

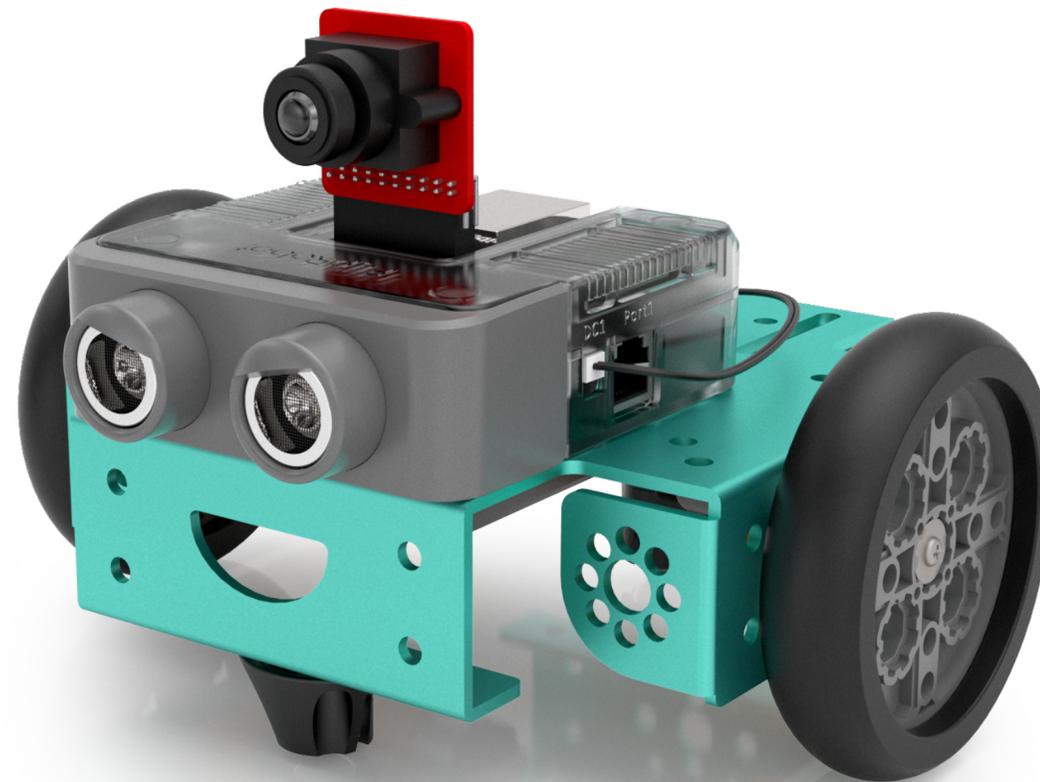
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ROBOTICS *COMPETITION*

PRACTICE PROJECT 5

AI vision recognition - Module 1



MISSION

As we will use the AI Camera on our FlipRobots in future practice projects, we need to install the specific software called “FlipAIOT” and perform some tests before we start to implement it.

LEARNING OUTCOMES

- Learn to install FlipAIOT successfully
- Learn to basic function and User interface of FlipAIOT

EQUIPMENT

- FlipRobot E310+
- Laptop
- Charging/Connection cable
- AI Camera Module
- Wifi Module
- Li-on Battery
- FlipAIOT app

WHAT IS AI IMAGE RECOGNITION

“Image recognition is a term for computer technologies that can recognize certain people, animals, objects or other targeted subjects through the use of algorithms and machine learning concepts.

The term “image recognition” is connected to “computer vision,” which is an overarching label for the process of training computers to “see” like humans, and “image processing,” which is a catch-all term for computers doing intensive work on image data.”



Reference: <https://www.techopedia.com/definition/33499/image-recognition>

WHAT IS FLIPAIOT

FlipAIOT is the FlipRobot's software dealing with AI modules, including vision recognition, data analyze, audio processing and more. For the OneWorld Robotics Competition, FlipAIOT will provide the following functions:

- Seeing vision from your AI camera.
- Allowing vision recognition training.
- Integrating the FlipCode and FlipAIOT function to start your OWRC mission.

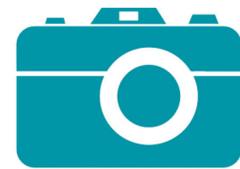


3 STEPS OF IMAGE RECOGNITION



AIOT RELATIONSHIPS

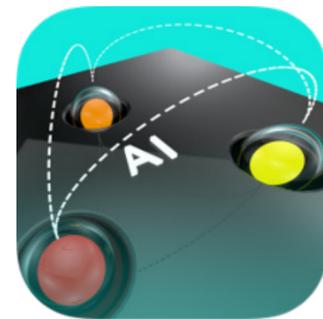
E310, WIFI AND BLUETOOTH



Camera Module



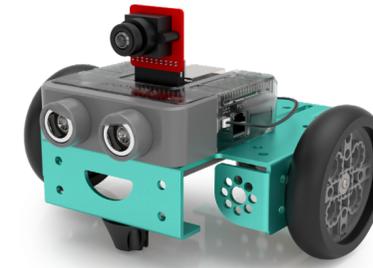
WIFI Module



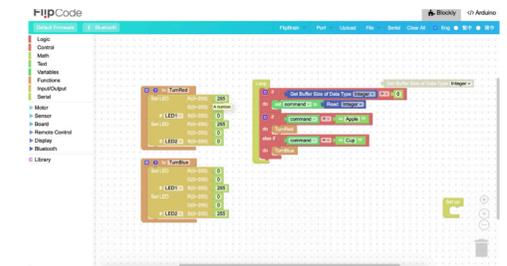
FlipAIoT



Bluetooth



FlipRobot

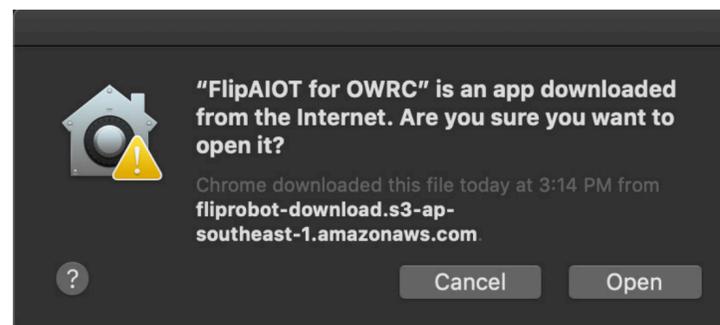


FlipCode

STEP 1

INSTALL FLIPAIOT (MAC)

1. Go to the OWRC website and click the "**Resources**" page.
2. Under FlipAIOT click on the **Mac App** drop down menu and then click download.
3. A zip file will then download, double click it to unzip or click the right button and press "unzip".
4. You'll then find the app on your desktop named **FlipAIOT for OWRC**, double click the icon.
5. You may see a notice message as below, please click **Open** to start using FlipAIOT.



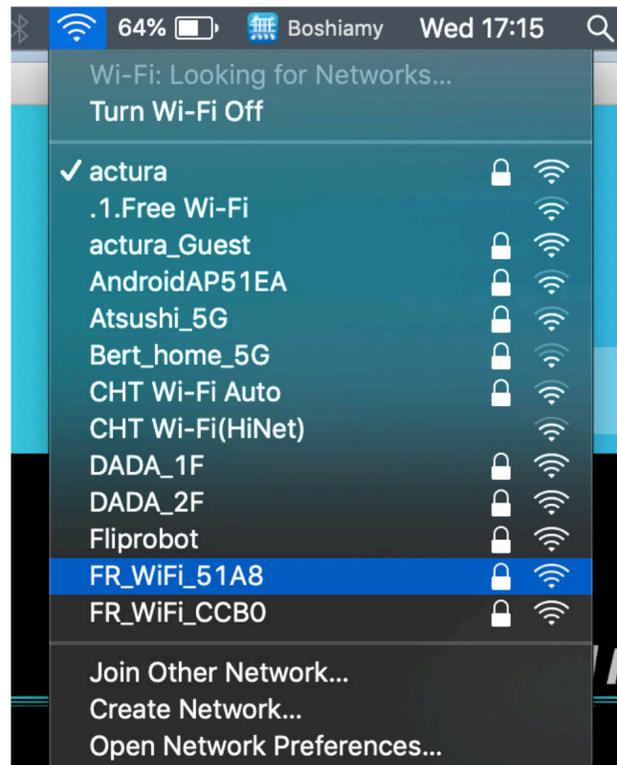
INSTALL FLIPAIOT (WINDOWS)

1. Go to the OWRC website and click the "**Resources**" page.
2. Under FlipAIOT click on the **Windows App** drop down menu and then click download.
3. An exe file will then download, double click to install it.
4. There will be a shortcut on your desktop and the FlipAIOT will open the software automatically.

STEP 2

LINK THE WIFI WITH YOUR FLIPROBOT

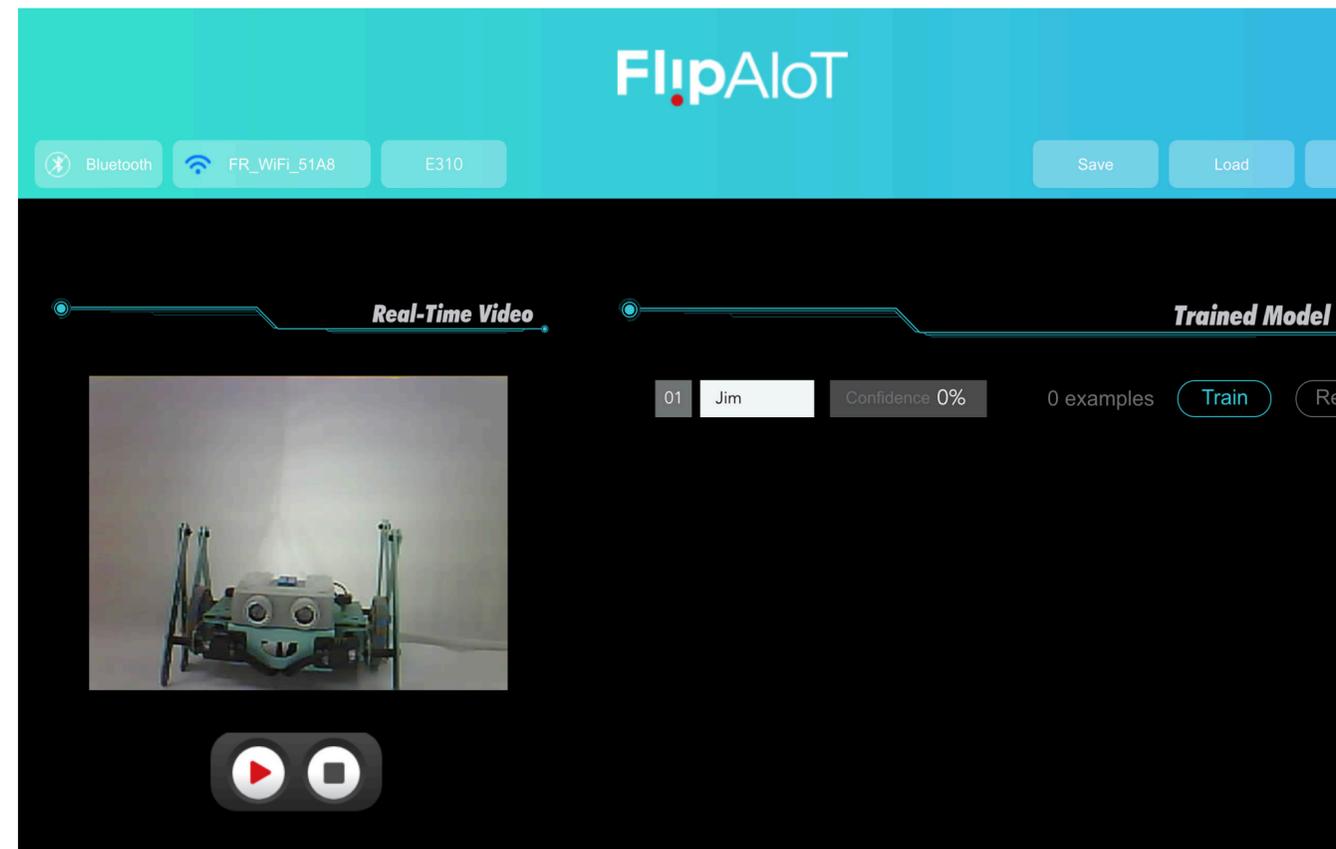
1. Click your laptop's wifi function and connect with your WiFi number, there will be a sticker on your WiFi board.
2. Type the default password: "**ilikerobot**" and click "Join" to connect the WiFi.



STEP 3

ENSURE YOUR AI CAMERA IS WORKING

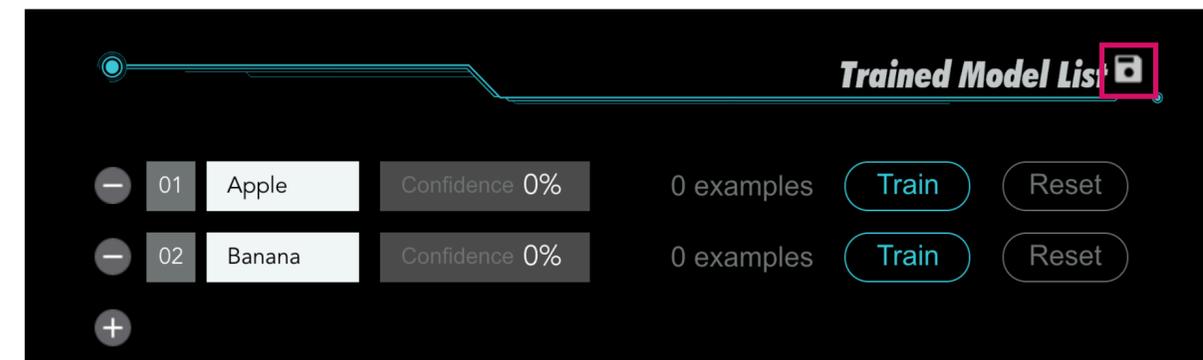
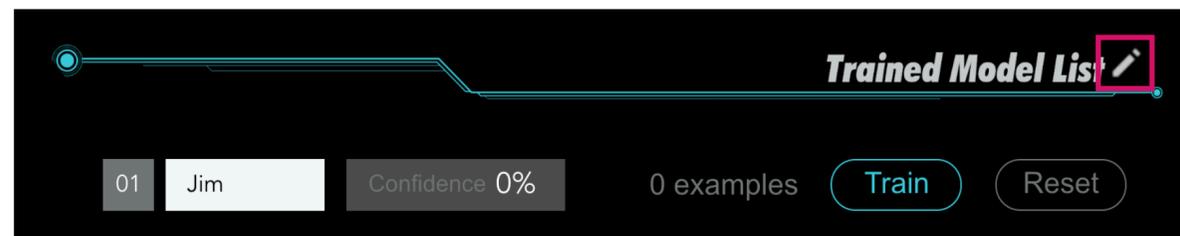
1. Once your FlipAIOT is linked with your FlipRobot, you should see the real-time video with the AI camera module.



STEP 4

EDIT YOUR TRAINED MODEL LIST

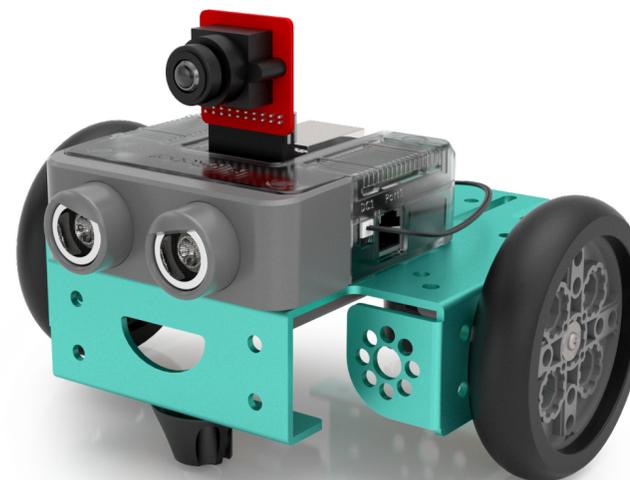
1. Prepare two different items for your first AI vision training that are different shapes and colors, e.g. an apple and a banana.
2. Click the **“pencil”** icon to edit your Trained Model.
3. Click the **+** to add your Trained Model. If you'd like to delete a Trained Model, then please click **-**.
4. Rename your Training Model, and click **“Save”** button to save your setting.



STEP 5

SET UP YOUR ENVIRONMENT FOR THE AI VISION TRAINING

1. Make sure your camera can see your object.



STEP 6

TRAINING YOUR 2 MODELS

1. Press the "**Train**" button, and get your examples. Each click will be recorded as a picture. For the AI vision training, it will remember these pictures and regard them as the same category.
2. Place your object at different distances and angles for each example. This will make your training module more accurate.

A screenshot of a 'Trained Model List' interface. The title 'Trained Model List' is at the top right with a pencil icon. Below it is a table with two rows. The first row is for 'Apple', showing 'Confidence 100%' in a blue box, '10 examples', and a 'Train' button highlighted with a red box. The second row is for 'Banana', showing 'Confidence 0%' in a grey box, '0 examples', and a 'Train' button. Each row also has a 'Reset' button.

Trained Model List 				
01	Apple	Confidence 100%	10 examples	Train Reset
02	Banana	Confidence 0%	0 examples	Train Reset

STEP 7

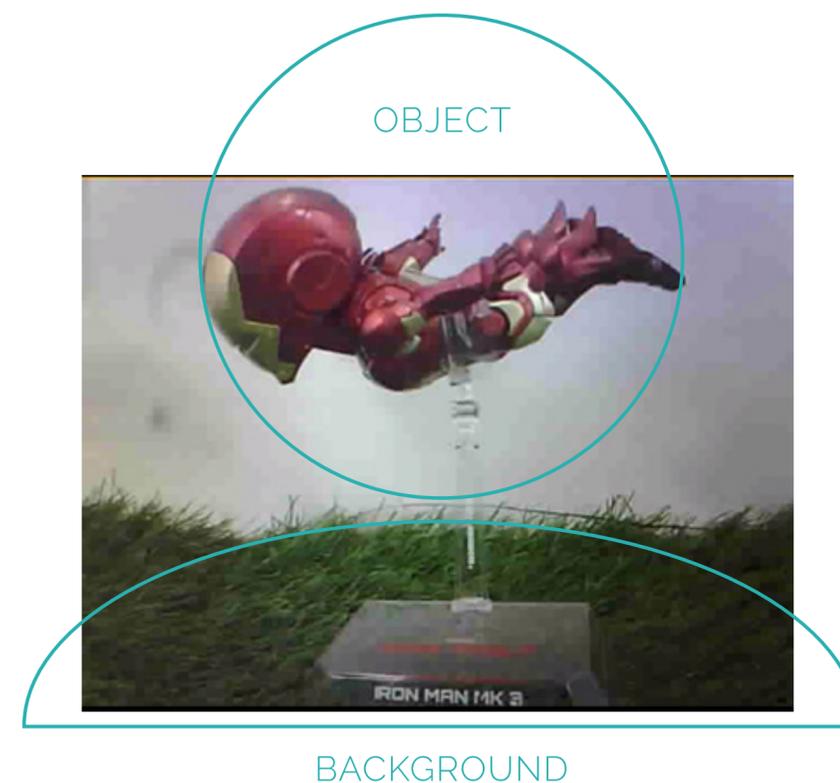
CHECK YOUR FLIPAIIOT IS ABLE TO RECOGNISE YOUR OBJECTS

1. Place each object in front of the camera and make sure the Trained Model is recognising your objects correctly (confidence level is displaying at 100%).
2. **Click here** to watch a recap of this process.

STEP 8

HOW TO ACCURATE TRAINING RESULT

1. It recognizes the whole image(including background and objects) not just elements of the image.ALL matter in regard to recognition result.
2. Add more samples for accurate training results, and please consider different elements to create samples.



DISTANCE

OBJECT

BACKGROUND

DIRECTION

COLOUR

TRAINING
EXAMPLES