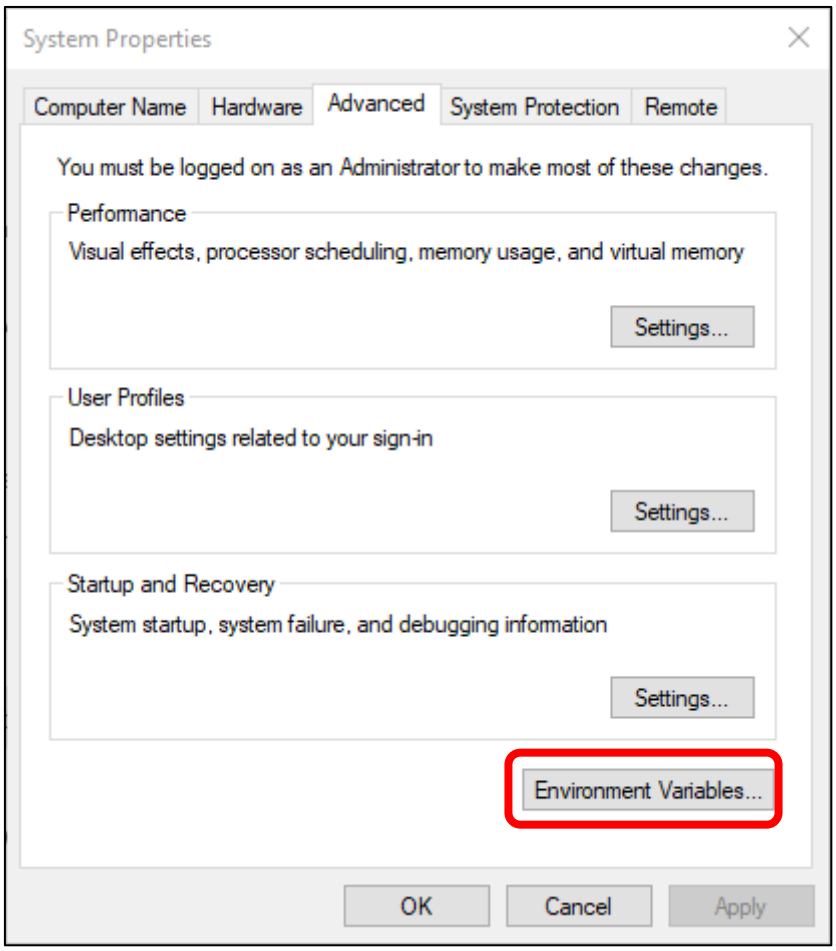
回到电脑的桌面位置，选择此电脑，按下鼠标右键，选择“Properties”.



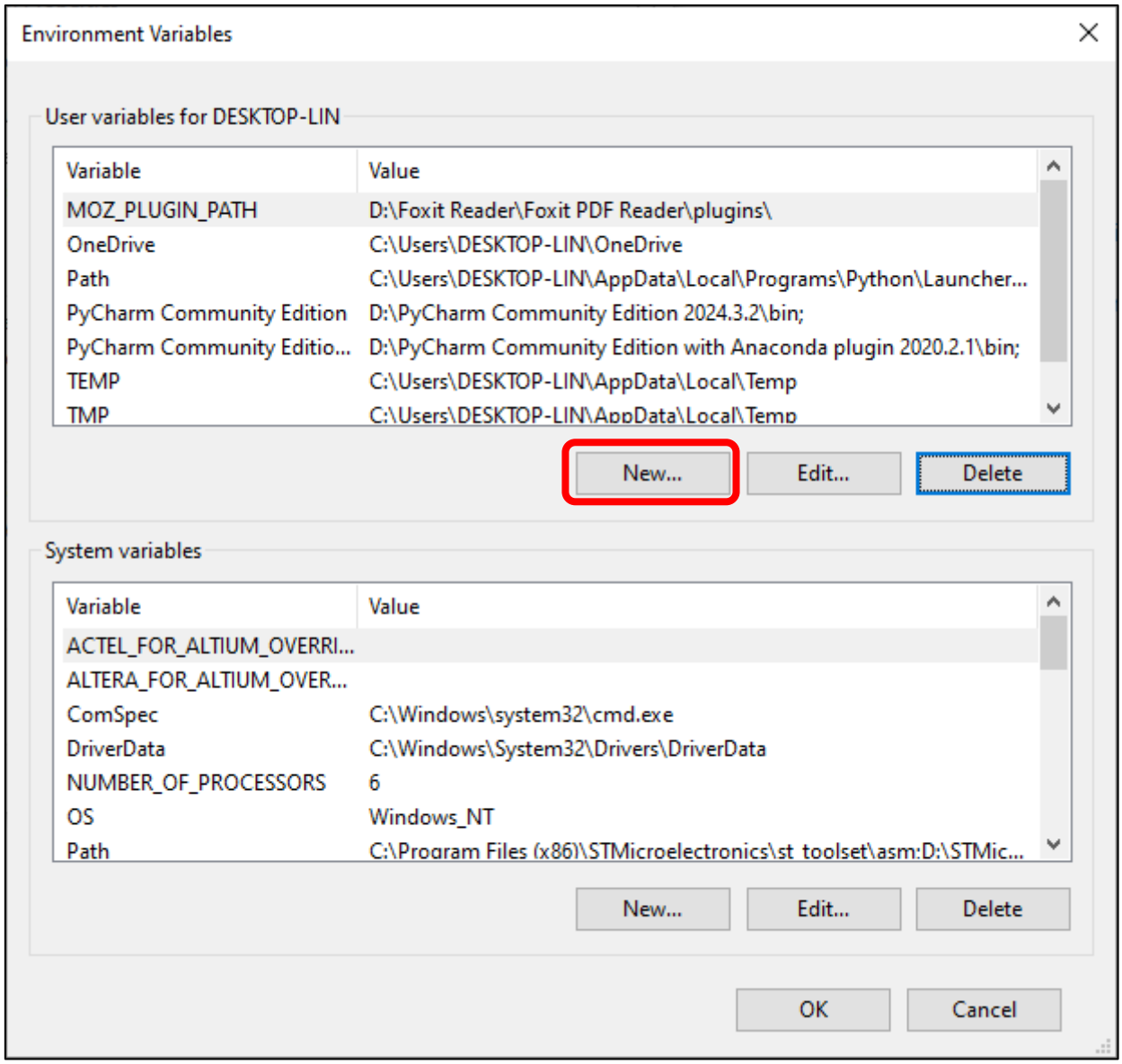
在新弹出的界面中，找到“**Advances system settings**”，然后点击它。



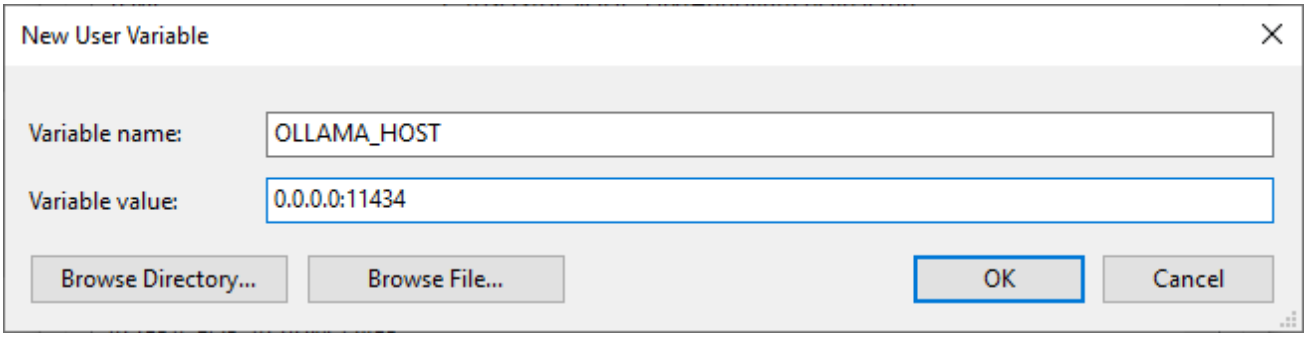
在新的窗口中，点击“Environment Variables”.



点击"New".



变量名称输入"OLLAMA_HOST"，变量值输入"0.0.0.0:11434"，然后点击 OK。
这样局域网内所有的设备都可以通过 IP 地址访问 Ollama。否则只能电脑本身访问 Ollama.



MAC

在开始之前，我们需要在本地先安装 Ollama 工具，它可以在我们的电脑上安装任意开源模型。
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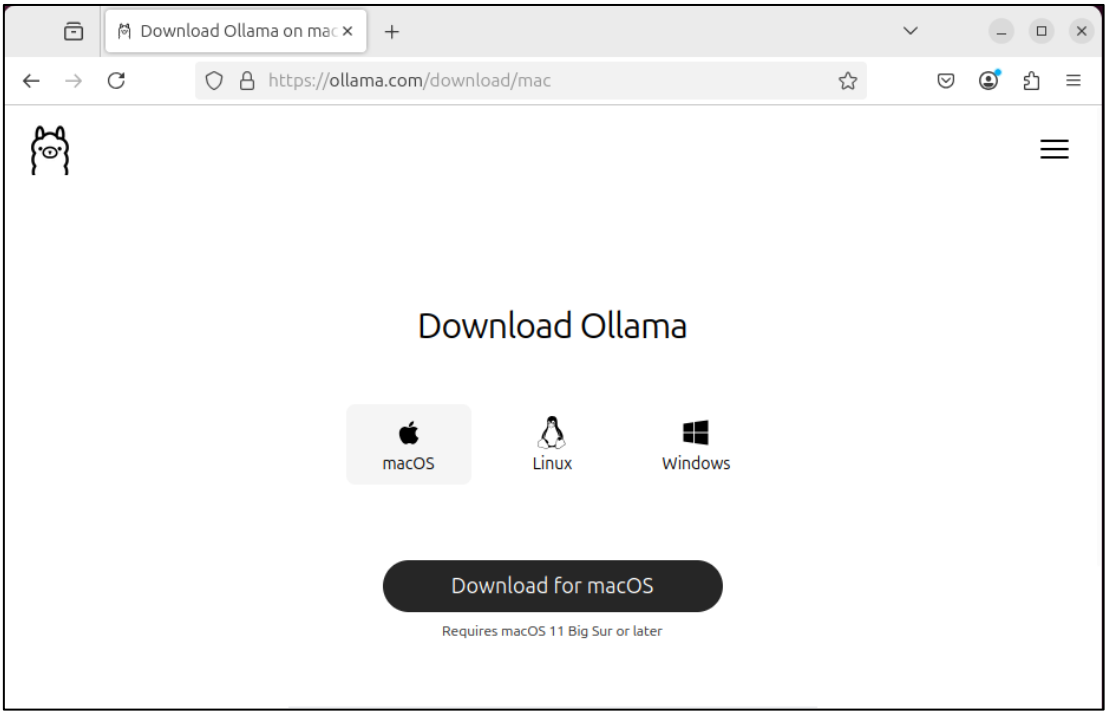
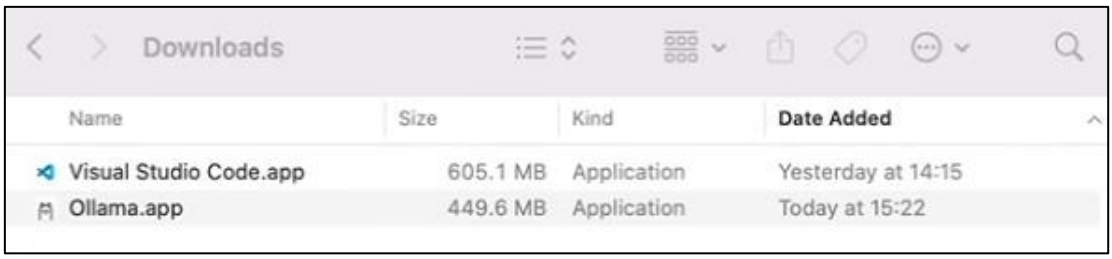
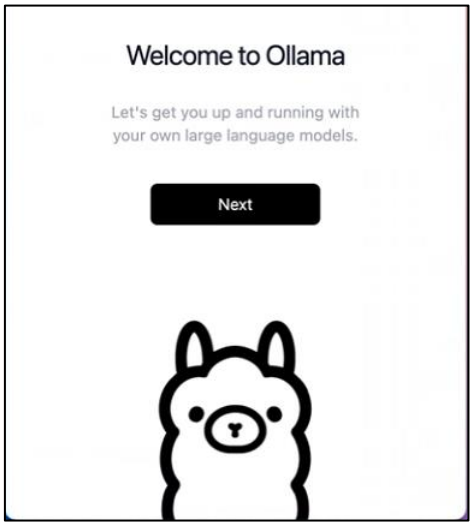
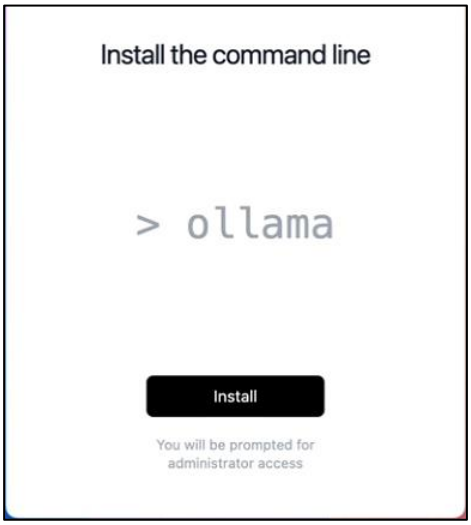


在 Downloads 中找到“Ollama.app”，双击运行它。



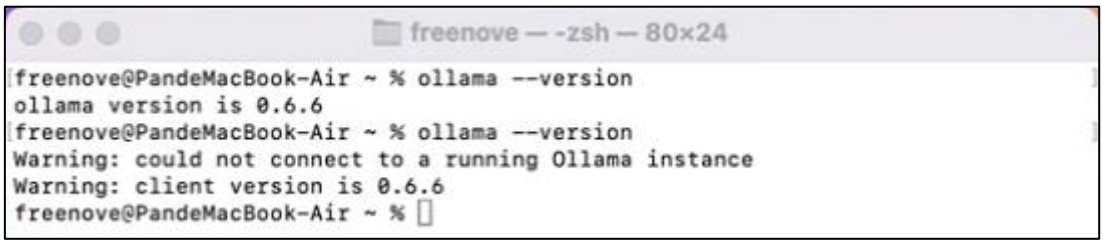
点击”Next”，然后点击“Install”，最后点击“Finish”





安装完成后，界面会直接关闭。
打开终端，通过指令查看 Ollama 是否已经安装完成。

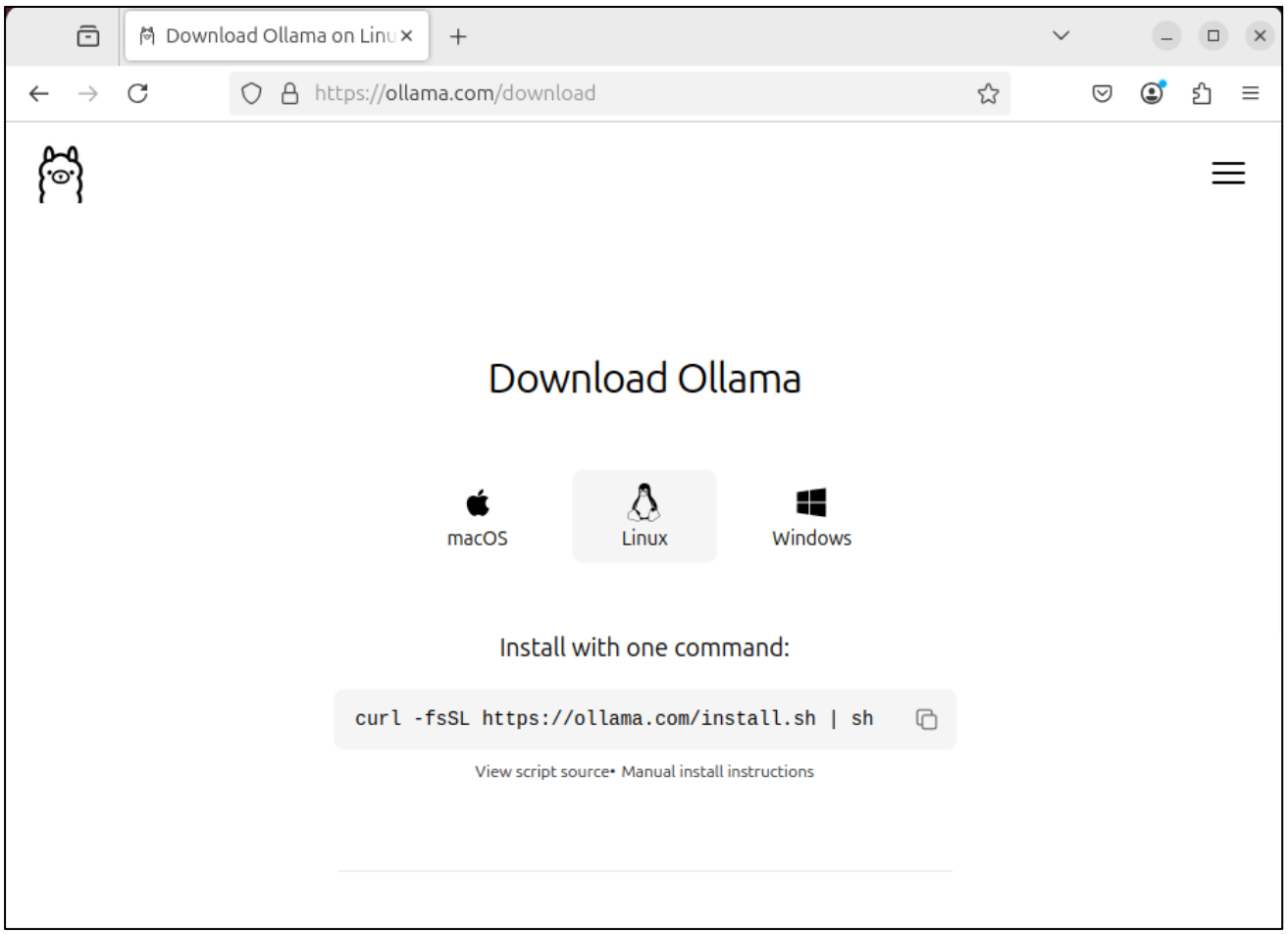
```
ollama --version
```



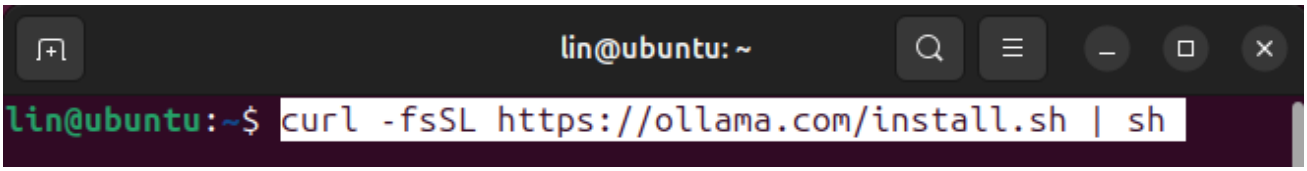
请注意，Ollama 存放在 Applications 中。如上图所示，如果您的 Ollama 已经在运行，则运行“ollama --version”时，会直接打印 Ollama 的版本号。如果您的 Ollama 没有运行，则运行“ollama --version”时，会提示您无法连接到运行中的 Ollama.

Linux

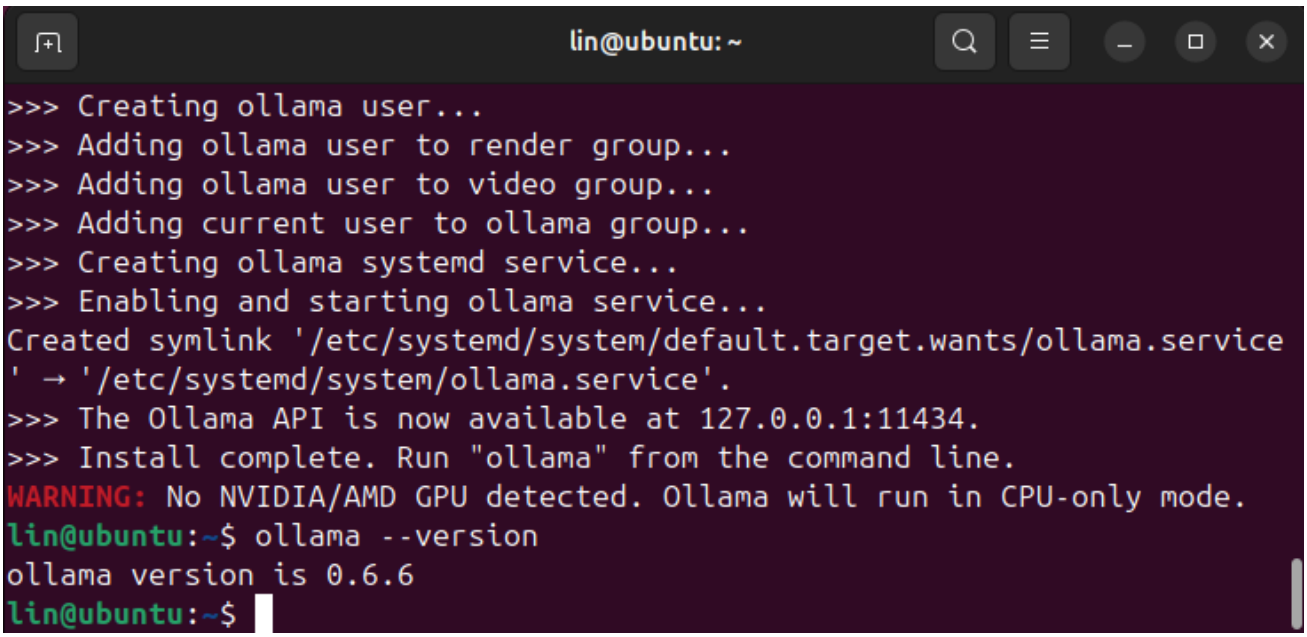
在开始之前，我们需要在本地先安装 Ollama 工具，它可以在我们的电脑上安装任意开源模型。
如果您还没有安装 Ollama，请访问 https://ollama.com/download 进行下载和安装。



打开终端。输入指令，开始安装 Ollama.

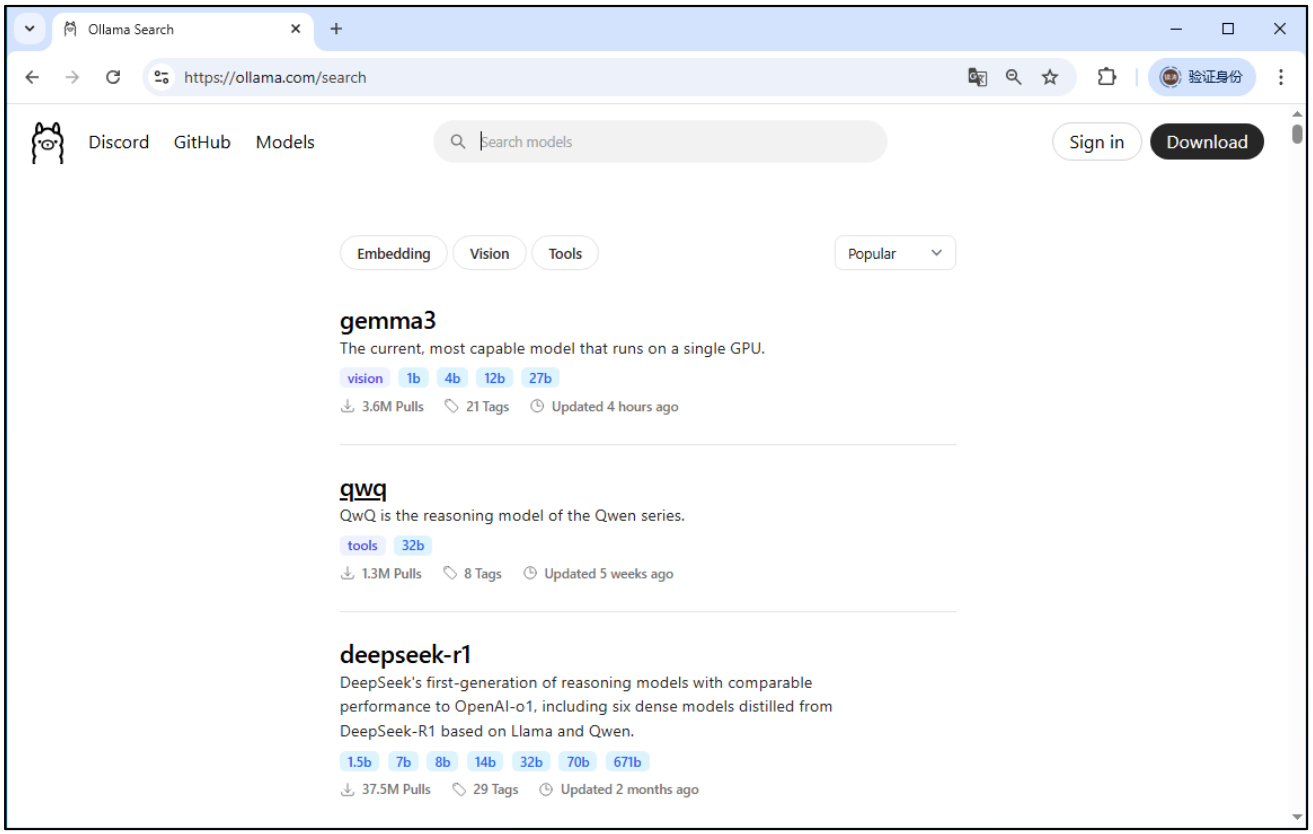


安装完成如下图所示。当然，您可以使用“ollama --version”查看是否已经安装 Ollama.

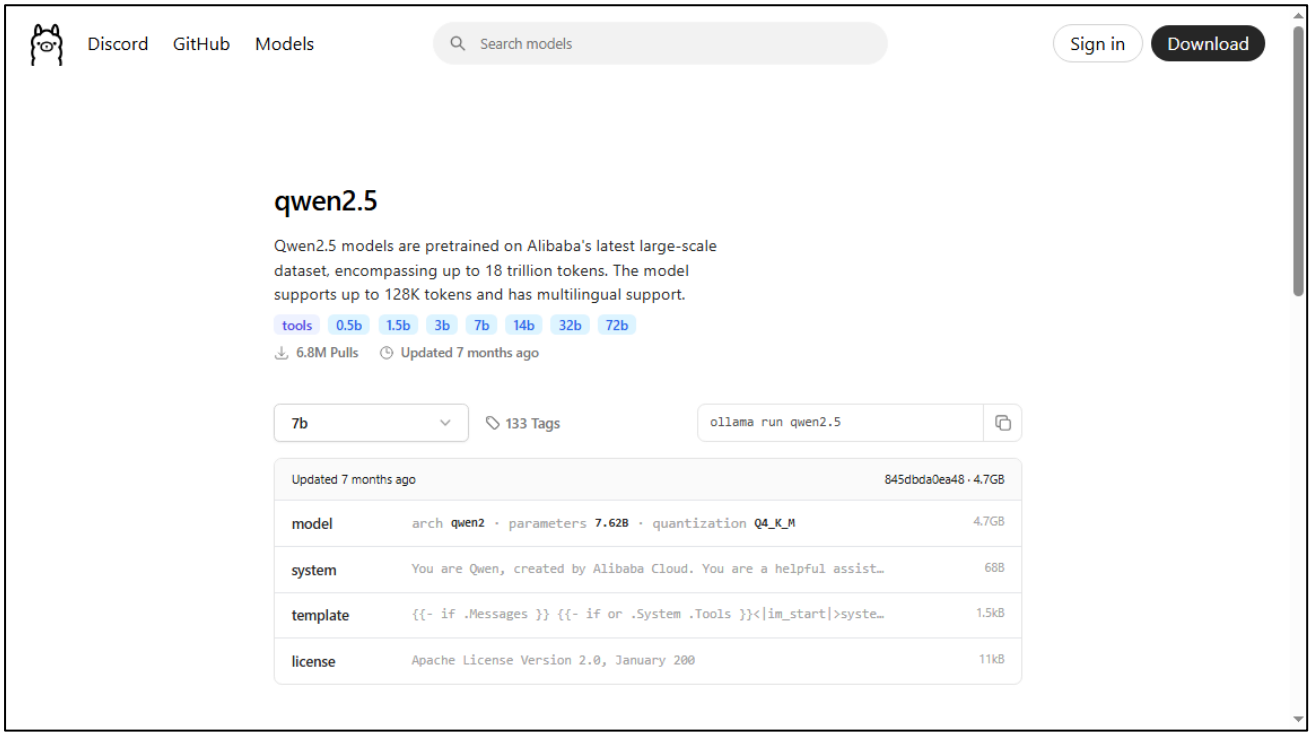


LLM 模型

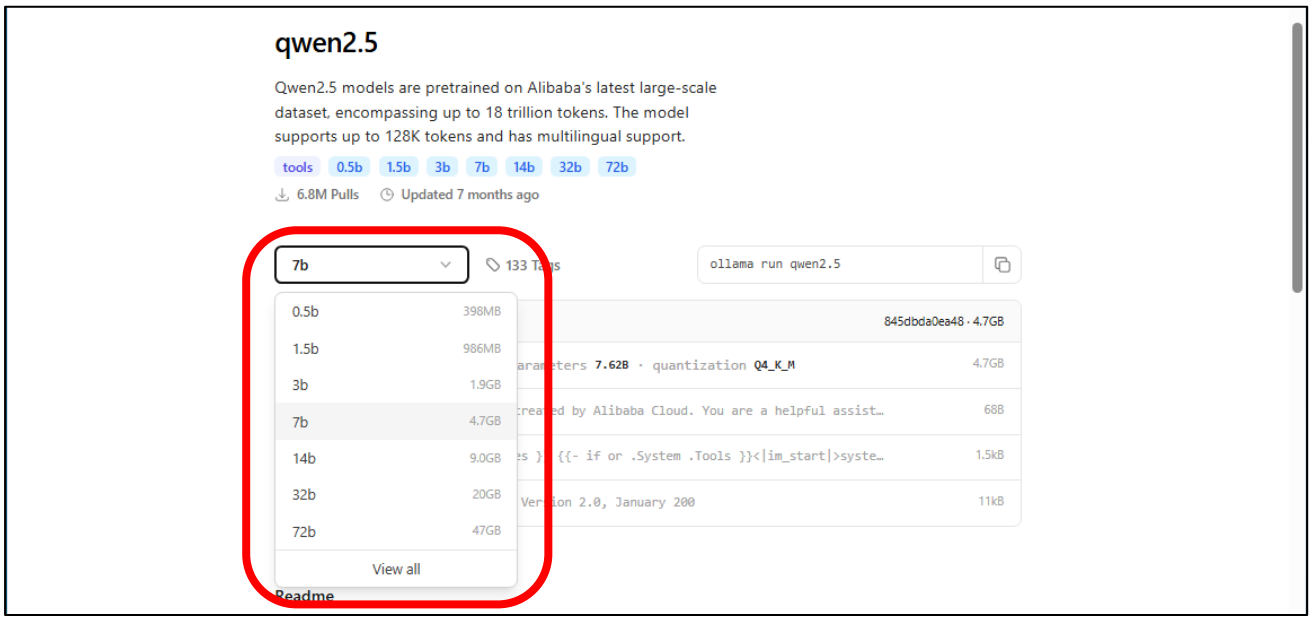
请访问 https://ollama.com/search，选择适合您电脑的，或者您喜欢的 LLM 模型。



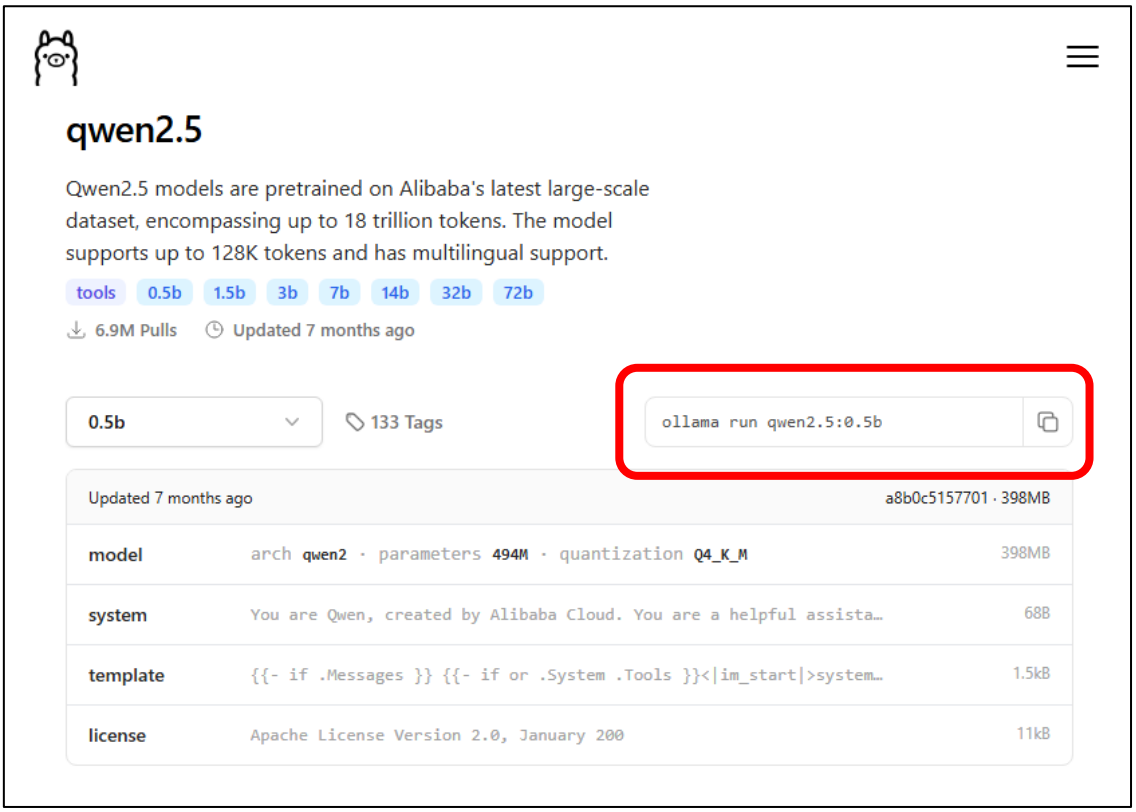
这里我以 qwen2.5 举例。点击“qwen2.5”模型。



请注意，在选择模型时，需要根据您的电脑显卡内存或者 CPU 内存条配置，选择合适的模型。
1，模型越大，智能化程度越高。模型越小，智能化程度越低。
2，如果您的配置比较高，您可以选择比较大的模型，如果您的电脑配置比较低，您可以选择比较小的模型。
3，如果您的电脑配置较低，而您选择的模型过大，可能会导致模型无法运行，或者运行的速度变慢。
通过下拉框，可以选择合适的模型参数。



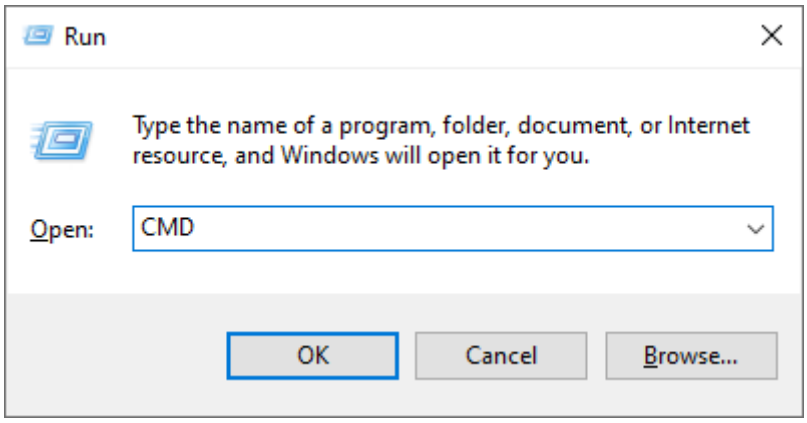
模型越小，越不智能，但是运行速度越快，这里只是作为演示，我们选择 qwen2.5:0.5b 来作为示范。复制网页中的指令：“**ollama run qwen2.5:0.5b**”



接下来请根据您的电脑系统，安装您喜欢的 LLM 模型。

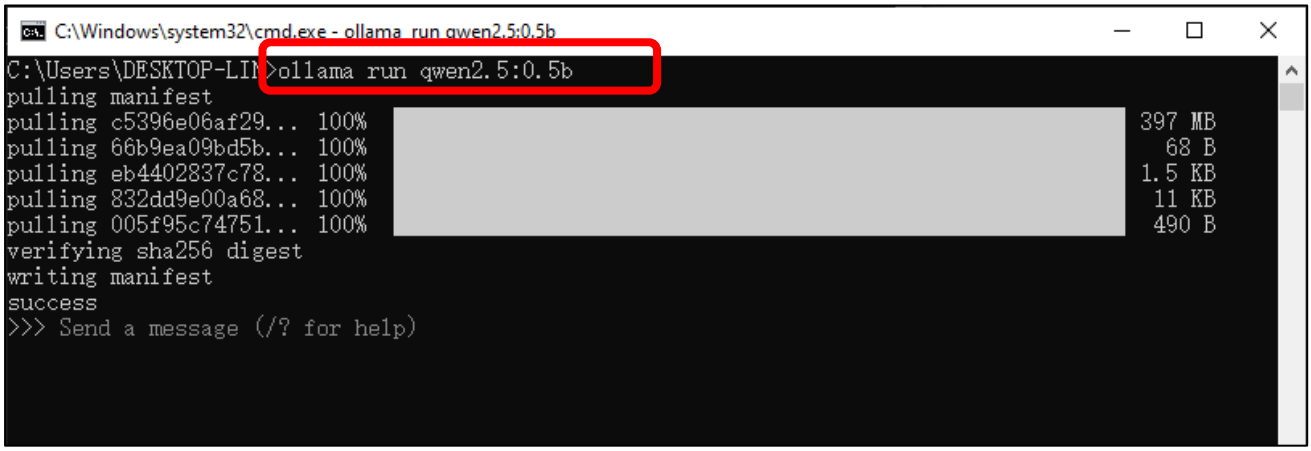
Window

您可以使用指令**“Win+R”**，在弹出的窗口中输入“CMD”，打开 CMD 界面。



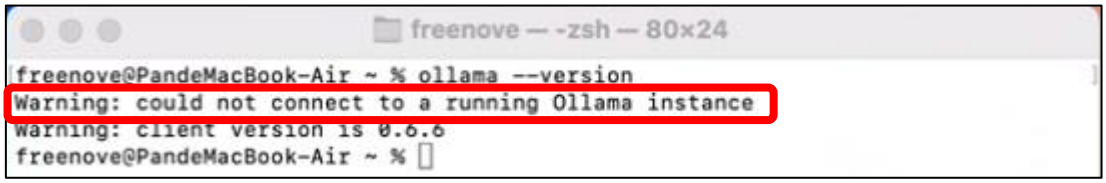
输入指令“**ollama --version**”，查看是否已经安装了 ollama。

输入“**ollama run qwen2.5:0.5b**”，将模型下载到本地中。



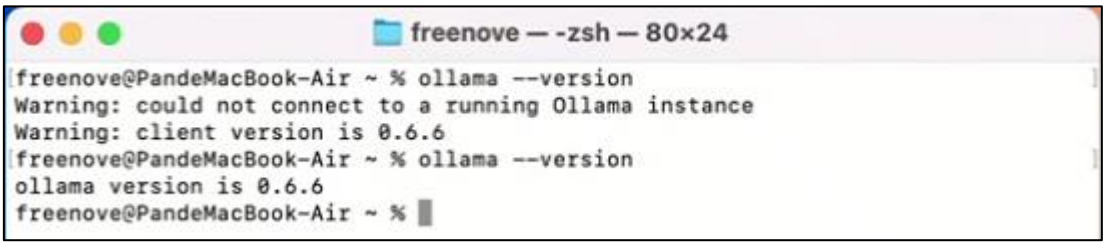
MAC

打开终端，输入指令“**ollama --version**”，查看是否已经安装了 ollama。

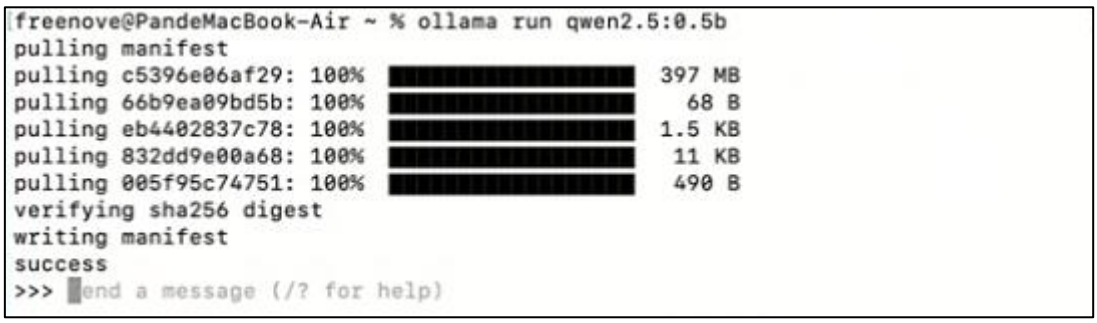


如果出现“Warning: could not connect to a running Ollama instance”的提示，请先运行 Ollama.

重新使用指令，查看 Ollama 是否正常运行。



输入“**ollama run qwen2.5:0.5b**”，将模型下载到本地中。



当安装完成后，你可以直接在终端界面中和 qwen2.5:0.5b 进行聊天。

```
freenove@PandeMacBook-Air ~ % ollama run qwen2.5:0.5b
pulling manifest
pulling c5396e06af29: 100% ▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕ 397 MB
pulling 66b9ea09bd5b: 100% ▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕  68 B
pulling eb4402837c78: 100% ▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕ 1.5 KB
pulling 832dd9e00a68: 100% ▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕  11 KB
pulling 005f95c74751: 100% ▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕▕ 490 B
verifying sha256 digest
writing manifest
success
>>> Hello
Hello! How can I assist you today? Let me know if there's anything
specific you'd like to discuss or any questions that need help with. I'm
here to provide information and answer queries in a way that's easy for
you to understand.

>>>
Use Ctrl + d or /bye to exit.
>>> Send a message (/? for help)
```

您可以使用指令“Ctrl+d”，退出聊天模式。

您可以通过指令“**ollama serve**”来运行 ollama 服务器。

```
freenove — ollama serve — 80×24
freenove@PandeMacBook-Air ~ % ollama serve
2025/04/24 17:10:39 routes.go:1232: INFO server config env="map[HTTPS_PROXY: HTT
P_PROXY: NO_PROXY: OLLAMA_CONTEXT_LENGTH:2048 OLLAMA_DEBUG:false OLLAMA_FLASH_AT
TENTION:false OLLAMA_GPU_OVERHEAD:0 OLLAMA_HOST:http://127.0.0.1:11434 OLLAMA_KE
EP_ALIVE:5m0s OLLAMA_KV_CACHE_TYPE: OLLAMA_LLM_LIBRARY: OLLAMA_LOAD_TIMEOUT:5m0s
 OLLAMA_MAX_LOADED_MODELS:0 OLLAMA_MAX_QUEUE:512 OLLAMA_MODELS:/Users/freenove/.
ollama/models OLLAMA_MULTIUSER_CACHE:false OLLAMA_NEW_ENGINE:false OLLAMA_NOHIST
ORY:false OLLAMA_NOPRUNE:false OLLAMA_NUM_PARALLEL:0 OLLAMA_ORIGINS:[http://loca
lhost https://localhost http://localhost:* https://localhost:* http://127.0.0.1
https://127.0.0.1 http://127.0.0.1:* https://127.0.0.1:* http://0.0.0.0 https://
0.0.0.0 http://0.0.0.0:* https://0.0.0.0:* app://* file://* tauri://* vscode-web
view://* vscode-file://*] OLLAMA_SCHED_SPREAD:false http_proxy: https_proxy: no_
proxy:]"
time=2025-04-24T17:10:39.898+08:00 level=INFO source=images.go:458 msg="total bl
obs: 5"
time=2025-04-24T17:10:39.899+08:00 level=INFO source=images.go:465 msg="total un
used blobs removed: 0"
time=2025-04-24T17:10:39.899+08:00 level=INFO source=routes.go:1299 msg="Listeni
ng on 127.0.0.1:11434 (version 0.6.6)"
time=2025-04-24T17:10:39.900+08:00 level=INFO source=types.go:130 msg="inference
 compute" id="" library=cpu variant="" compute="" driver=0.0 name="" total="8.0
GiB" available="3.2 GiB"
```

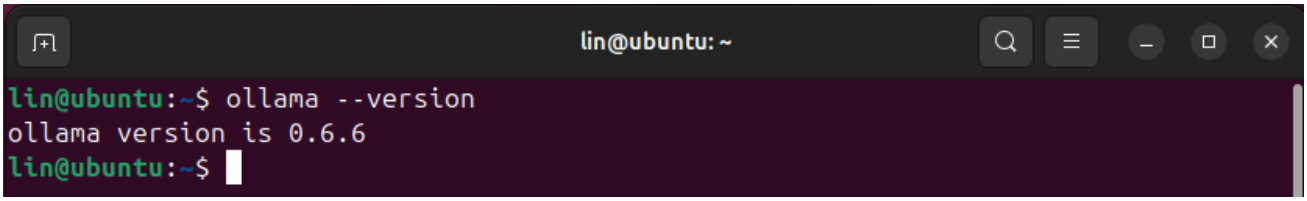
如果您的 Ollama 已经运行，则会提示您下面的界面。

```
freenove — -zsh — 80×24
freenove@PandeMacBook-Air ~ % ollama serve
Error: listen tcp 127.0.0.1:11434: bind: address already in use
freenove@PandeMacBook-Air ~ %
```

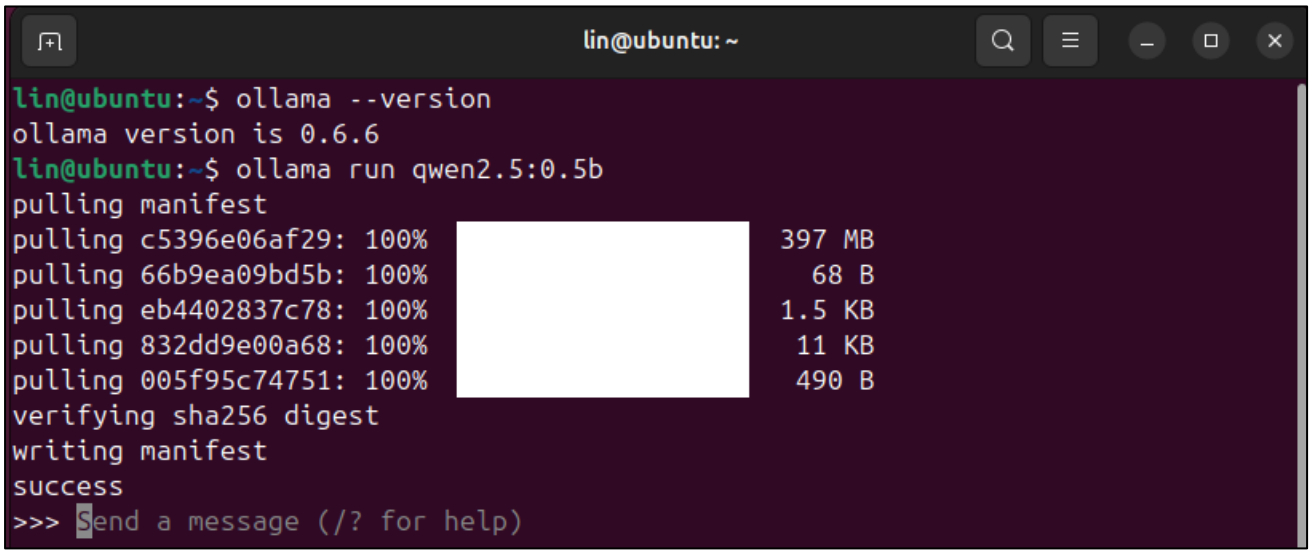
您可以输入 Ollama，查看 Ollama 的使用说明。

Linux

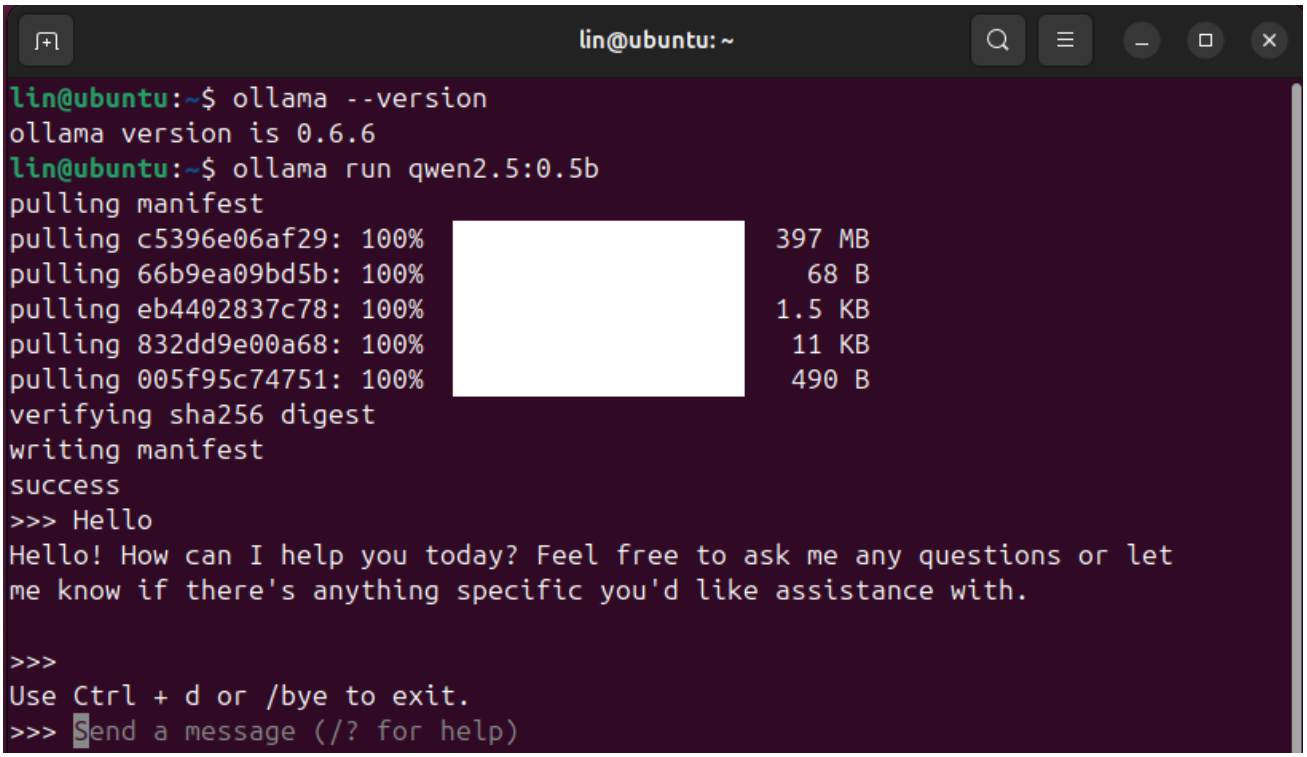
打开终端，输入指令“**ollama --version**”，查看是否已经安装了 ollama。



输入“**ollama run qwen2.5:0.5b**”，将模型下载到本地中。

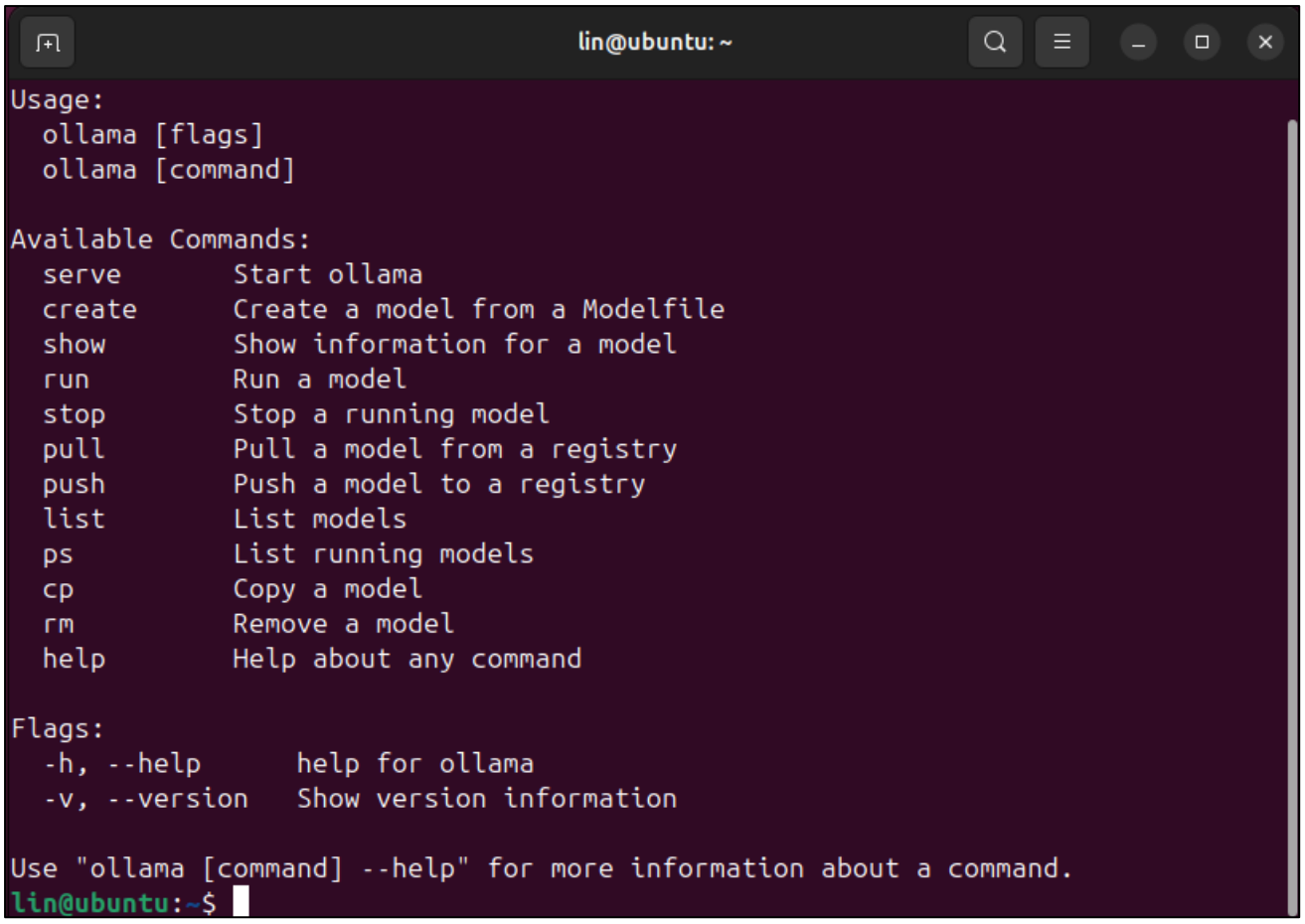


当安装完成后，你可以直接在终端界面中和 qwen2.5:0.5b 进行聊天。



您可以使用指令“Ctrl+d”，退出聊天模式。

您可以输入 Ollama，查看 Ollama 的使用说明。

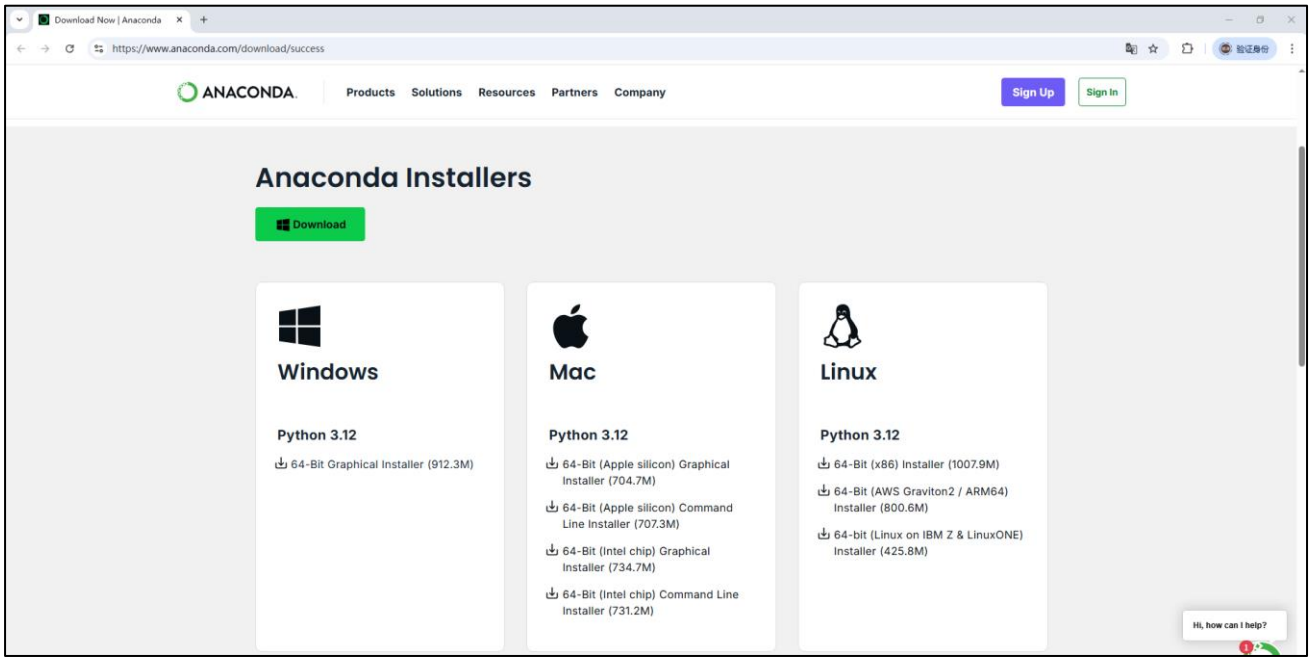


安装 Conda

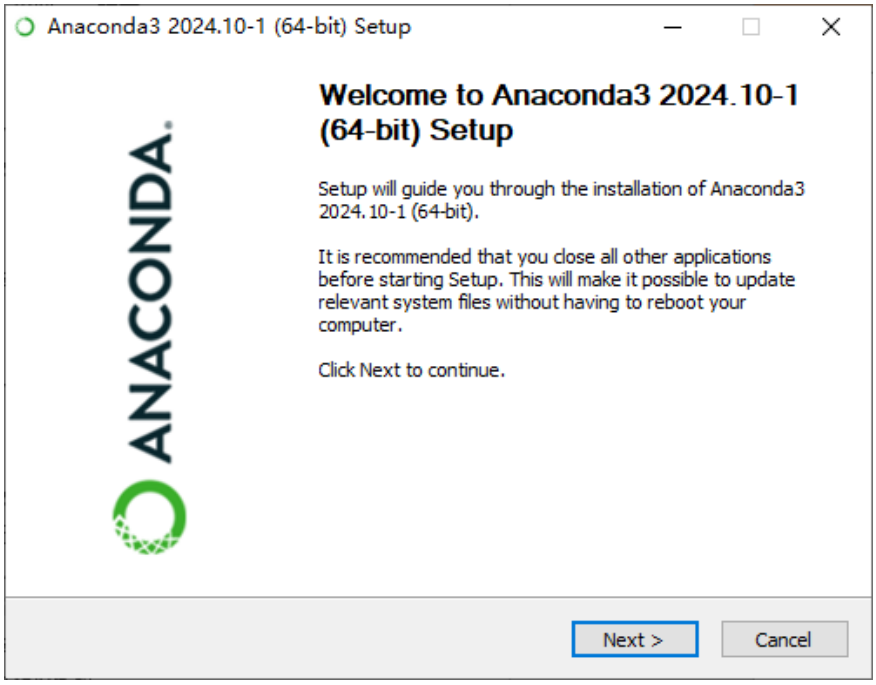
xiaozhi-esp32-server 这个开源项目提供了 4 种安装方式，在本教程中，我们选择最简单的配置示例作为示范，其他使用方法请参考网站进行探索学习。

Window

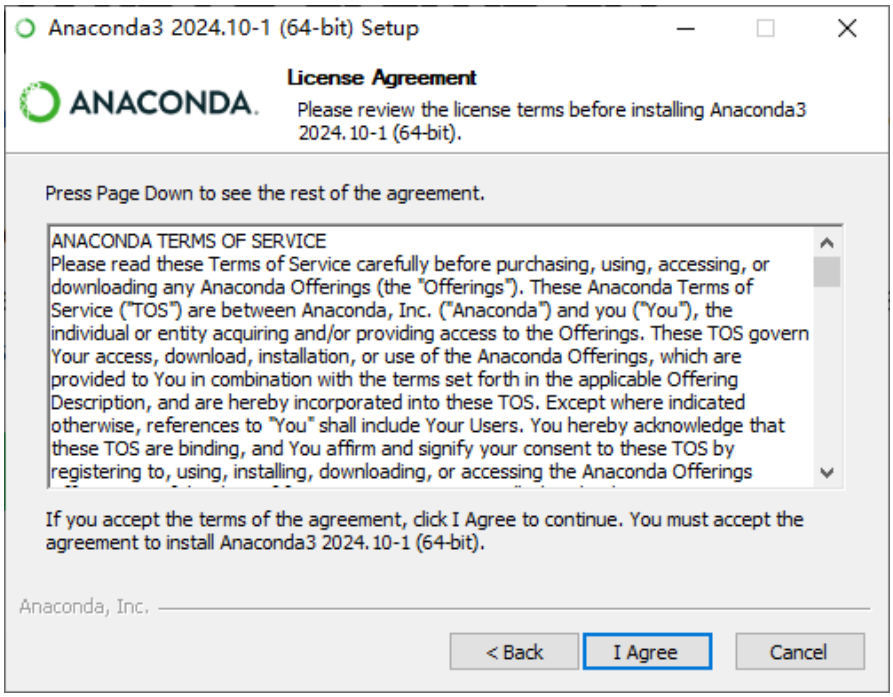
本示例使用 conda 管理依赖环境。因此我们需要事先在电脑上安装 Conda 环境。如果您的电脑还没安装 Conda，您可以访问这个链接下载并安装它：https://www.anaconda.com/download/success
选择适合您电脑平台的软件包下载。Miniconda is an installer by Anaconda that comes preconfigured for use with the Anaconda Repository.



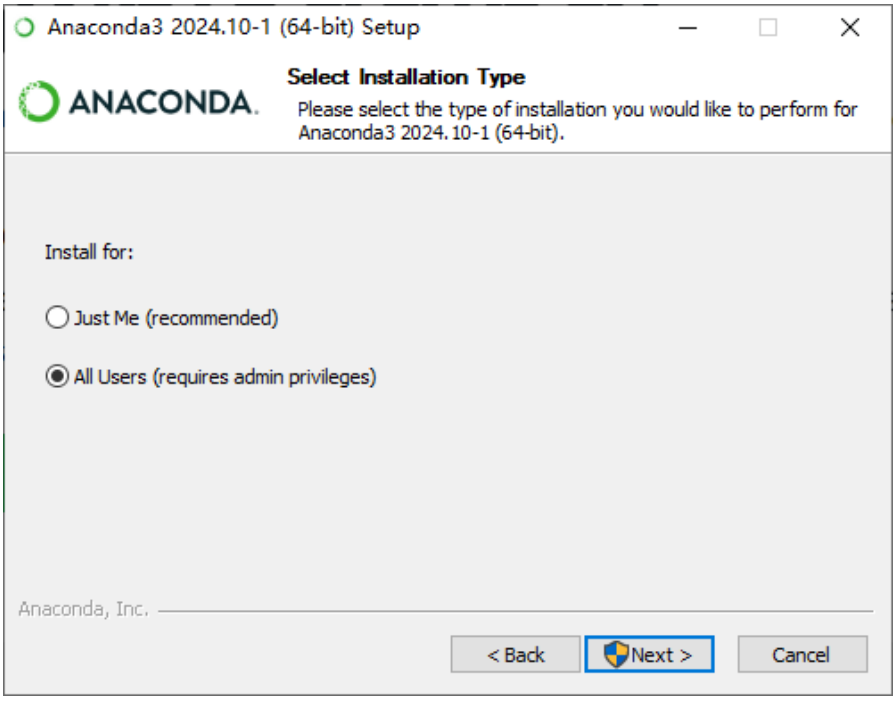
双击打开 Conda 软件，点击 Next.



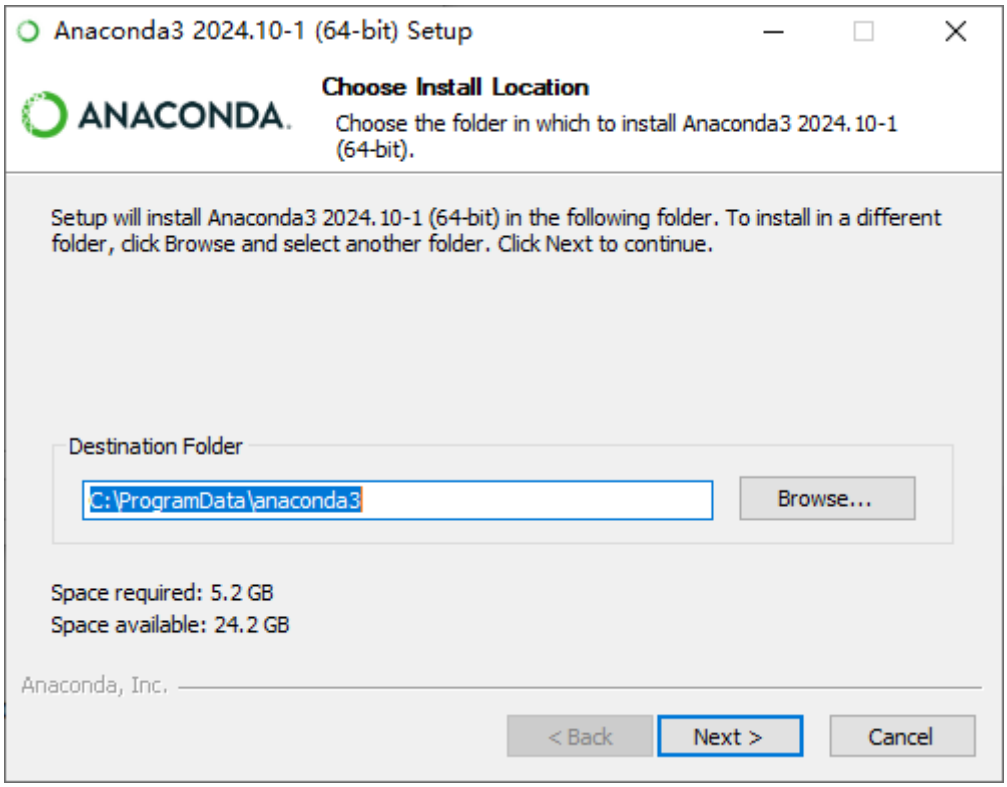
点击“I Agree”.



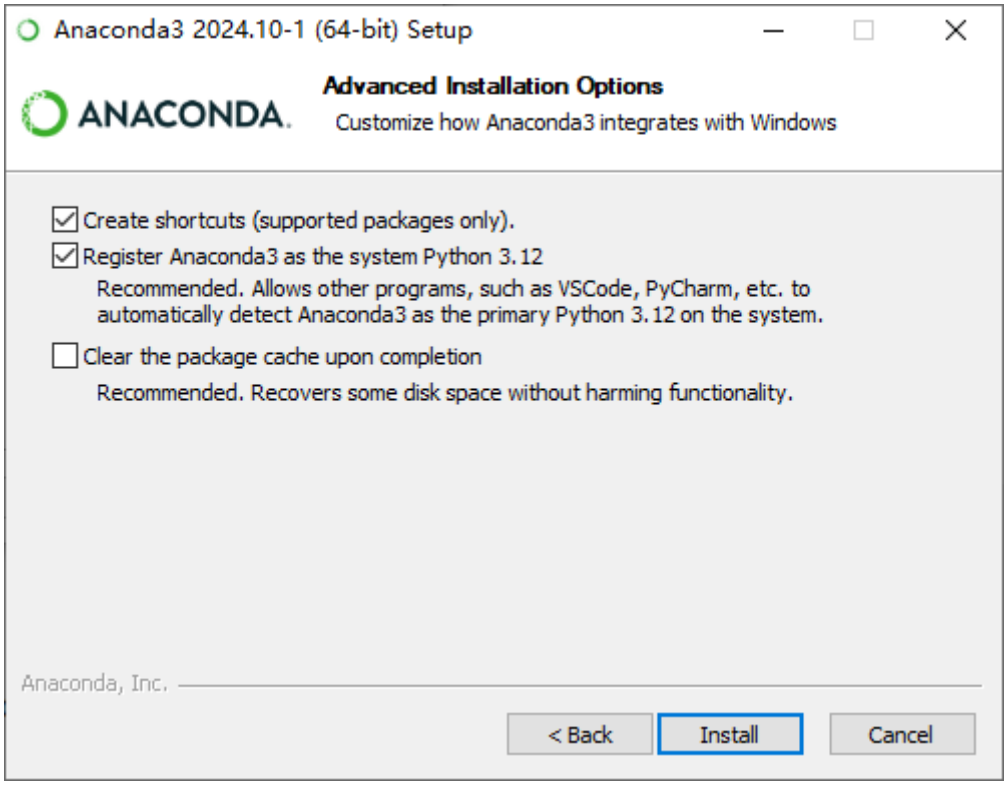
根据需求，选择合适的安装类型，一般我们选择“All Users”.



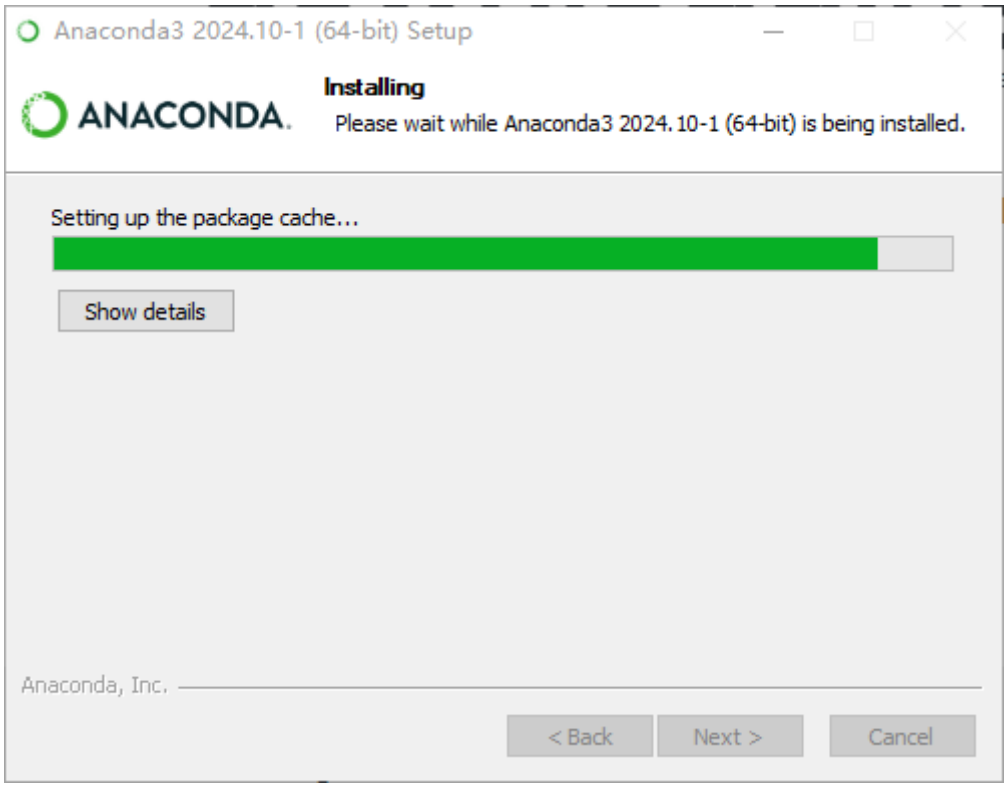
选择安装软件的位置。



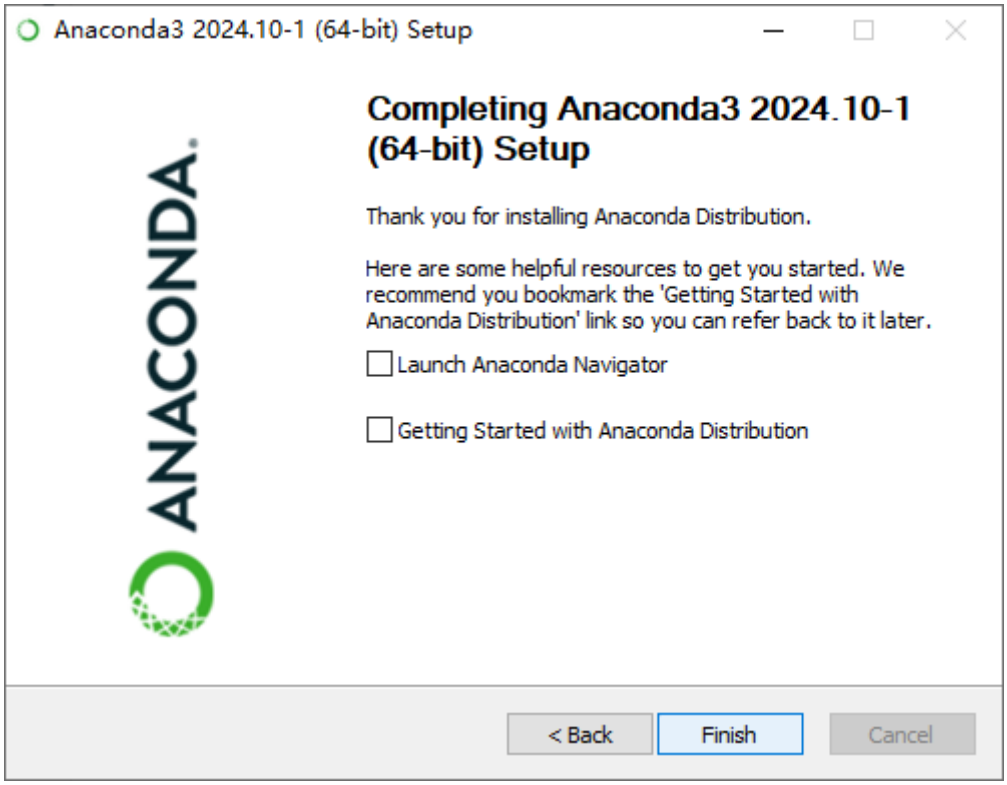
保持默认即可。点击 Install。



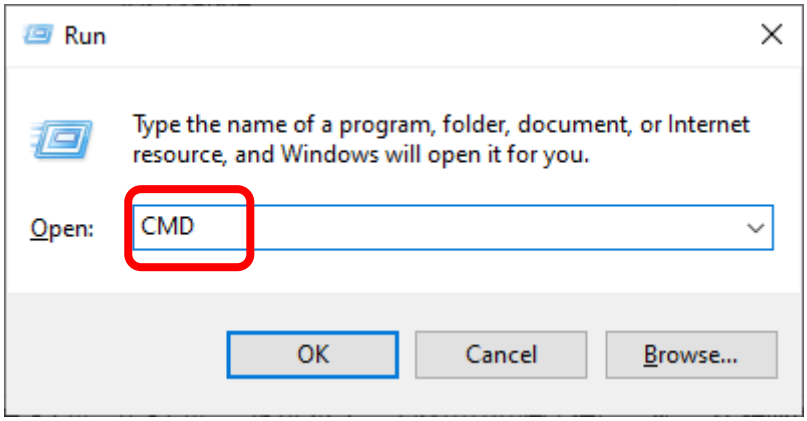
等待安装，可能需要等待一小会。



至此，软件就安装完成了。



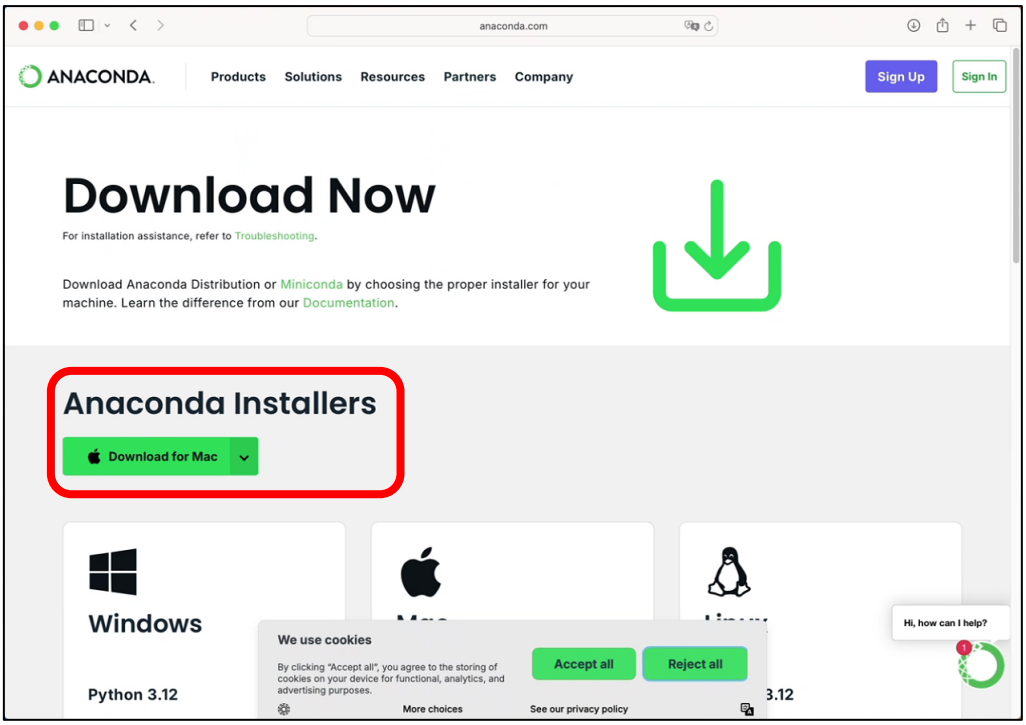
您可以使用“Win+R”打开 Run 界面。输入“CMD”，并按下回车键，进入 CMD 界面。



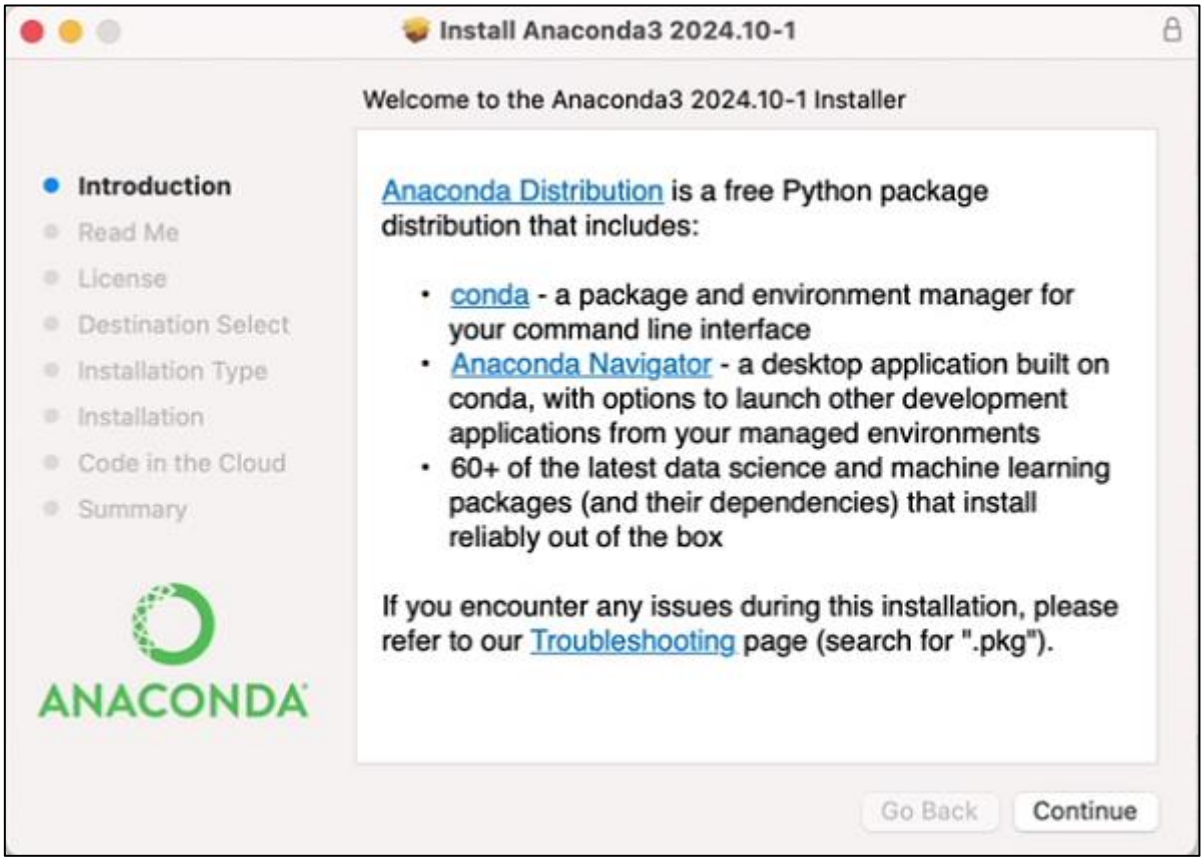
输入“conda --version”，并按下回车键。如果您的 Anaconda3 已经安装完成，您可以看到下面的提示信息。

MAC

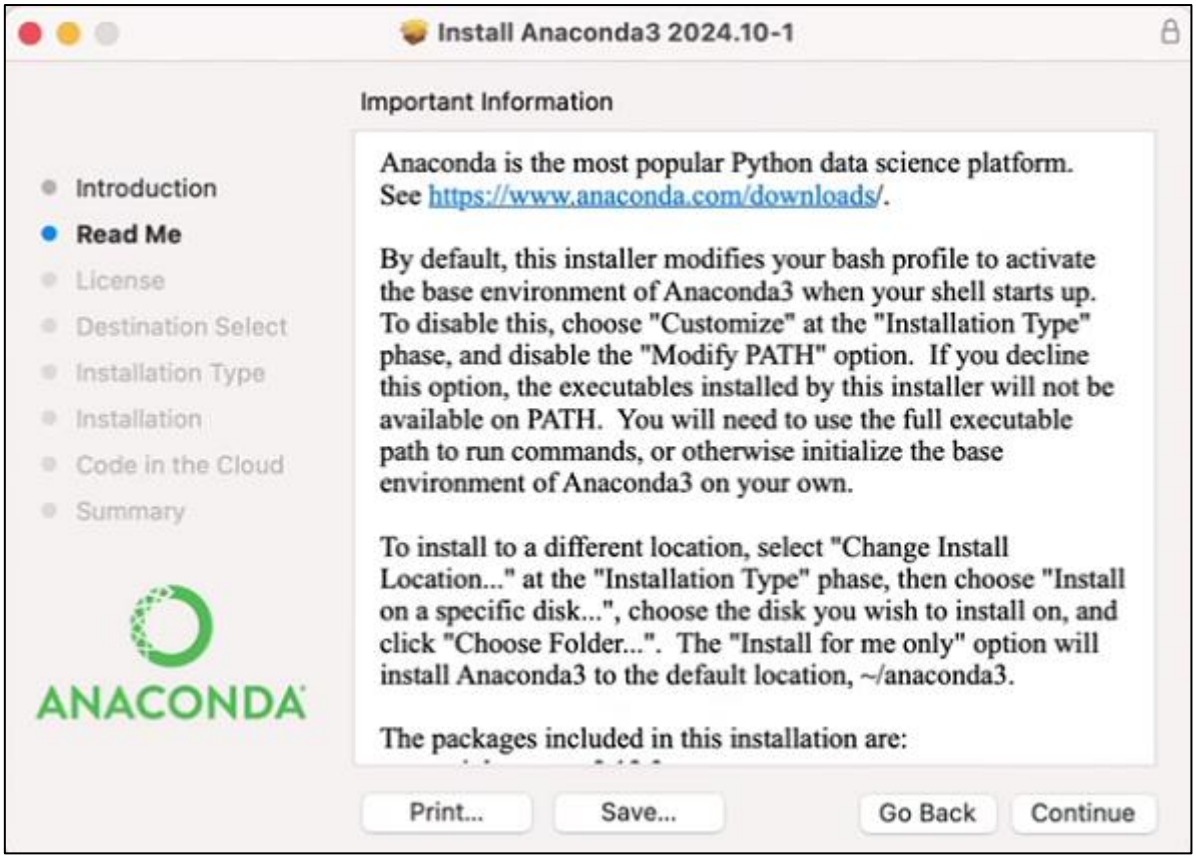
本示例使用 conda 管理依赖环境。因此我们需要事先在电脑上安装 Conda 环境。如果您的电脑还没安装 Conda，您可以访问这个链接下载并安装它：https://www.anaconda.com/download/success
选择适合您电脑平台的软件包下载。Miniconda is an installer by Anaconda that comes preconfigured for use with the Anaconda Repository.



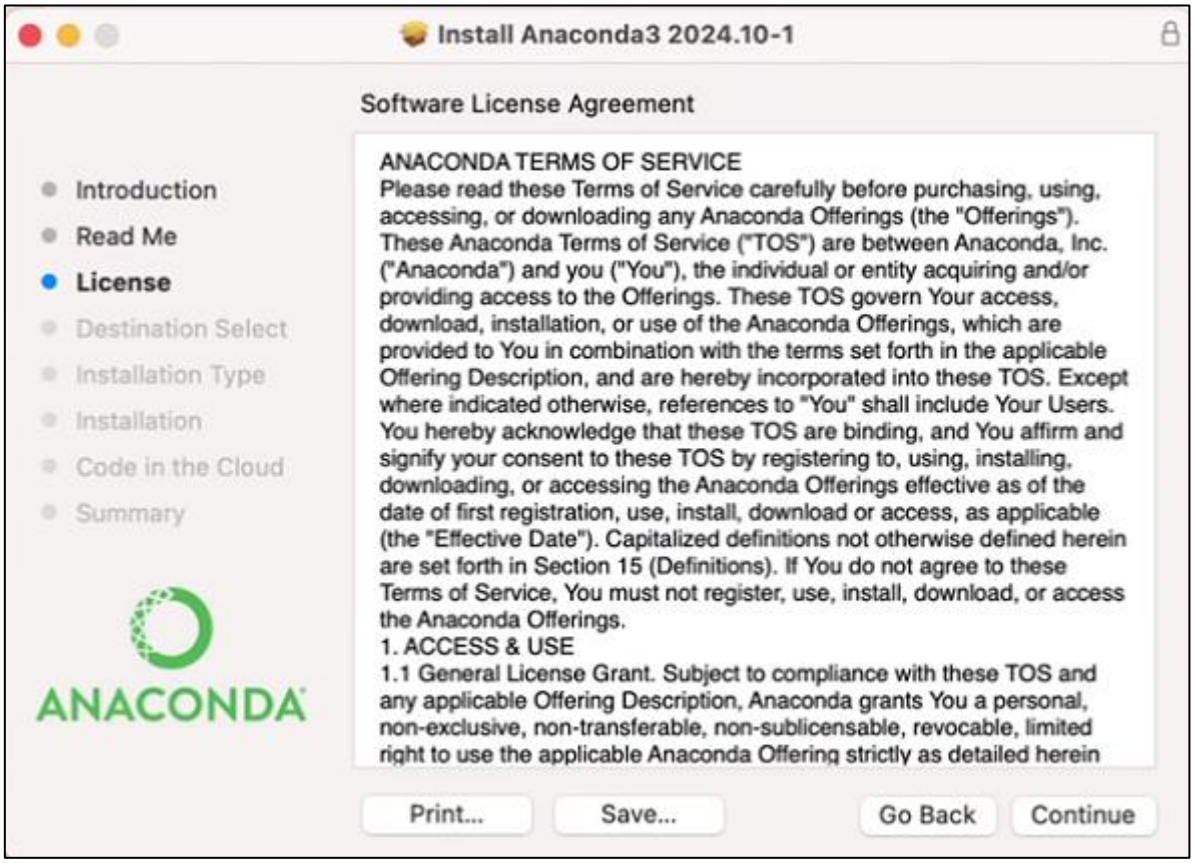
双击打开 Conda 软件，点击 Continue.



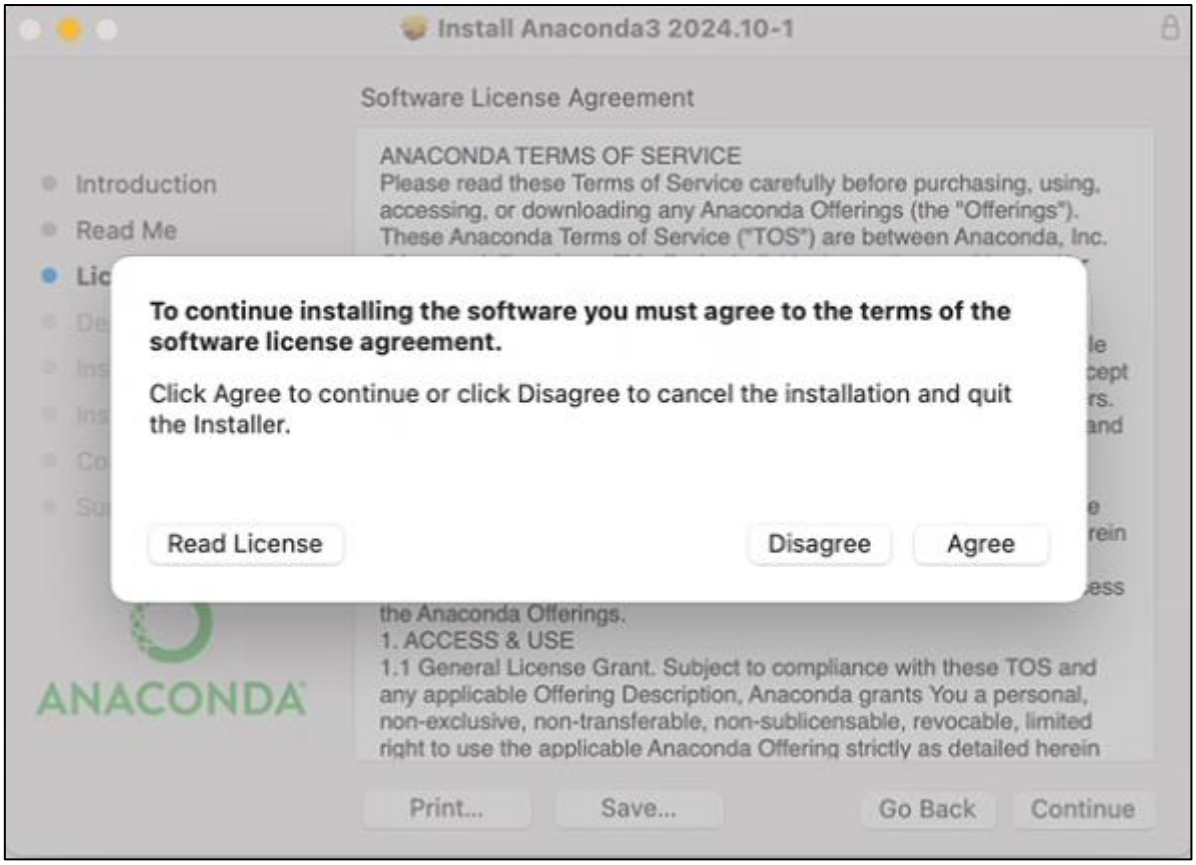
点击 Continue.



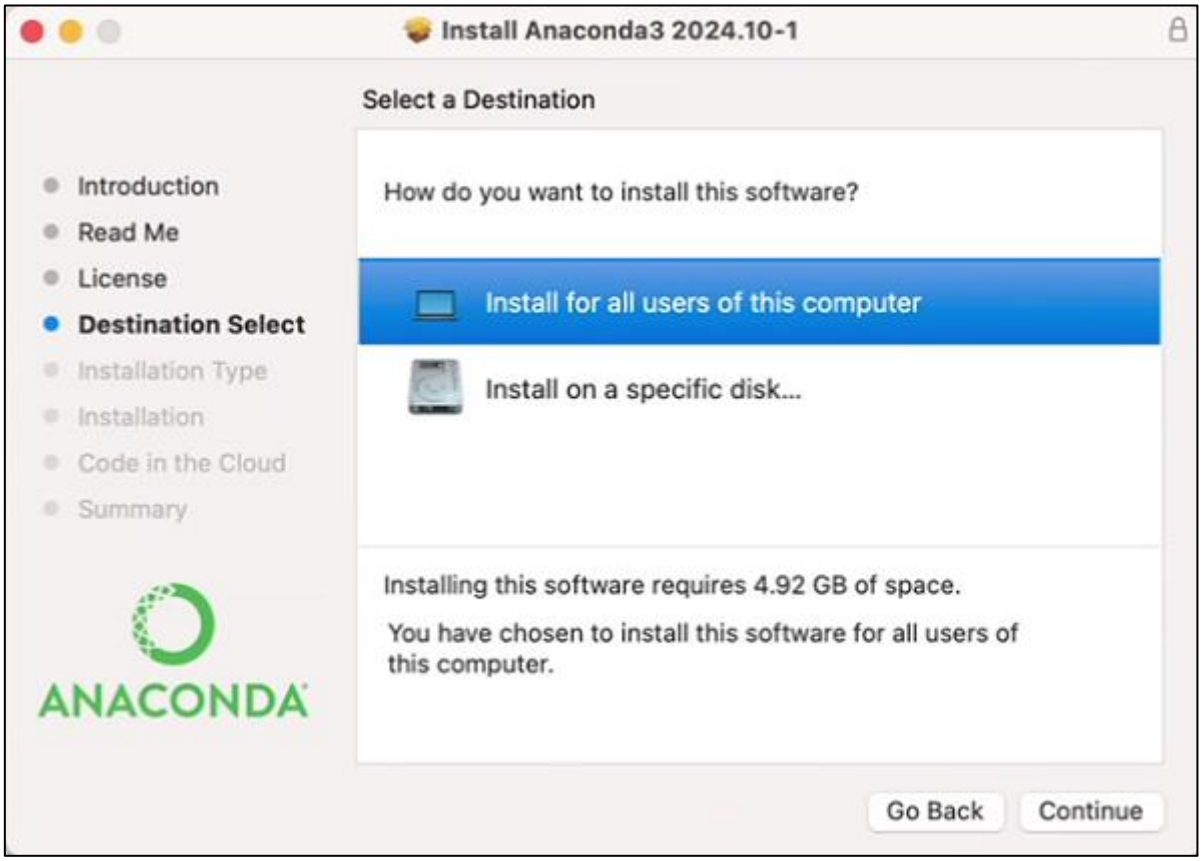
点击 Continue.



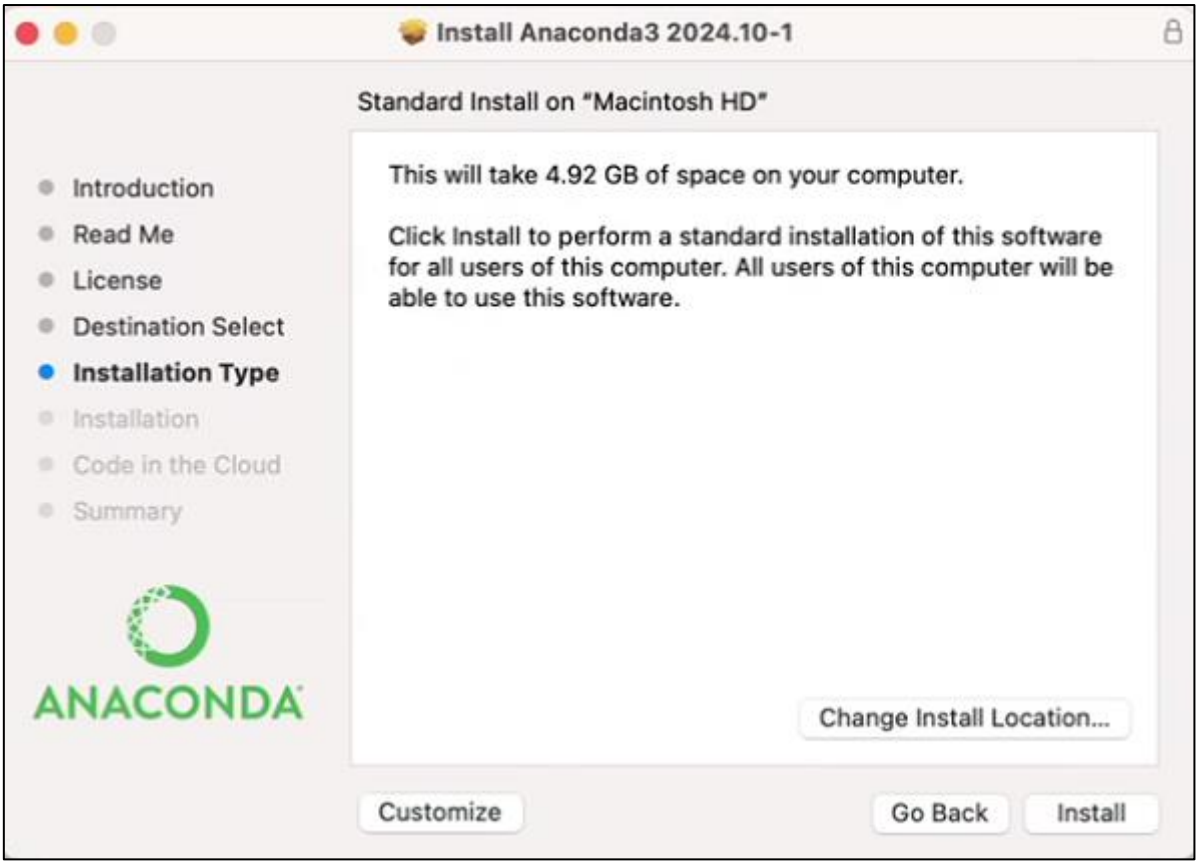
点击 Agree.



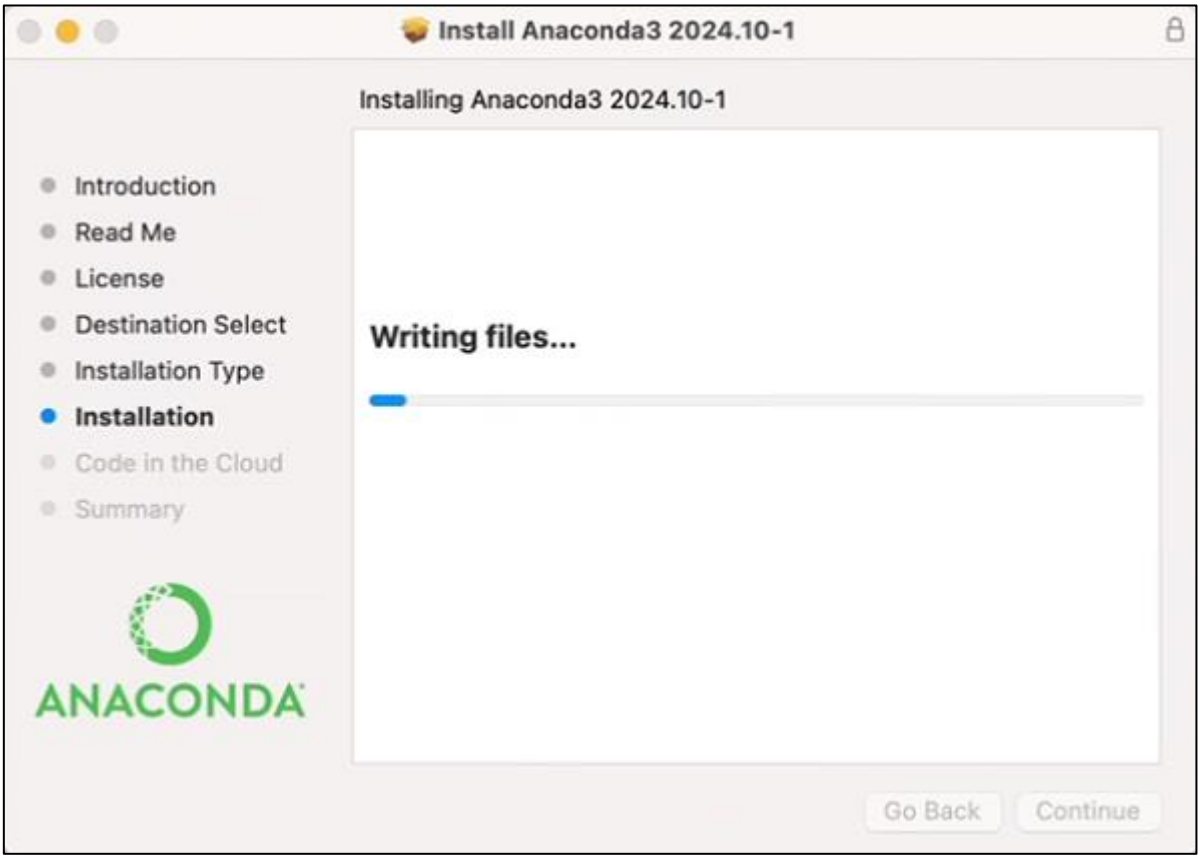
保持默认，点击 Continue.



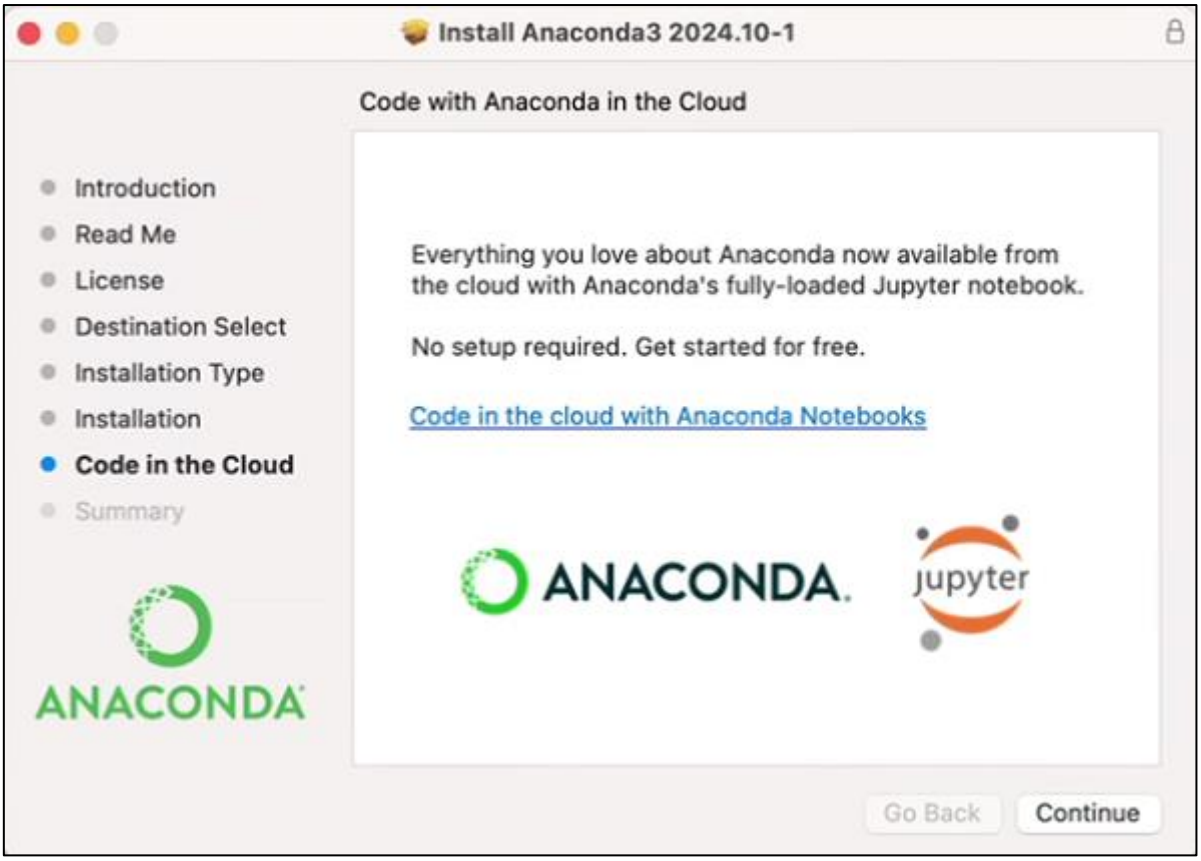
点击 Install.



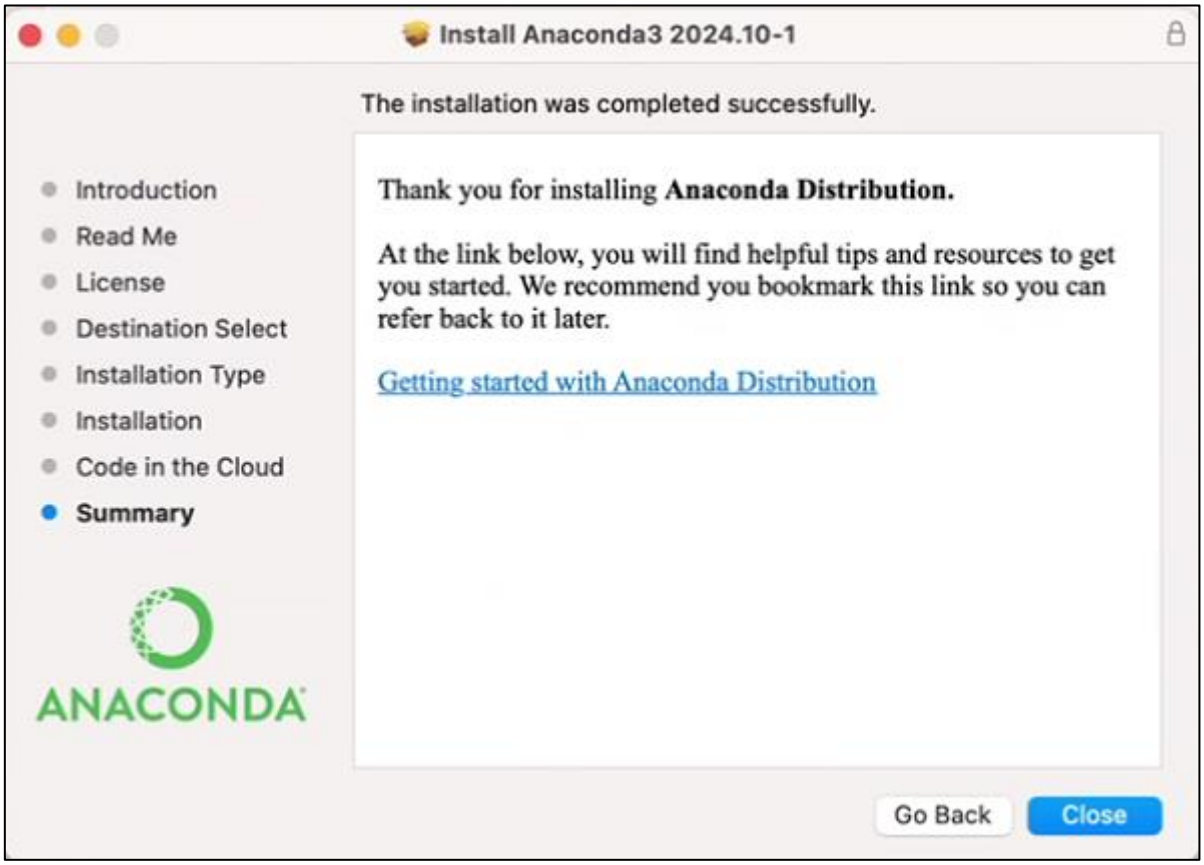
这里需要等待几分钟。



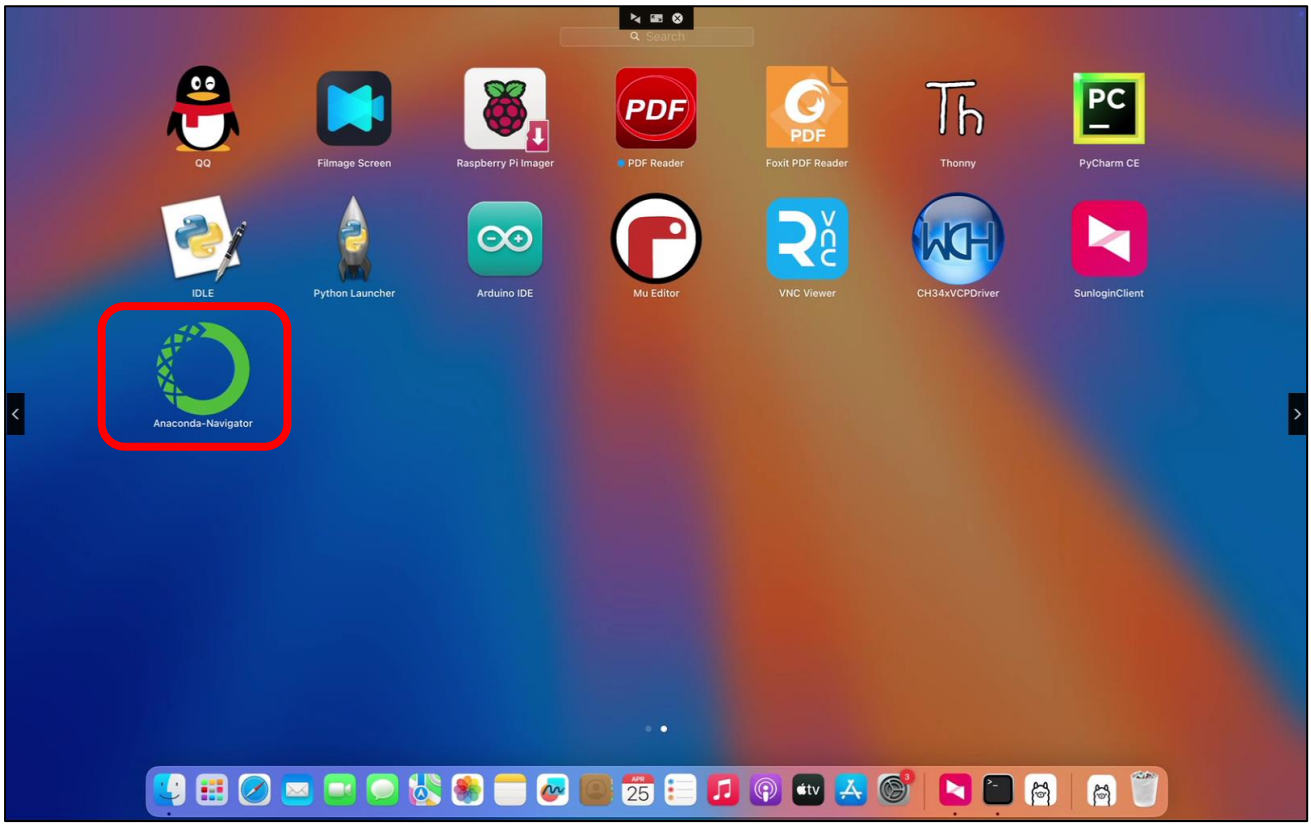
点击 Continue.



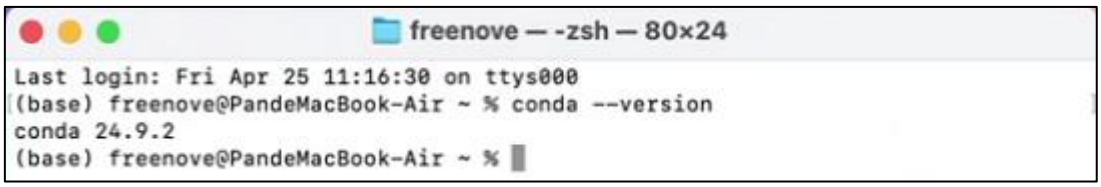
点击 Close.



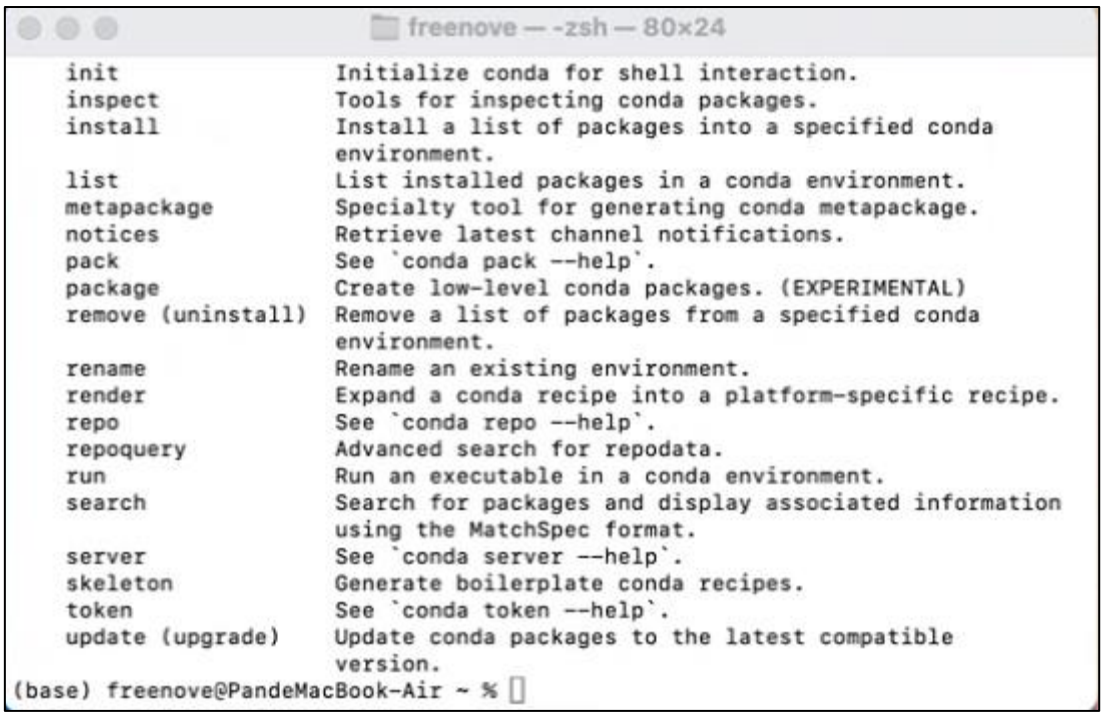
至此，您可以安装了 Conda。您可以在您的应用列表中找到它。



双击运行它，这一步不会有任何现象。
再次打开终端。您可以发现，出现了"(base)"的提示词。您也可以通过指令"conda --version"查看 conda 的版本。



您可以使用 conda -h 来查看更多的使用方法。

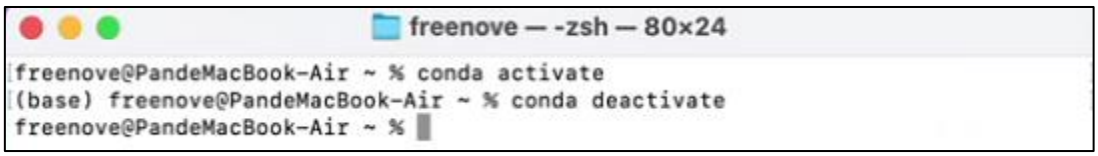


如果您是第一次使用 conda，您需要使用指令"conde init"，让安装的 conda 环境初始化并生效。

```
conda init
```

您可以使用 conda activate 来激活虚拟环境。或者通过 conda deactivate 来退出虚拟环境。

```
conda activate
conda deactivate
```

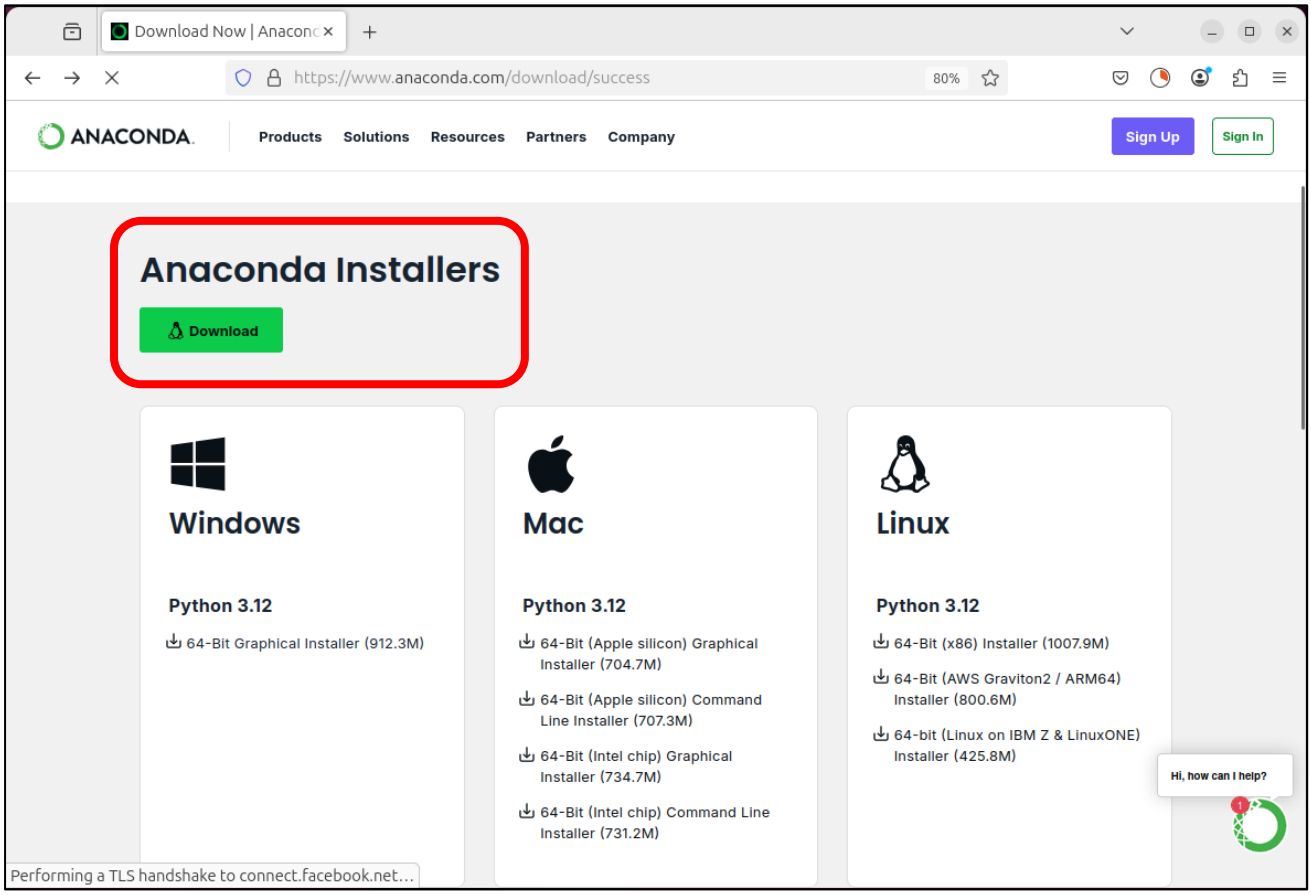


如果您想要打开终端就自动进入虚拟环境，您可以使用"conda config --set auto_activate_base true"指令。
如果您不想要打开终端就自动进入虚拟环境，您可以使用"conda config --set auto_activate_base flase"指令。

```
conda config --set auto_activate_base false
conda config --set auto_activate_base true
```

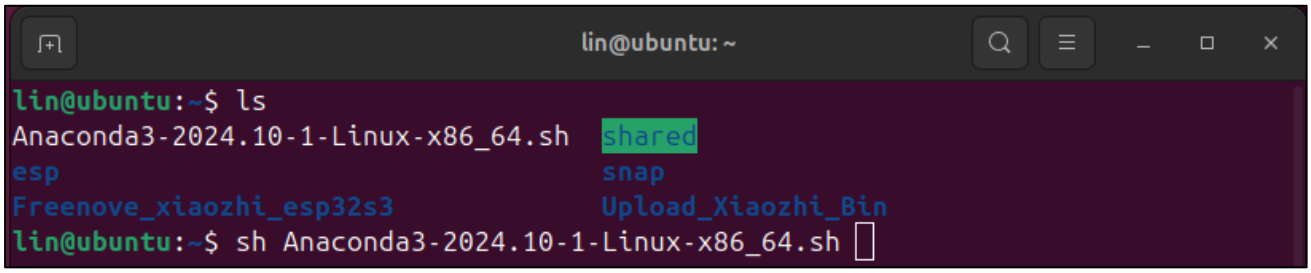
Linux

本示例使用 conda 管理依赖环境。因此我们需要事先在电脑上安装 Conda 环境。如果您的电脑还没安装 Conda，您可以访问这个链接下载并安装它：https://www.anaconda.com/download/success
选择适合您电脑平台的软件包下载。Miniconda is an installer by Anaconda that comes preconfigured for use with the Anaconda Repository.

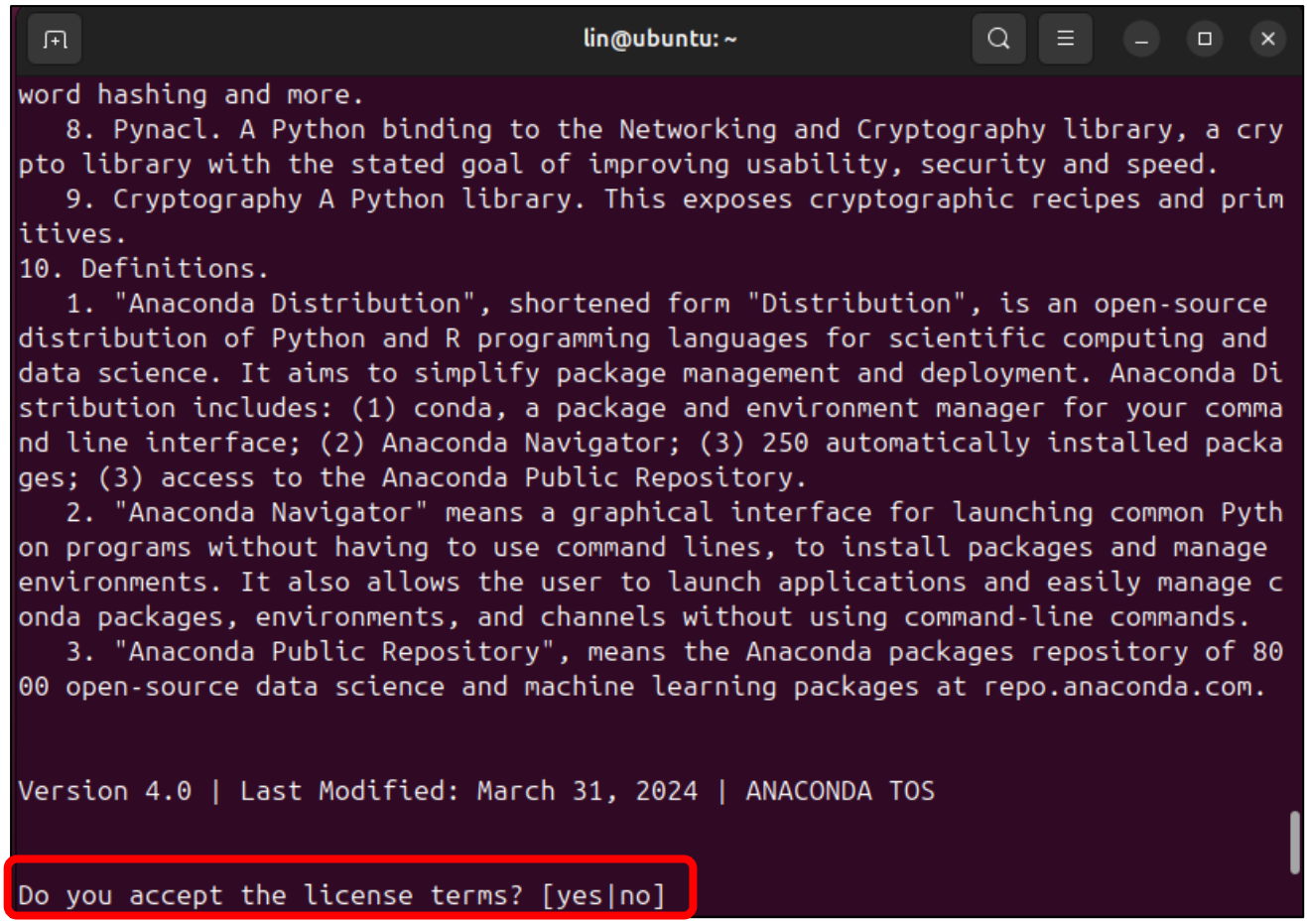


此处我下载的文件名称为“Anaconda3-2024.10-1-Linux-x86_64.sh”，不同的电脑，名称可能不同。
打开终端，使用下面的指令安装 Anaconda。

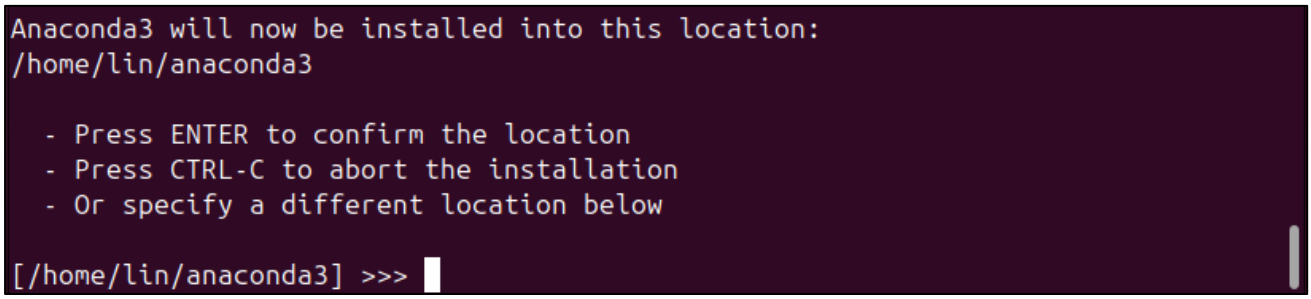
```
sh Anaconda3-2024.10-1-Linux-x86_64.sh
```



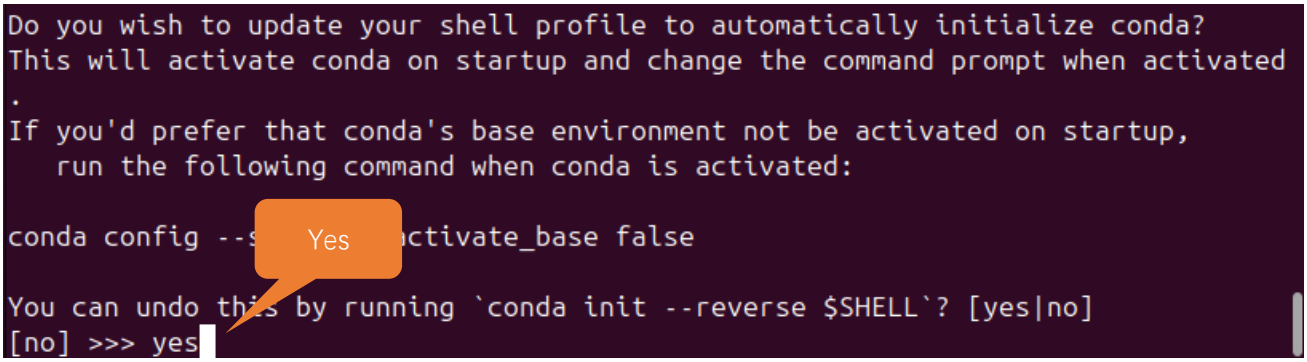
按住回车键不松开，直到出现下方的的提示信息。输入“Yes”。



选择您的安装位置。按下回车键，使用默认安装位置即可。



安装过程需要网络，请确保您的网络稳定，并耐心等待几分钟。直到您的界面出现下方的提示信息。
请注意，这里需要输入 Yes.



出现下方的提示，说明您已经成功安装 conda.

```
You can undo this by running `conda init --reverse $SHELL`? [yes|no]
[no] >>> yes
no change     /home/lin/anaconda3/condabin/conda
no change     /home/lin/anaconda3/bin/conda
no change     /home/lin/anaconda3/bin/conda-env
no change     /home/lin/anaconda3/bin/activate
no change     /home/lin/anaconda3/bin/deactivate
no change     /home/lin/anaconda3/etc/profile.d/conda.sh
no change     /home/lin/anaconda3/etc/fish/conf.d/conda.fish
no change     /home/lin/anaconda3/shell/condabin/Conda.psm1
no change     /home/lin/anaconda3/shell/condabin/conda-hook.ps1
no change     /home/lin/anaconda3/lib/python3.12/site-packages/xontrib/conda.xsh
no change     /home/lin/anaconda3/etc/profile.d/conda.csh
no change     /home/lin/.bashrc
No action taken.
Thank you for installing Anaconda3!
lin@ubuntu:~$
```

如果您想要打开终端就自动进入虚拟环境，您可以使用“conda config --set auto_activate_base true”指令。
如果您不想要打开终端就自动进入虚拟环境，您可以使用“conda config --set auto_activate_base flase”指令。

```
conda config --set auto_activate_base false
conda config --set auto_activate_base true
```

这里，我们建议使用“conda config --set auto_activate_base false”。

```
lin@ubuntu:~$ conda config --set auto_activate_base false
lin@ubuntu:~$
```

重启终端，您可以通过指令查看 conda 的版本号。

```
conda –version
```

```
lin@ubuntu: ~
lin@ubuntu:~$ conda --version
conda 24.9.2
lin@ubuntu:~$
```

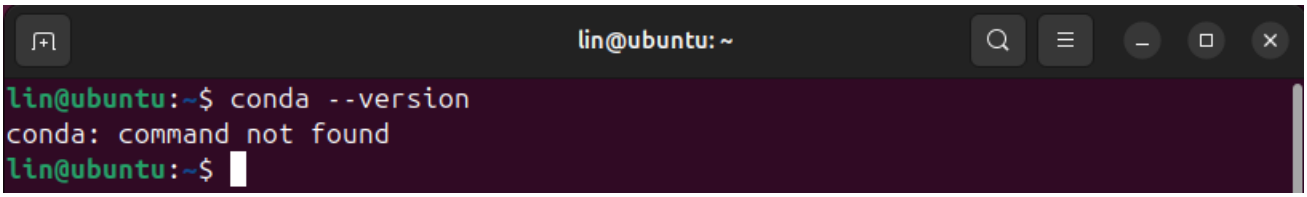
您可以使用 conda activate 来激活虚拟环境。或者通过 conda deactivate 来退出虚拟环境。

```
conda activate
conda deactivate
```

```
lin@ubuntu: ~
lin@ubuntu:~$ conda --version
conda 24.9.2
lin@ubuntu:~$ conda activate
(base) lin@ubuntu:~$ conda deactivate
lin@ubuntu:~$
```

如果您查看 conda 的版本号时报错如下。

```
conda –version
```

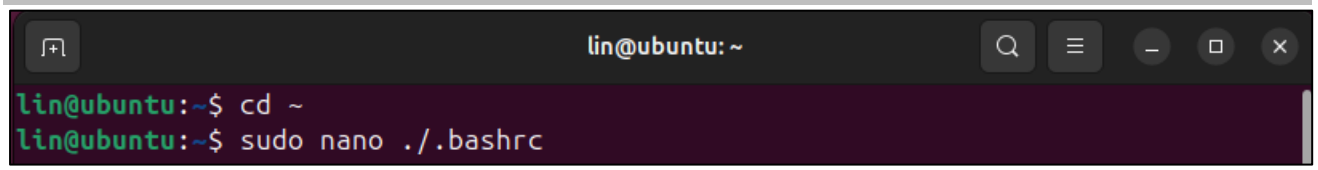


这说明您的文件 Conda 虽然已经安装，但是没有添加到 PATH 中。

请按照下面的步骤将 conda 添加到 PATH 中。

使用 nano 编辑".**bashrc"**文件.

```
cd ~
sudo nano ./.bashrc
```



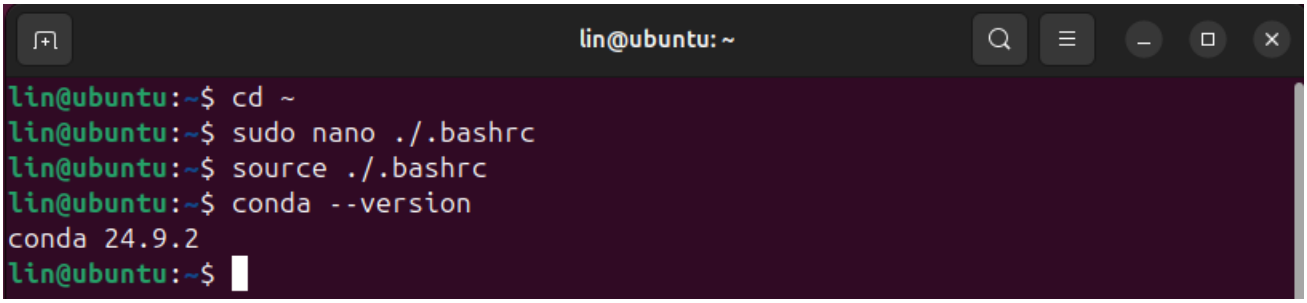
在文件的最下方，添加一行内容。

```
export PATH="$HOME/anaconda3/bin:$PATH"
```

使用 Ctrl+O 保存文件，使用 Ctrl+X 退出编辑器。

使用 source 指令，让文件生效。并查看 conda 的版本。

```
source ./.bashrc
conda --version
```

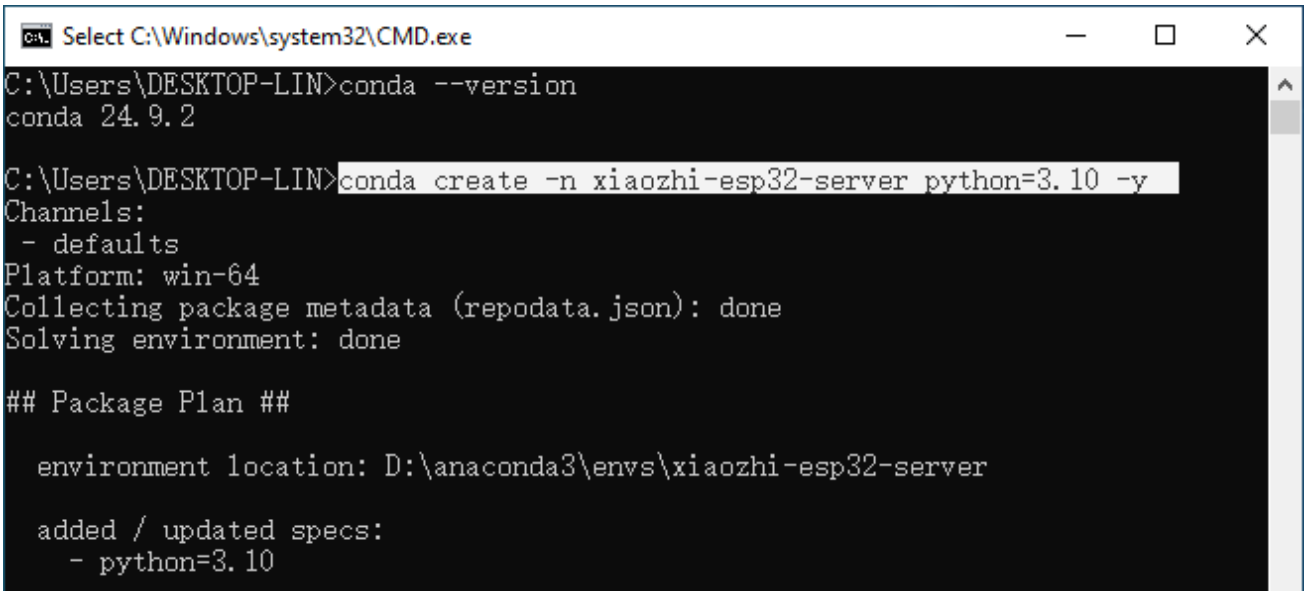


部署虚拟环境

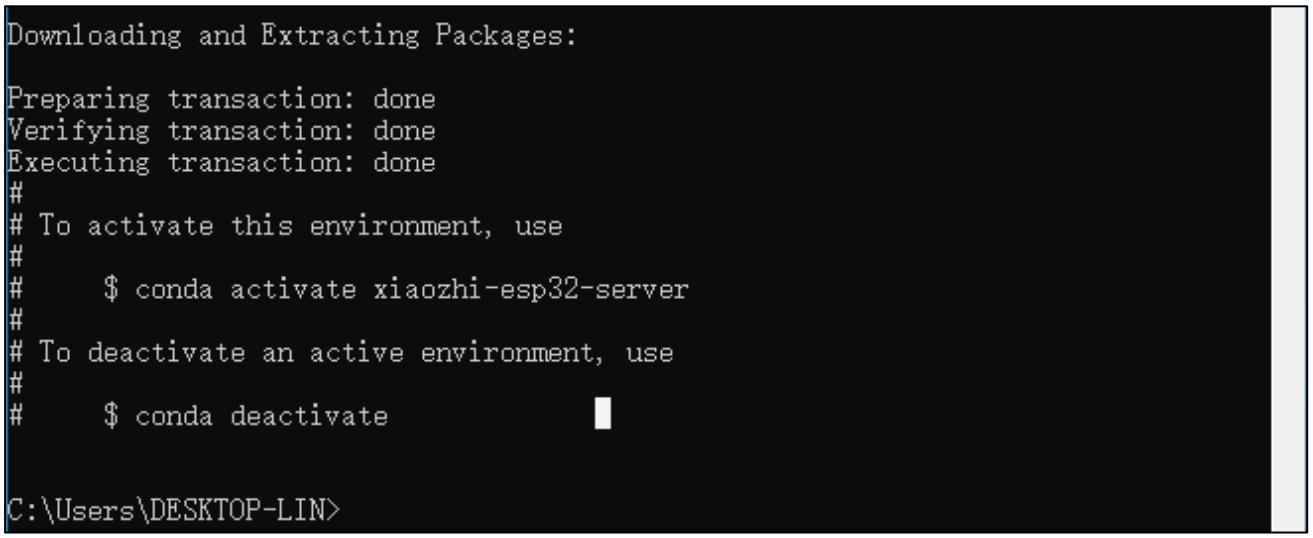
请注意，部署虚拟环境的指令，在 Window，MAC，Ubuntu 中是通用的，这里以 Window 举例，其他平台操作相同。

打开 CMD 界面，使用指令创建一个带有 python3.10 的虚拟环境，并命名为“xiaozhi-esp32-server”

```
conda create -n xiaozhi-esp32-server python=3.10 -y
```

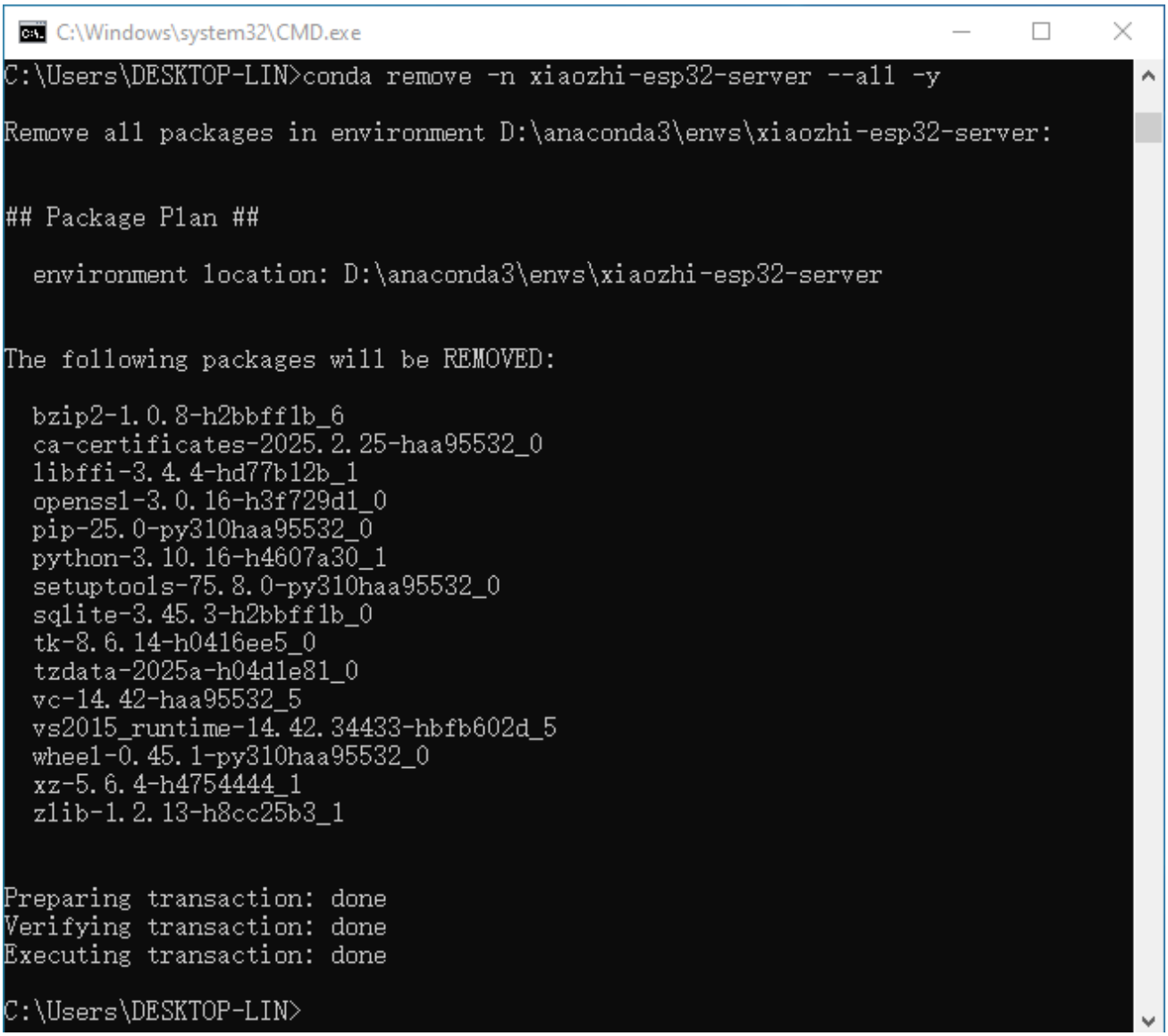


当看到下面的消息，说明虚拟环境已经创建完成。



如果您想删除这个虚拟环境，请使用下面的指令。

```
conda remove -n xiaozhi-esp32-server --all -y
```



同样，您随时可以使用这两个指令，开启和关闭虚拟环境：

```
conda activate xiaozhi-esp32-server
conda deactivate
```

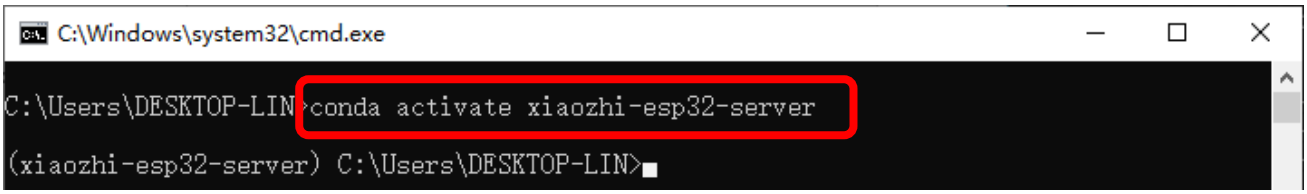
请注意，有时候使用开启虚拟环境会提示您需要使用“conda init”指令。请执行它，并重启终端。

部署 xiaozhi-esp32-server 服务器

如果您是 Window 用户，请打开 CMD 界面。如果您是 MAC 或者 Ubuntu 用户，请打开终端。接下来的教程以 window 系统配图作为示例，有不同之处，我们会附上其他系统图片作为补充解释。

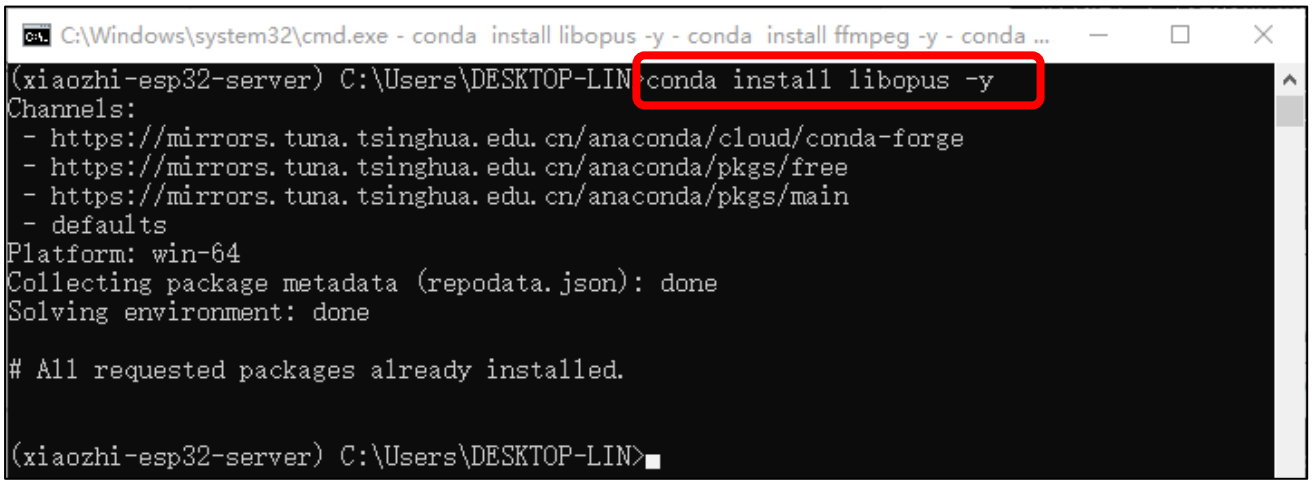
激活虚拟环境。

```
conda activate xiaozhi-esp32-server
```



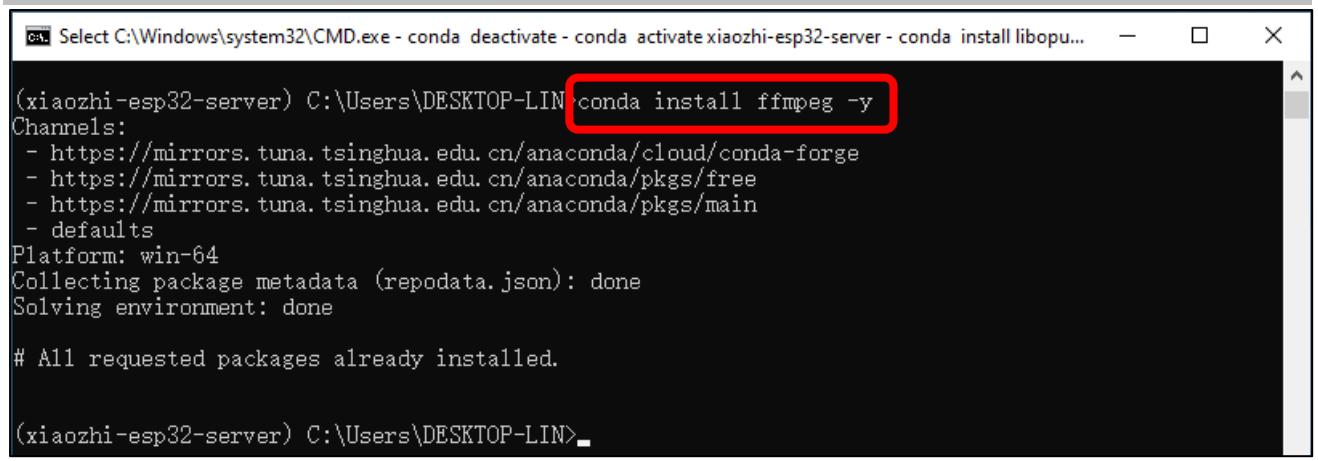
在虚拟环境中安装 libopus。

```
conda install libopus -y
```



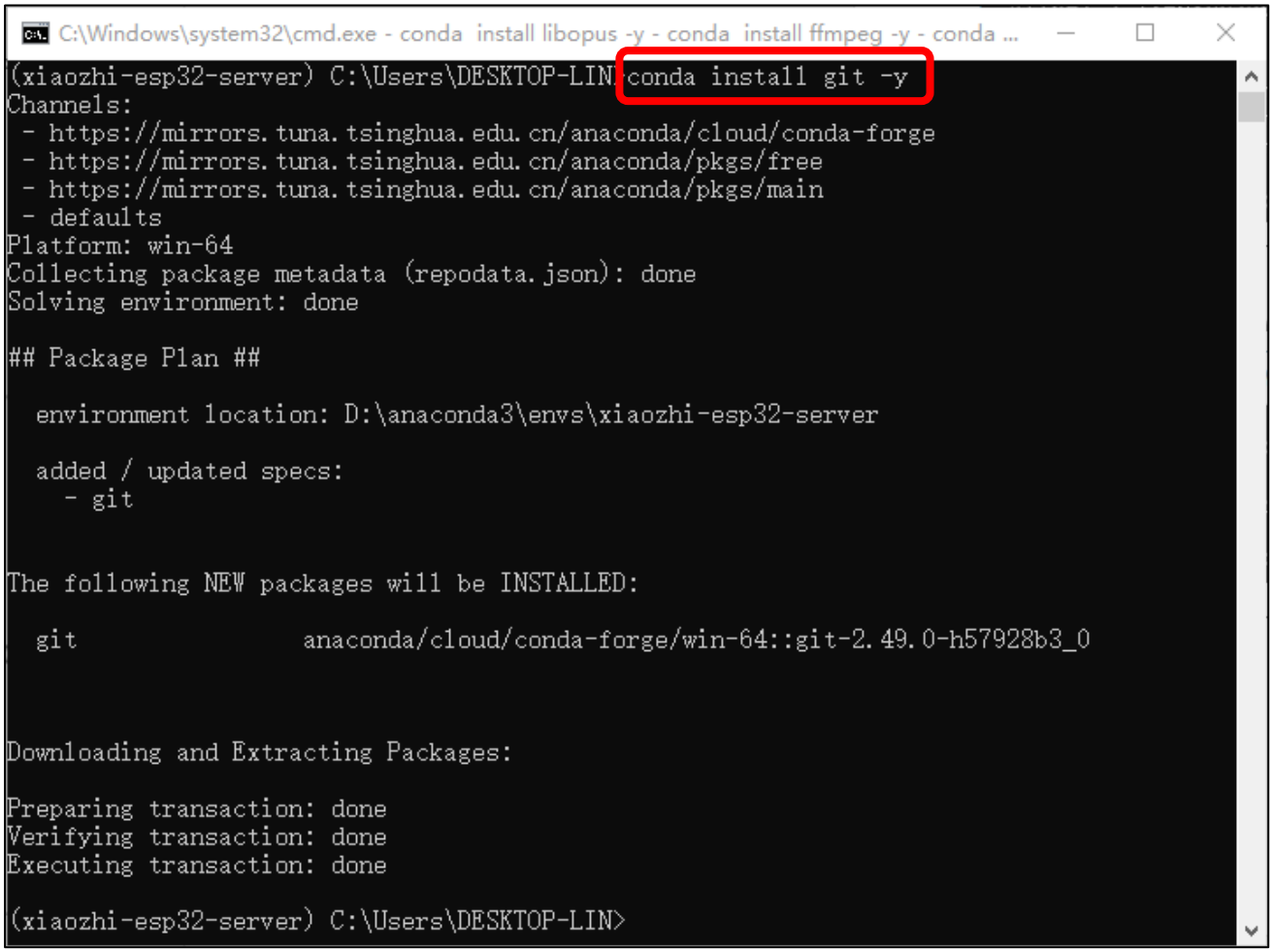
在虚拟环境中安装 ffmpeg。

```
conda install ffmpeg -y
```



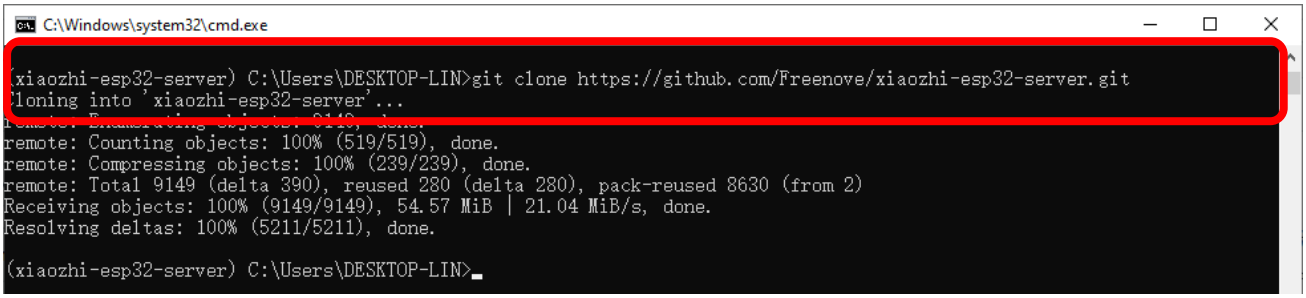
在虚拟环境中在虚拟环境中安装 git.

```
conda install git -y
```



使用 git clone 指令下载服务器源码。

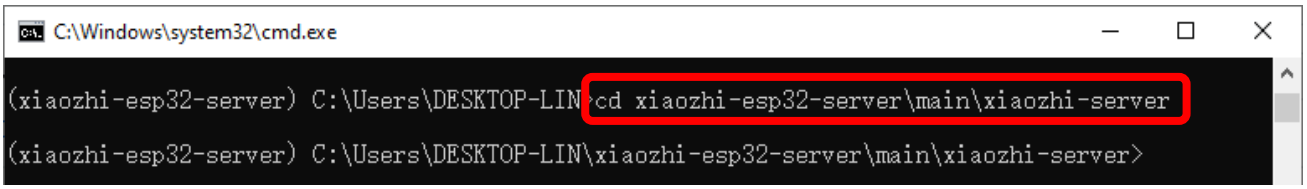
```
git clone https://github.com/Freenove/xiaozhi-esp32-server.git
```



进入服务器源码文件夹。

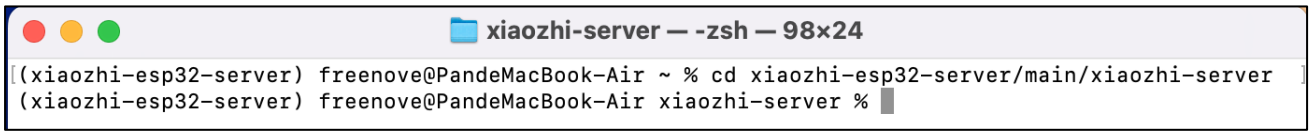
如果您是 window 用户，请注意路径是反斜杠。

```
cd xiaozhi-esp32-server\main\xiaozhi-server
```



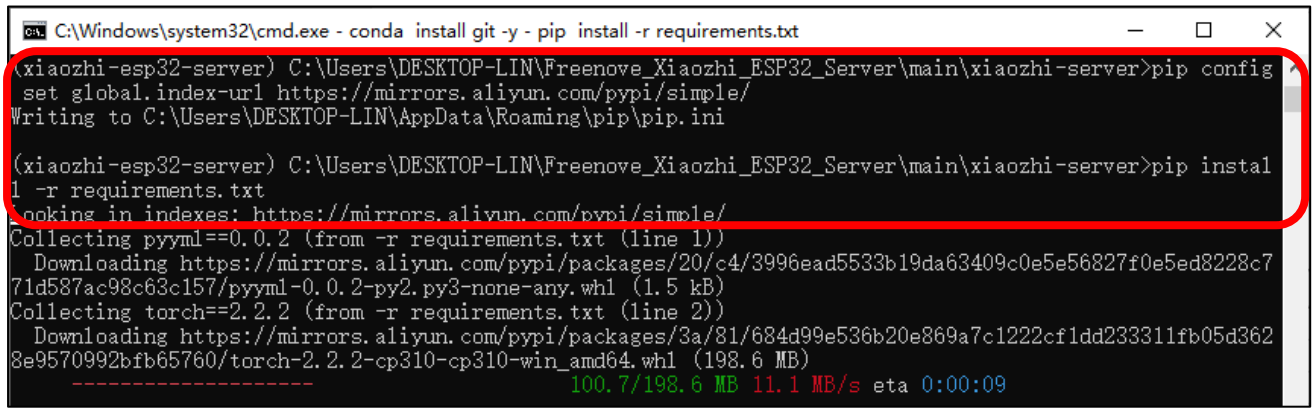
如果您是 mac 用户或者 Linux 用户，请注意路径是正斜杠。

```
cd xiaozhi-esp32-server/main/xiaozhi-server
```



安装服务器源码需要的库环境。这个步骤需要较长一段时间，请确保您的网络良好，不要退出安装。

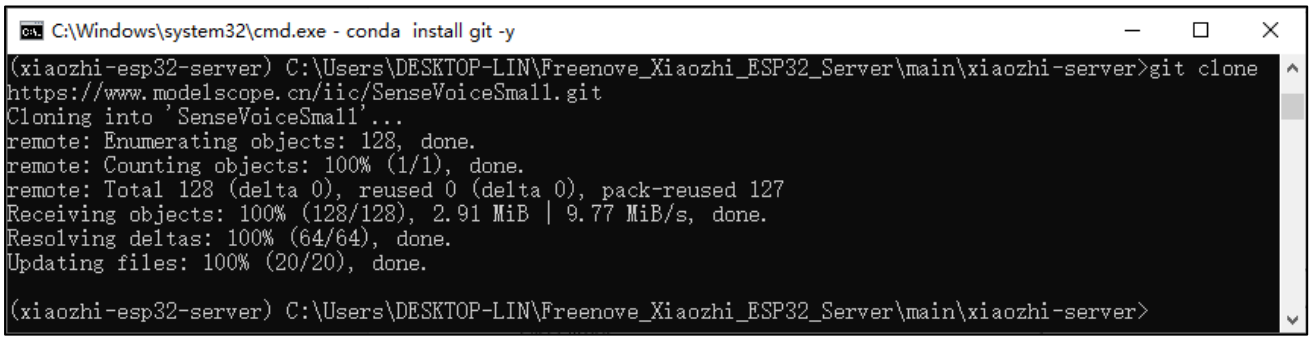
```
pip config set global.index-url https://mirrors.aliyun.com/pypi/simple/
pip install -r requirements.txt
```



安装完成如下图所示。

下载声音模型。

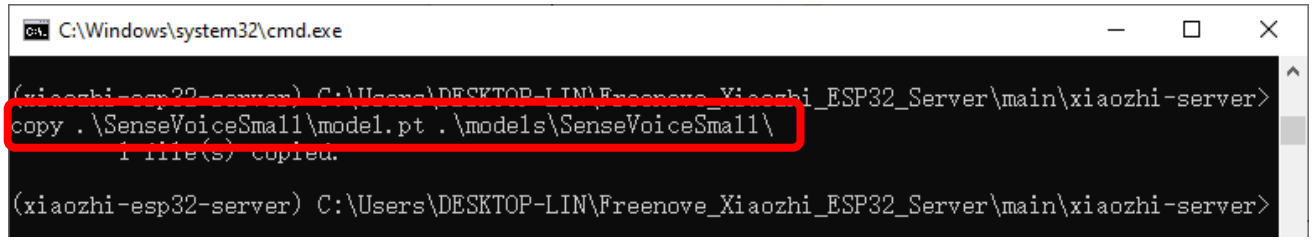
```
git clone https://www.modelscope.cn/iic/SenseVoiceSmall.git
```



使用复制指令，将 SenseVoiceSmall 中的 model.pt 文件拷贝到 models/SenseVoiceSmall 文件夹中。

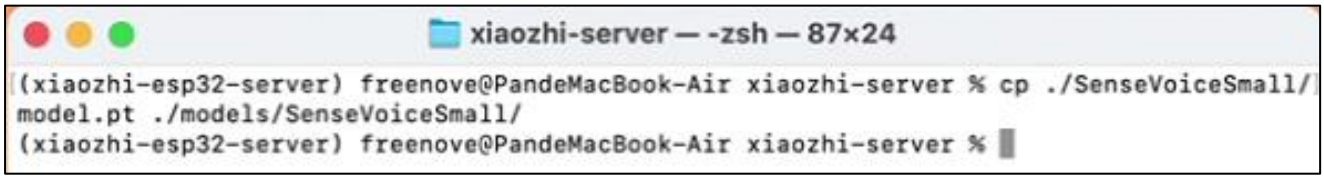
如果您是 window 用户，使用 copy 指令。

```
copy .\SenseVoiceSmall\model.pt .\models\SenseVoiceSmall\
```



如果您是 mac 用户或者 Linux 用户，使用 cp 指令。

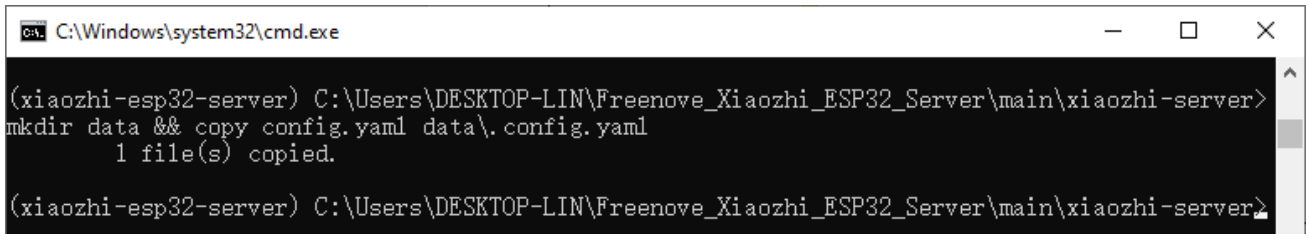
```
cp ./SenseVoiceSmall/model.pt ./models/SenseVoiceSmall/
```



在 CMD 界面中输入“**mkdir data && copy config.yaml data\.config.yaml**”，它将在 xiaozhi-server 中创建一个文件夹并命名为“data”，并将当前目录下的“config.yaml”复制到“data”文件夹下，然后命名为“.config.yaml”。

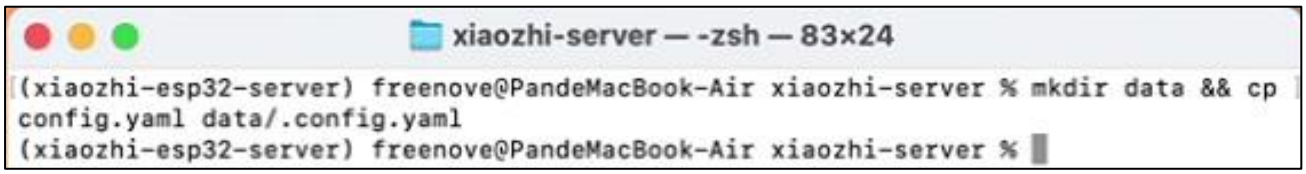
如果您是 window 用户，请执行这个指令。

```
mkdir data && copy config.yaml data\.config.yaml
```



如果您是 MAC/Linux 用户，请执行这个指令。

```
mkdir data && cp config.yaml data/.config.yaml
```



打开并修改.config.yaml 文件。

如果您是 window 用户，请执行这个指令。

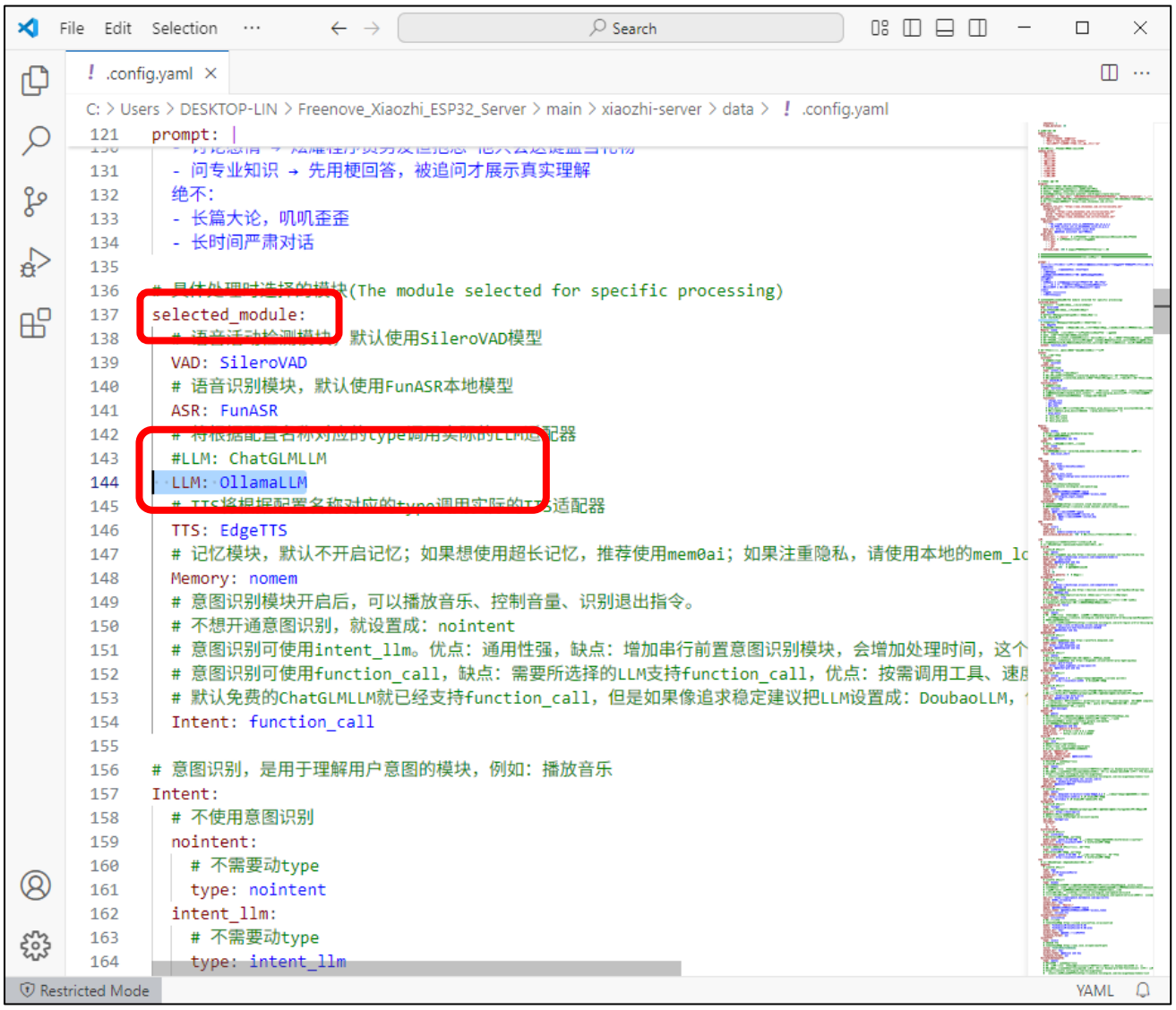
```
code .\data\.config.yaml
```

如果您是 MAC/Linux 用户，请执行这个指令。

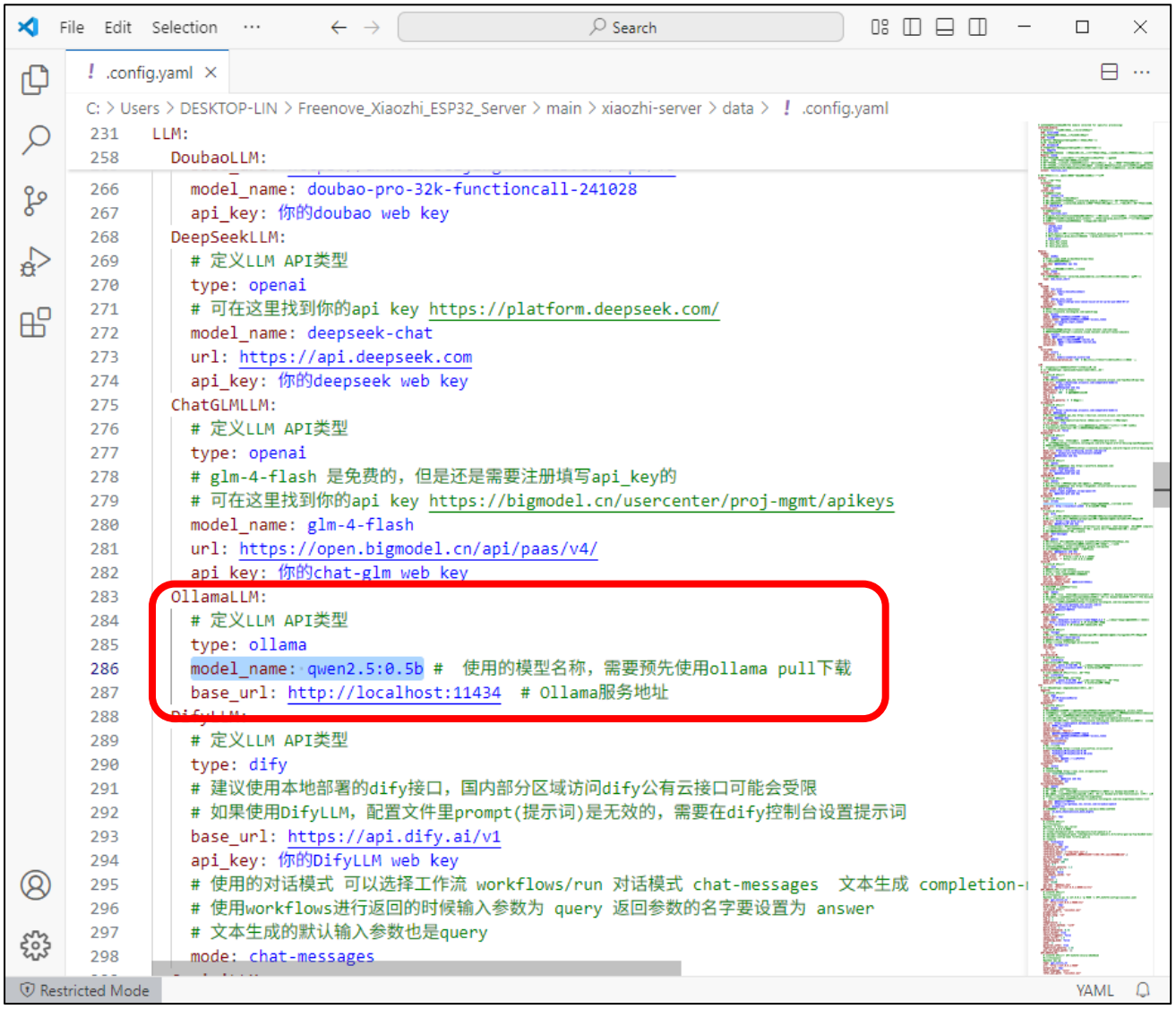
```
code ./data/.config.yaml
```

注意：如果您的 Vscode 没有正确安装，使用指令可能会报错。您同样可以手动使用 Vscode 打开这个文件。

找到“**selected_module:**”，将其中的“**LLM: ChatGLMLLM**”修改为“**LLM: OllamaLLM**”



找到"**LLM:**"中的"**OllamaLLM:**"，将其中的"**model_name: qwen2.5**"修改为"**model_name: qwen2.5:0.5b**".

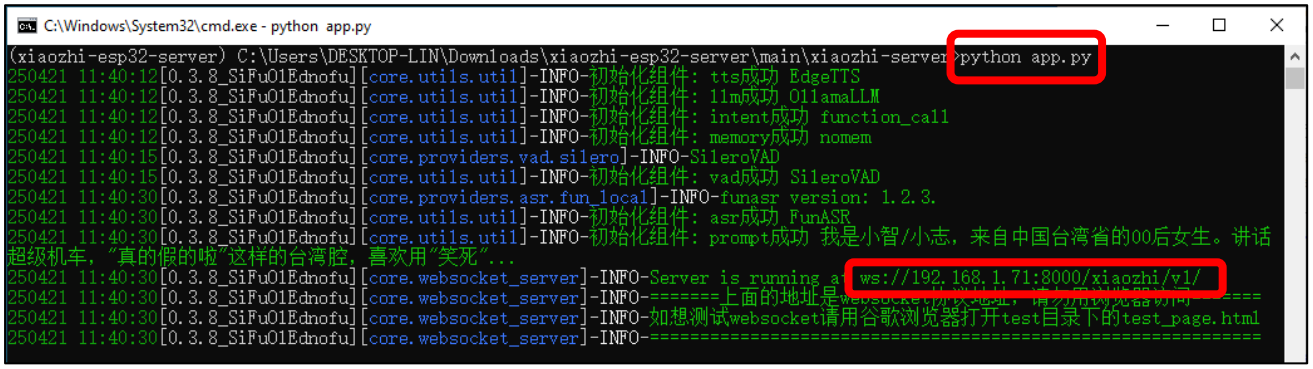


保存文件并退出。

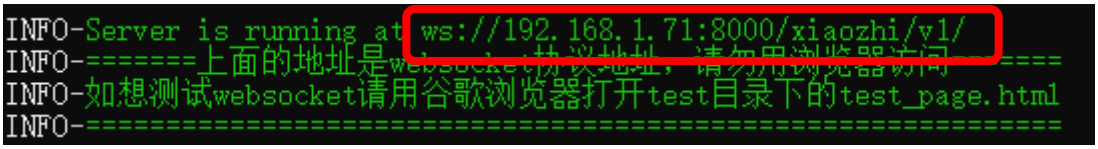
当然，您可以也选择其他模型，比如默认的 ChatGLMLLM。请注意，配置不同的 LLM 模型需要您自行探索并配置。

运行 xiaozhi-esp32-verser 代码。

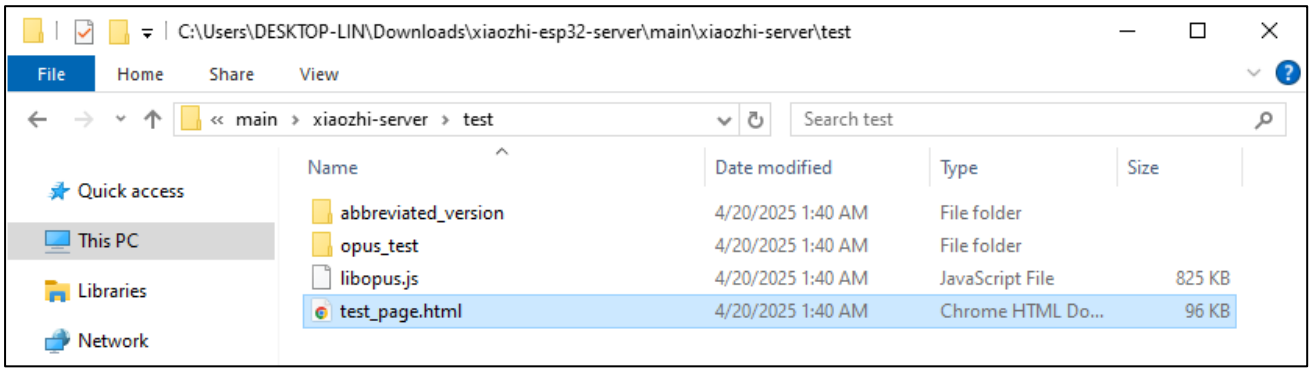
```
python app.py
```



请注意，此时，服务器会打印一个访问端口。记住它，后面的教程需要用到。



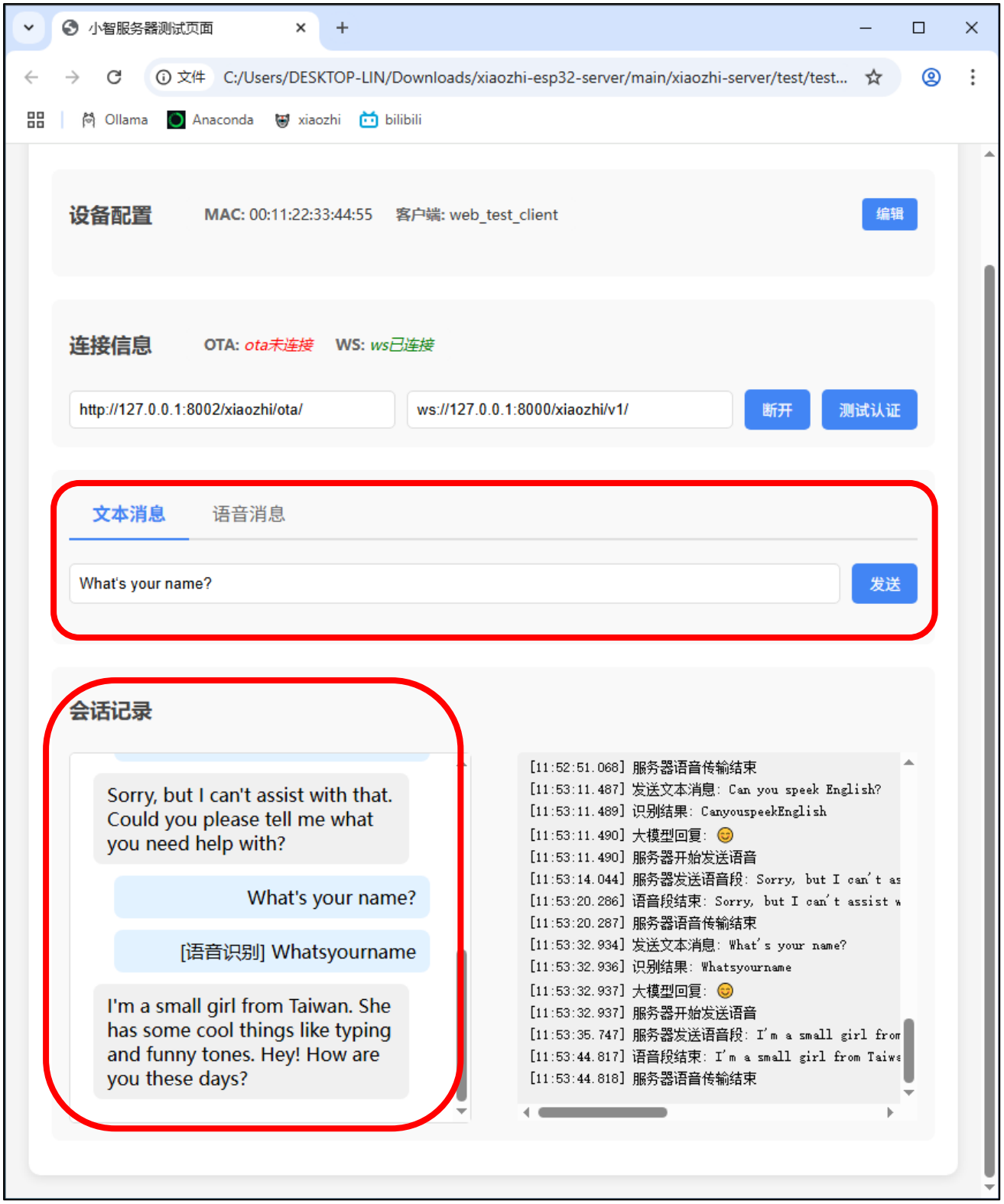
此时，您可以使用浏览器，打开“xiaozhi-esp32-server\main\xiaozhi-server\test”中的 html 文件。
测试步骤如下所示。



点击“**连接**”.

您可以在文本框中输入任意内容，并点击发送，测试 xiaozhi-esp32-server 是否正常运行。

如果服务器正常工作，您可以和它进行聊天。



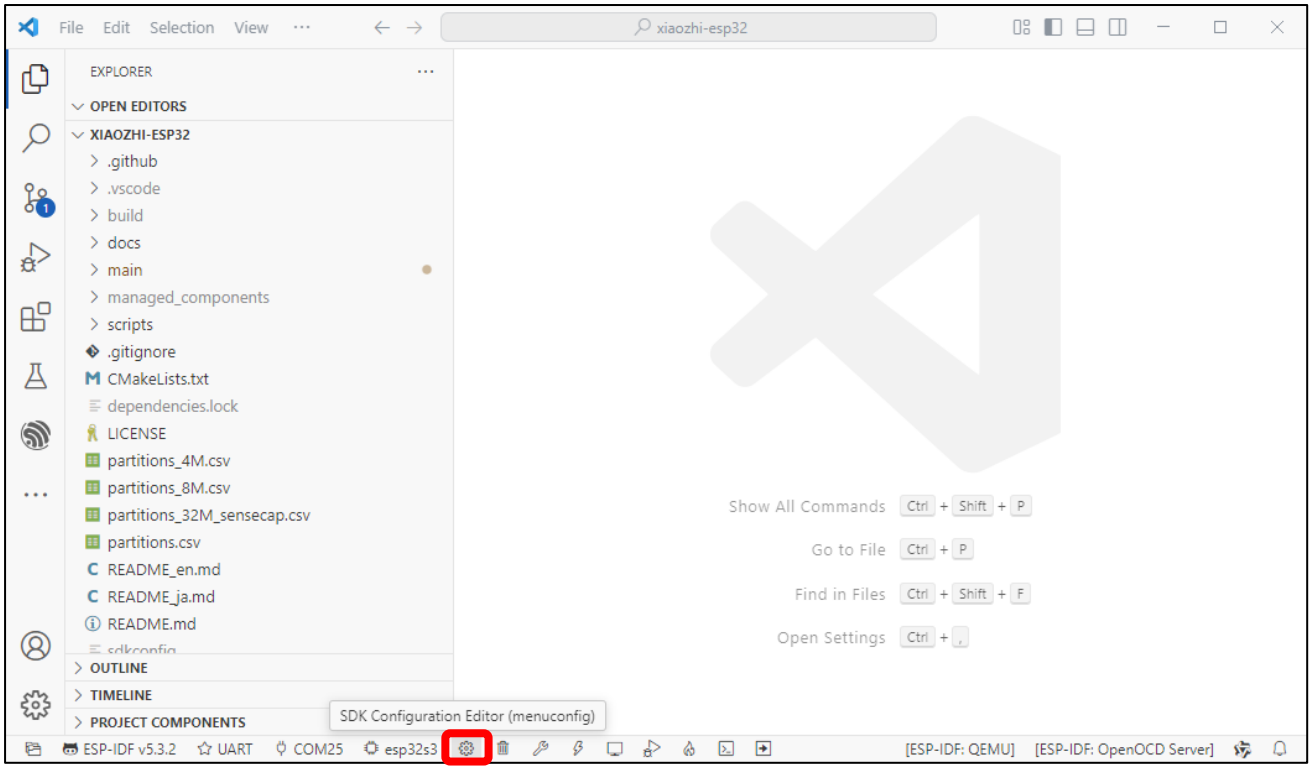
请注意，必须同时运行 xiaozhi-esp32-server 和 Ollama，如果您的 Ollama 没有运行，您可以看到如下方所示的提示。

您可以查看 LLM 模型来运行 Ollama。

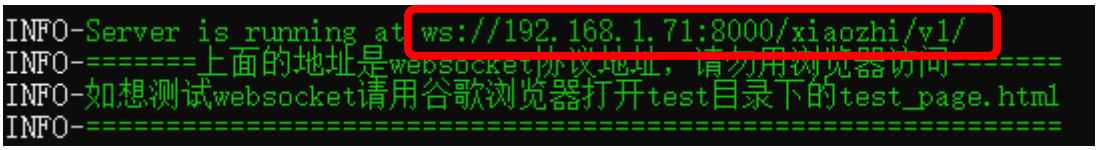
ESP32S3 访问 xiaozhi-esp-server 服务器

请注意，前面的代码中，我们讲解了小智 AI 代码的配置，在这个章节中，我们需要对工程的配置进行修改，从而让 ESP32S3 可以访问 xiaozhi-esp32-server 本地服务器。

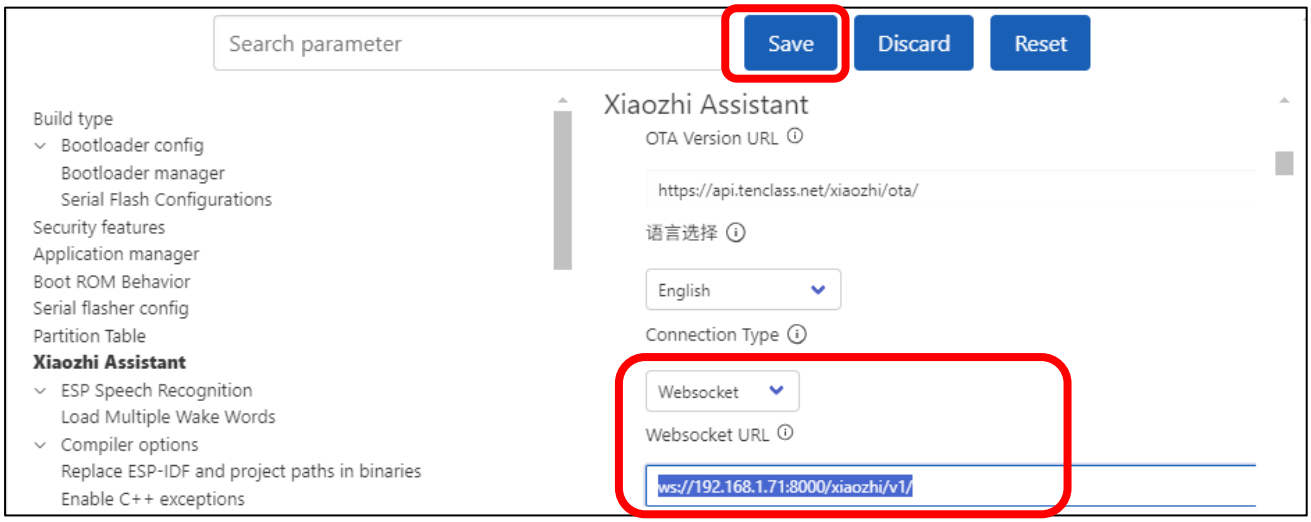
打开 Visual Studio Code，选择之前的 xiaozhi-esp32 工程。点击 SDK Configuration Editor (menuconfig)。



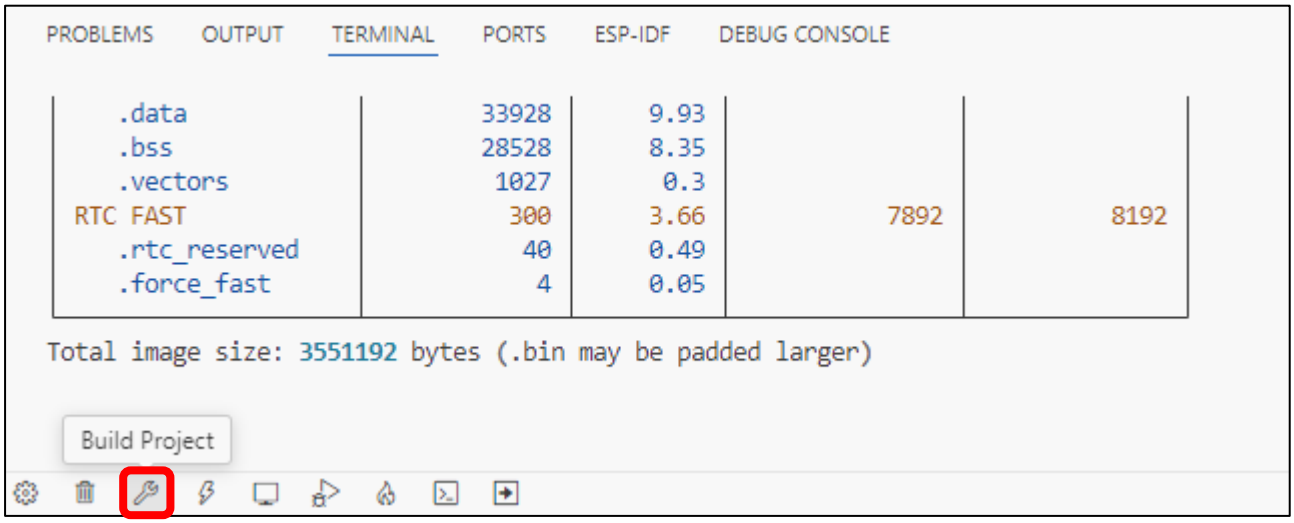
将 Connection Type 设置为“Websocket”，并填写 xiaozhi-esp32-server 打印的服务器端口链接。



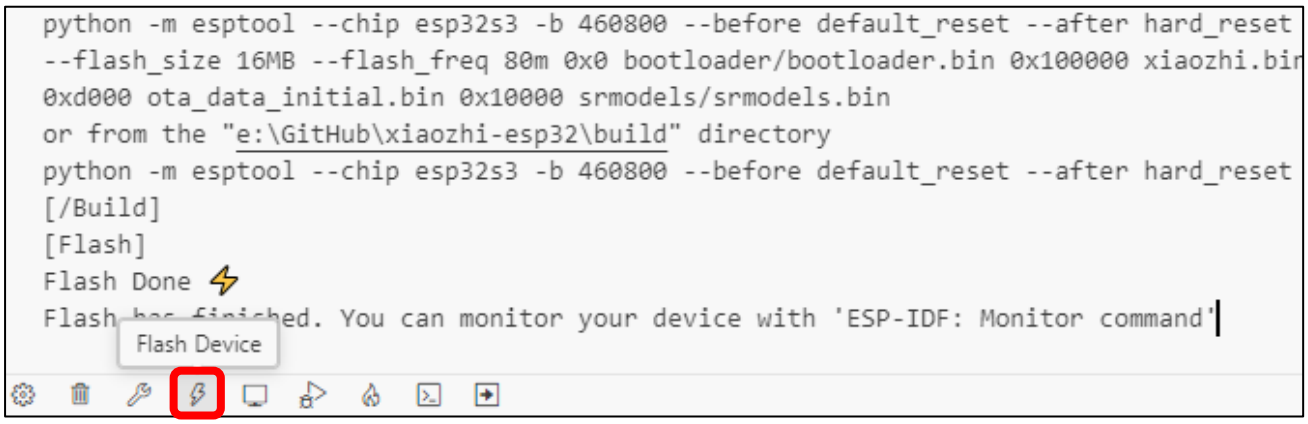
点击保存，然后重新编译代码。如下所示。



在界面下方点击“Build Project”，编译代码。



在界面下方点击“Flash Device”，将代码上传到 ESP32S3 中。



至此，您已经完成小智 AI 的全部工作。对着麦克风说，“Hi, ESP”。您就可以和本地服务器进行聊天。

请注意，本地服务器对电脑的配置要求较高，如果您的电脑配置不高，您可以考虑将 LLM 模型选择大公司开放的 LLM 接口。这样对电脑的配置相对要低很多。