Experiment 1: Warehousing Goods

一、Scene Description

When goods warehousing, porter carry goods to a particular point according to the category that may cause the wrong positioning of the goods, damage to the packaging, and long carrying time. To avoid those problems, this experiment created an AI goods warehousing system to ensure that goods are placed accurately, the packaging is intact and the warehouse is quickly.
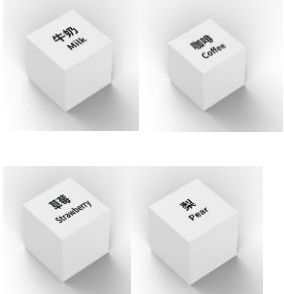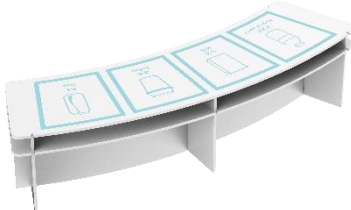
二、Experiment Principle

The AI goods warehousing system adopts OCR recognition technology to realize automatic warehousing goods by robotic arm. First, the robot uses visual sensors to obtain the data of the goods box, then uses OCR recognition technology to identify the goods name, and finally uses the Magician Lite to carry the goods box to a particular point on the shelf.

OCR (optical character recognition) refers to the process in which electronic devices (such as scanners or digital cameras) check characters printed on paper and then use character recognition to translate shapes into computer text; Then the image file is analyzed and processed to obtain text and layout information.

三、Experiment Equipment

Equipment Image	Name	Number

	Dobot Magician Lite	1
	Suction cup	1
	Camera	1
	Power Adapter	1
	Tape-C Cable	1
	Goods Boxes	4
	Maps	1
	Shelves	1

四、Experiment Steps

1. Scene Create

（1）Please put Magician Lite, shelves, goods cards on the map as shown below.

Figure 1.1 The map of warehousing goods system

（2）Prepare the experimental equipment and place the equipment, the physical picture is shown in Figure 1.2.

Figure 1.2 The physical map of warehousing goods system

2. Program Design

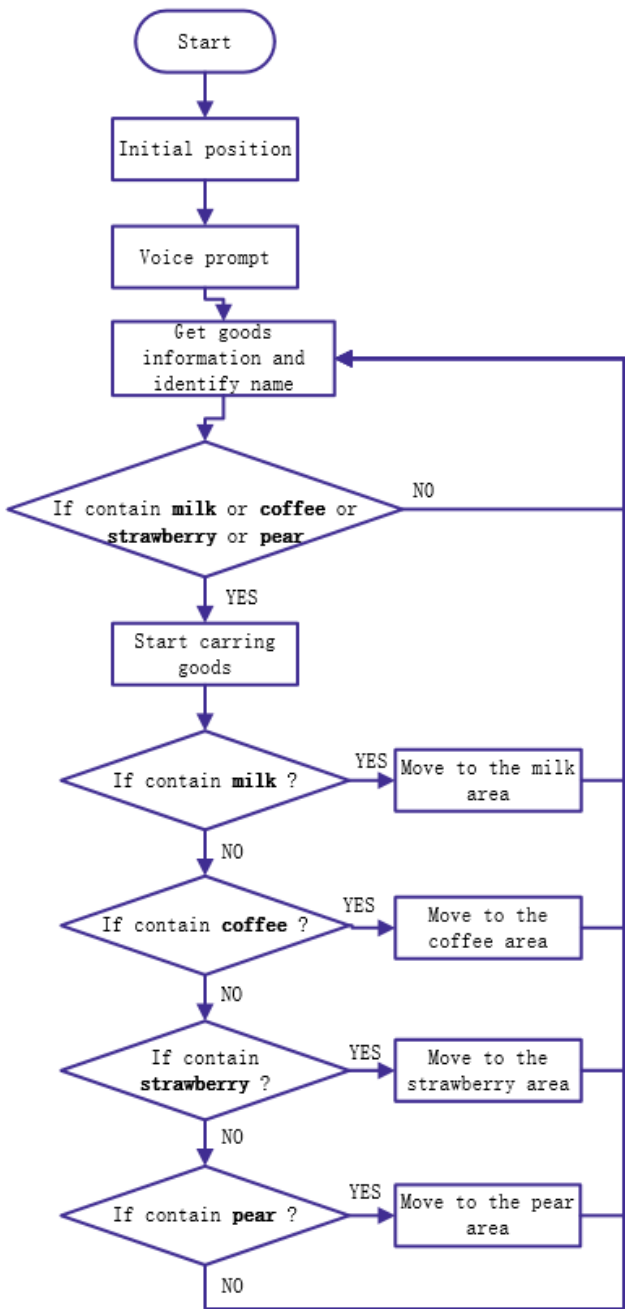Step 1： Read the flow diagram of warehousing goods, as shown in Figure 1.3.

Figure 1.3　The flow diagram of warehousing goods system

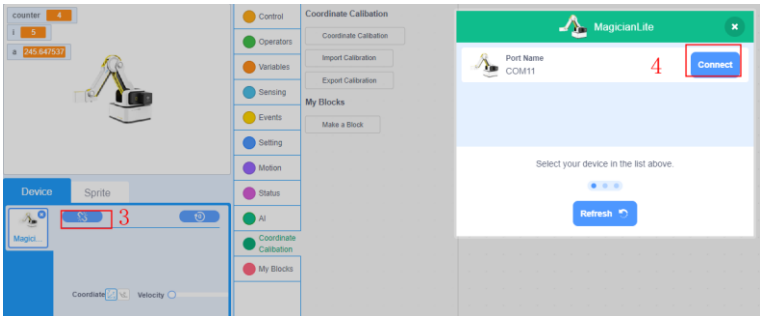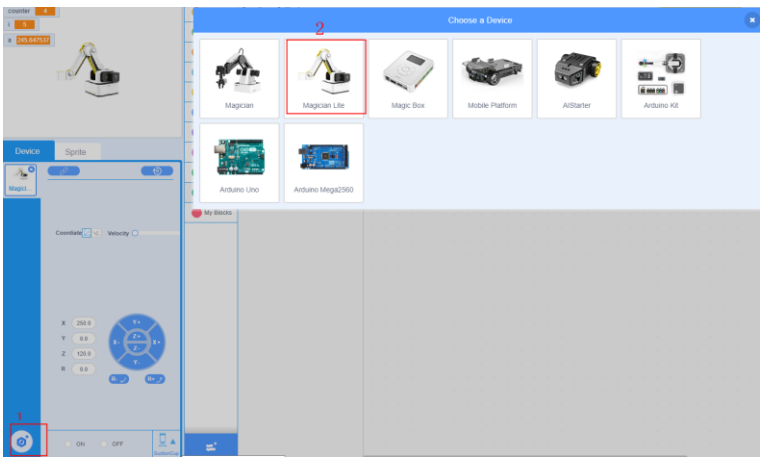Step 2：　Add device and connect it. As shown in Figure 1.4

Figure 1.4 add device and connect it
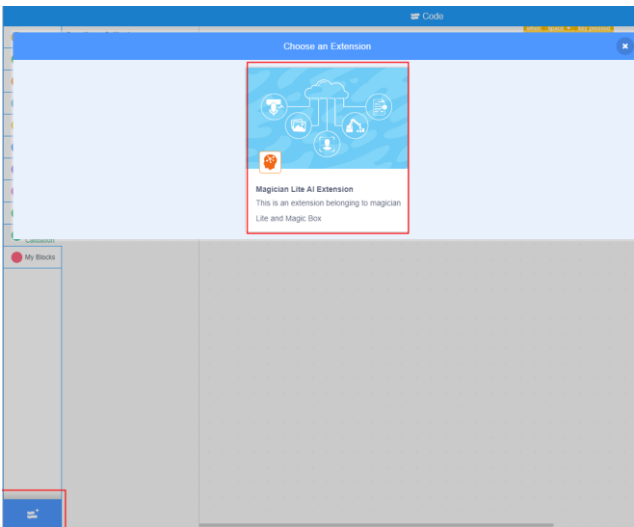
Step 3：Add AI extension module, as shown in Figure 1.5.

Figure 1.5 Add AI expansion module

Step 4： Initial settings.
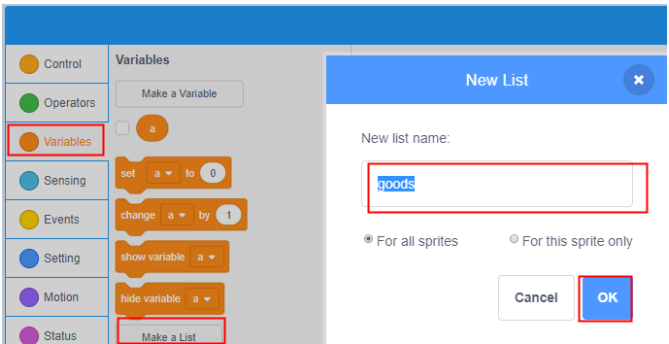
1）Create a list called "goods", as shown in Figure 1.6.

Figure 1.6 create a list

2）Set the starting method, set the end tool of the robot arm to the suction cup, set the lifting height in jump mode and the goods list, as shown in Figure 1.7.
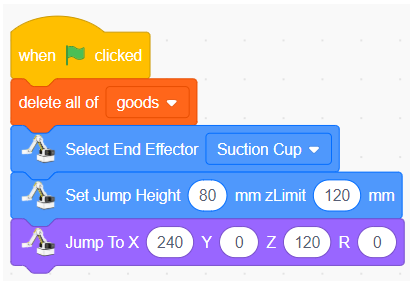

Figure 1.7 Basic settings

3): Voice prompt. The robot first introduces itself, and then voice prompts, as shown in Figure 1.8
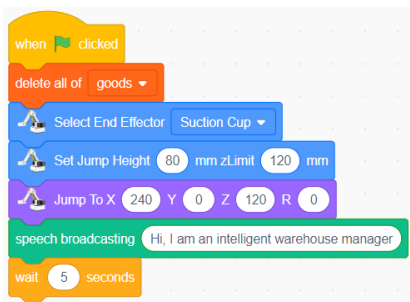

Figure 1.8 Speech prompt

4) Add goods such as milk, coffee, strawberry, pear to the goods list, as shown in Figure 1.9.
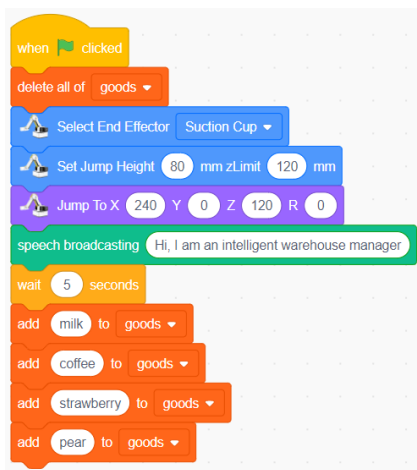
Figure 1.9 Add goods to the list

Step 5：Obtain goods information. The robot moves above the goods recognition area, then automatically takes photos to obtain goods data and recognize name, as shown in Figure 1.10.
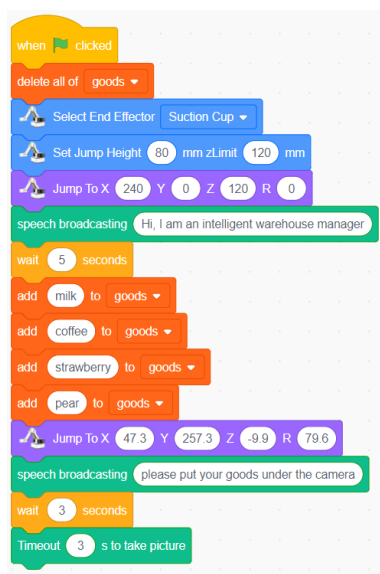

Figure 1.10 Get the text on the goods card

Step 6: Determine whether the identified goods name is a goods in the product list, and if it is, then perform the operation related to the goods warehouse, as shown in Figure 1.11.
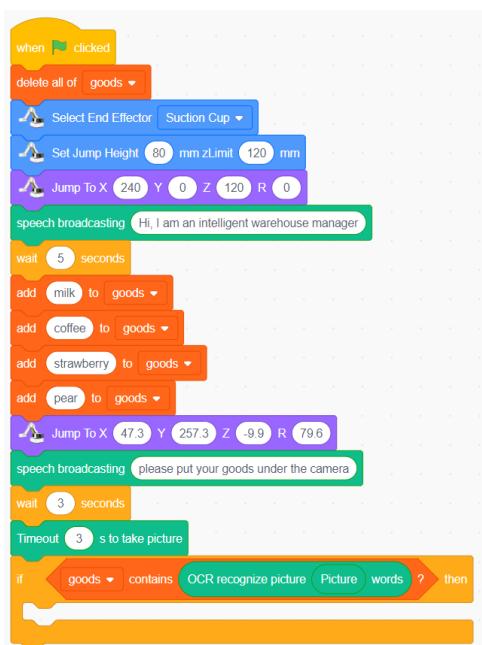
Figure 1.9 Judging OCR recognition result

Step 7: If the goods list contains the text in the OCR recognition picture, voice play "Robot is moving the goods" first, and then grab the goods box, as shown in Figure 1.12.
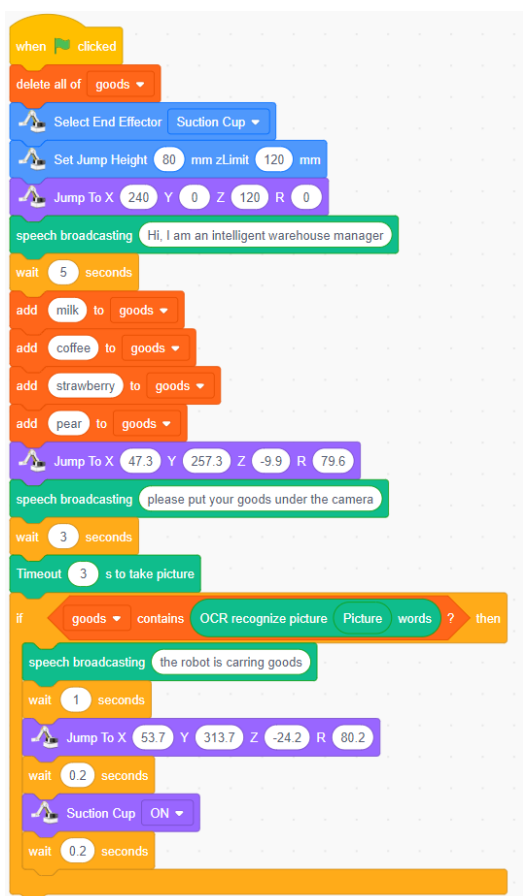

Figure 1.12 Identify and grab goods cards

Step 8: Determine whether the text in the OCR recognition picture contains "milk". If so, move the robot above the position of the milk, place the grabbed milk box in the position of the milk, and then voice prompt "Please place the product in the identification area"; otherwise, determine whether it is other goods, as shown in Figure 1.13.
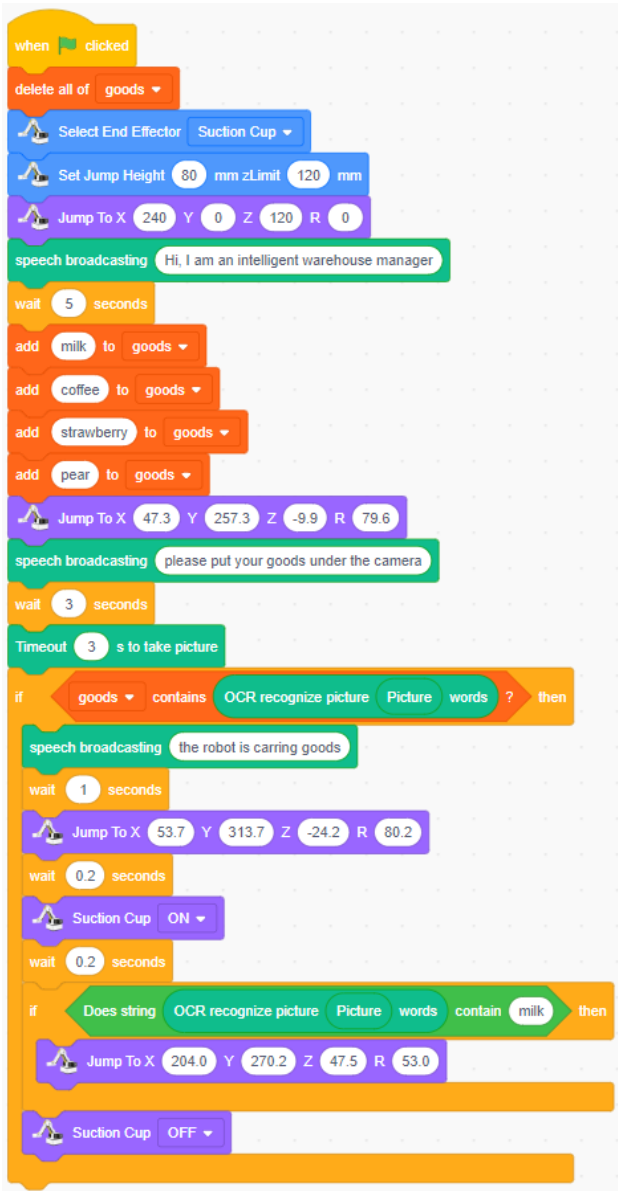

Figure 1.13 The recognized goods is milk

Step 9: If the text in the OCR recognition picture does not contain "milk", it is judged whether other goods are recognized. If so, the

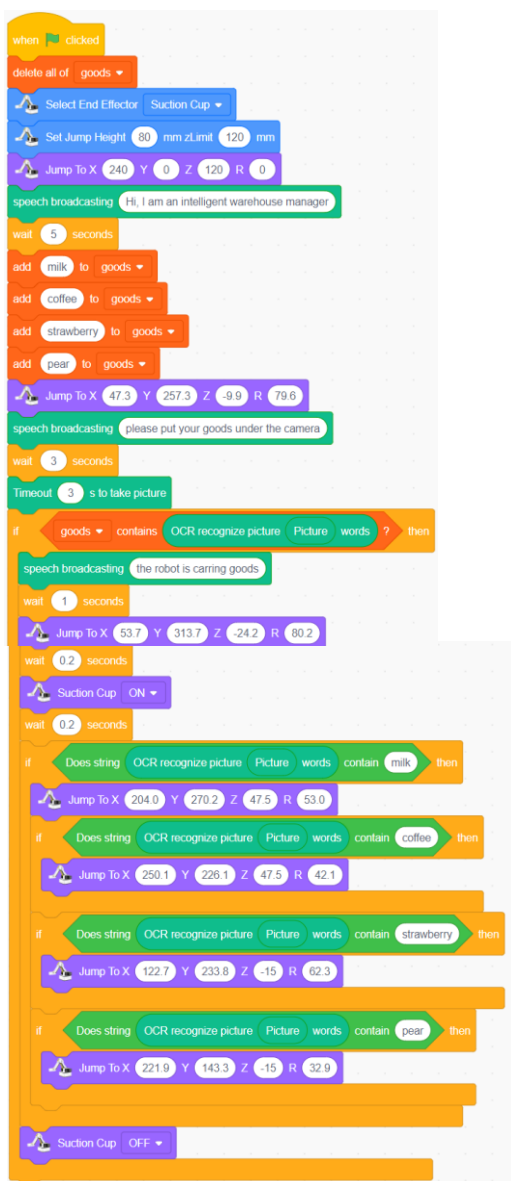goods are placed in the corresponding position, as shown in Figure 1.14.

Figure 1.14 recognized other goods

Step 10: There is usually more than one goods that needs to be stored in the warehouse, and different products need to be identified repeatedly; until the program stops running, the goods storage operation is stopped, as shown in Figure 1.15.
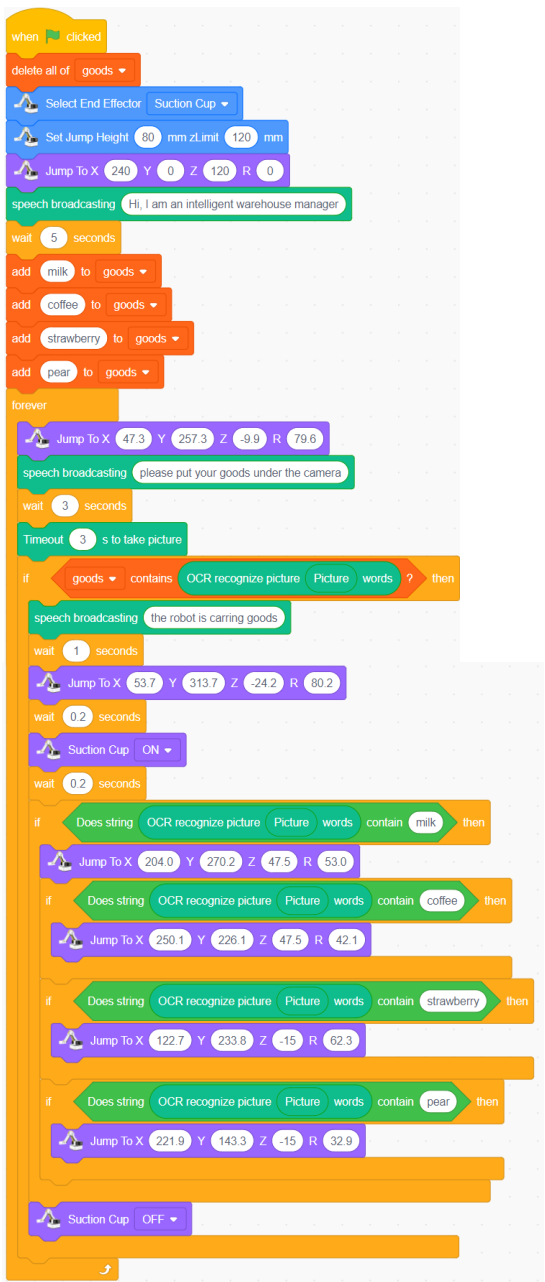
Figure 1.15 The completed program of warehousing goods system