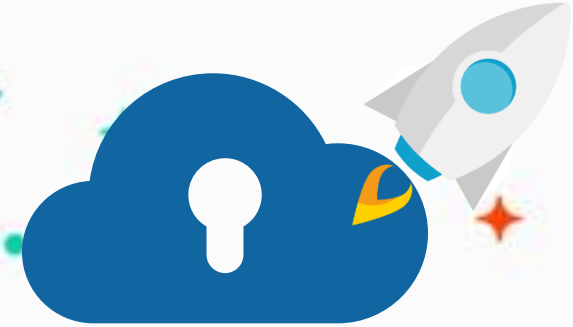

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Lesson 25. A Timid Mouse

LETURER:

Lesson Objective

Learning Objectives

1. Learn about the function of measuring objects with the Intelligent Eye.
2. Learn to use LED lights of the Intelligent Eye and obstacle detection.

Possible Difficulties

1. The Intelligent Eye only detects the presence or absence of objects.
2. The lighting setting of the Intelligent Eye.



Background Information



Context Import



Since the 21st century, advances in color control, digital display and projection, and material technology have enabled lighting to bring more possibilities for the expression of spatial vision. Whether it is an indoor viewing space or a vast outdoor space, lighting has become the most cost-effective "building material" by virtue of its direct impact on audience perception. More and more cities have begun to create special light shows to form a highly recognizable cultural and psychological experience. Dramatic and attractive light shows tend to be normalized and popularized.

Context Import



Landmark buildings in many tourist cities will turn on the lights around the buildings at night, with gorgeous lighting effects, such as the Yellow Crane Tower in Chongqing and the Canton Tower in Guangzhou. What is displayed is not only the architecture, but also the culture of a city.

Context Import



These gorgeous lighting effects are all generated by computer-controlled colored lights, showing different effects according to different needs. The smart eye sensor also has colored lights, which can also display gorgeous lighting effects. We can use the colored light function of the smart eye to make a smart eye robot that can shine brightly, and use the obstacle detection function of the Intelligent Eye to control the state of the colored light.



Knowledge Introduction

New Knowledge | Intelligent Eye



Intelligent Eye Sensor, or called Smart Eye, built-in 8 pieces of 24bit LED color lights, support continuous gradient and simple graphic display. At the same time, it has the function of infrared detection of obstacles, and the detection range is 0cm-15cm.

New Knowledge | Intelligent Eye



When the Intelligent Eye is in the detection mode, if an obstacle is detected within the range, the detection value becomes 1; the longest detection distance is 15cm.

New Knowledge | Intelligent Eye

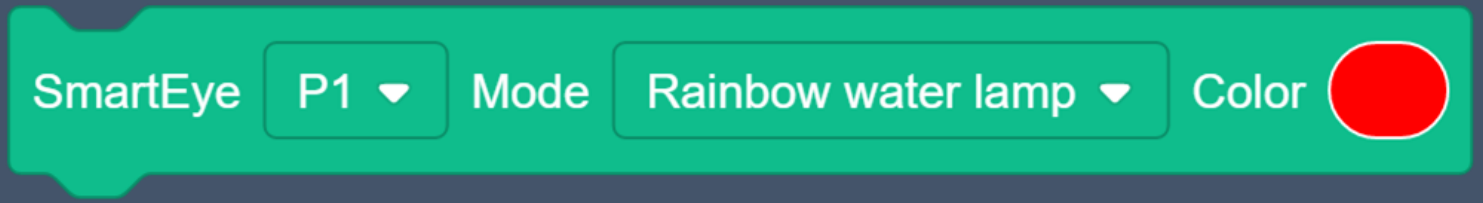


The built-in 8 LEDs of Intelligent Eye can not only set different colors, but also can set different presentation modes. There are a total of 9 demo modes, namely flowing light, scanning light, breathing light and so on.

New Knowledge | Intelligent Eye

Color	Effects
Controllable	Spiral light
Controllable	Monochrome water lamp
Controllable	Double flash light
Controllable	On Off light
Controllable	Scanning light
Uncontrollable	Rainbow water lamp
Uncontrollable	Red breathing light
Uncontrollable	Green breathing light
Uncontrollable	Blue breathing light

New Knowledge | Intelligent Eye



Set the mode and color of Smart Eye

Parameter value: 1-8, sensor connection port

New Knowledge | Intelligent Eye



Set the color of the Smart Eye

Parameter value: 1-8, sensor connection port

Set the different color lights of the Smart Eye

Click the color block to change the color.

New Knowledge | Intelligent Eye



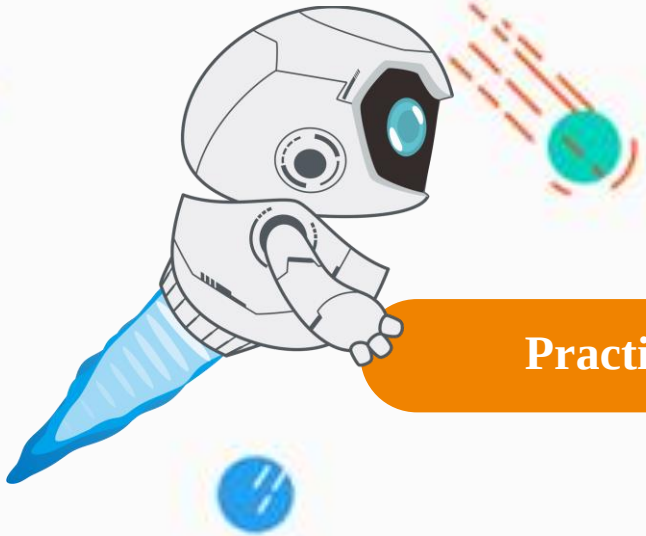
Read the infrared detection value of the Smart Eye

Parameter value: 1-8, sensor connection port

Return value: 0-1, 0 means no, 1 means yes

Tips:

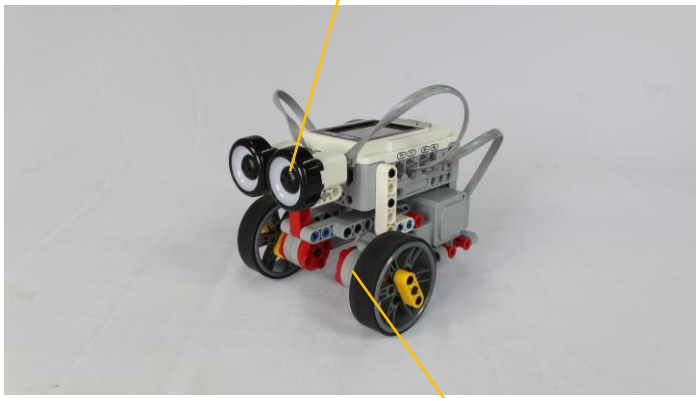
If the obstacle is a white object, the detection effect is the best; if the obstacle is a black object and an object that absorbs light, the detection effect is poor.



Practice

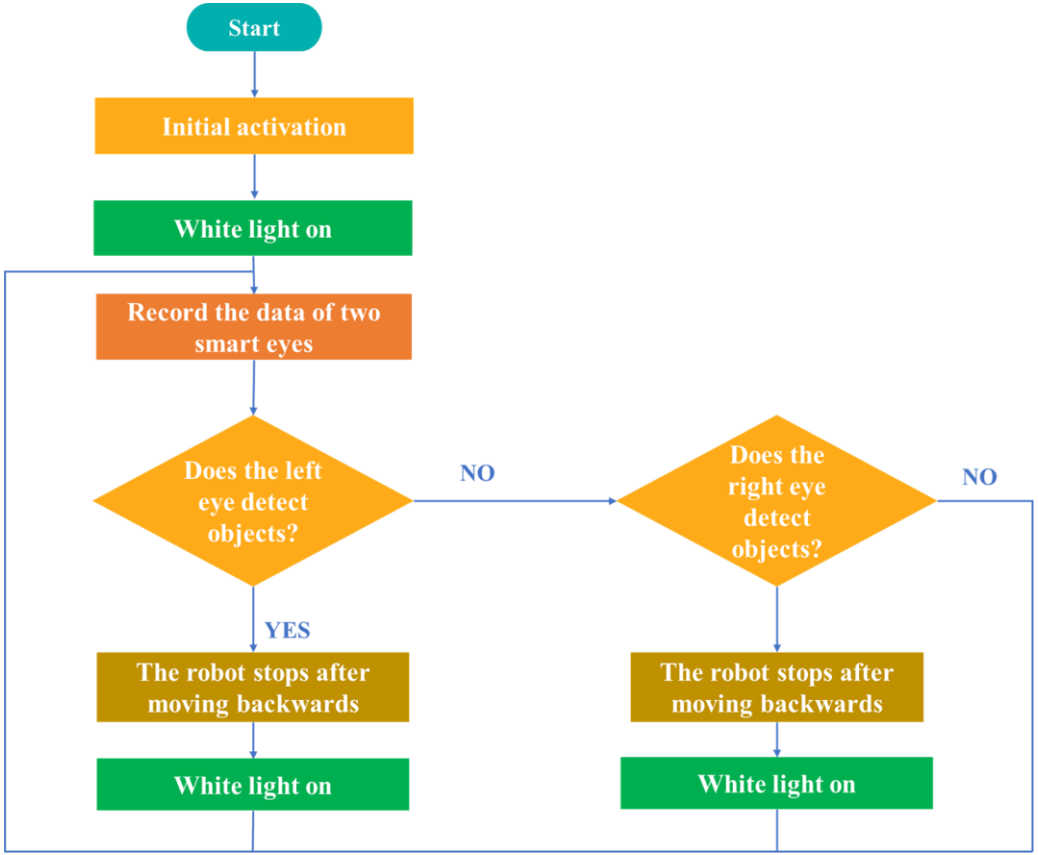


New Knowledge



Assemble a timid mouse robot with the Intelligent Eye according to the construction manual, and realize the function that the robot backs up and the LED light changes color when an obstacle is detected in front.

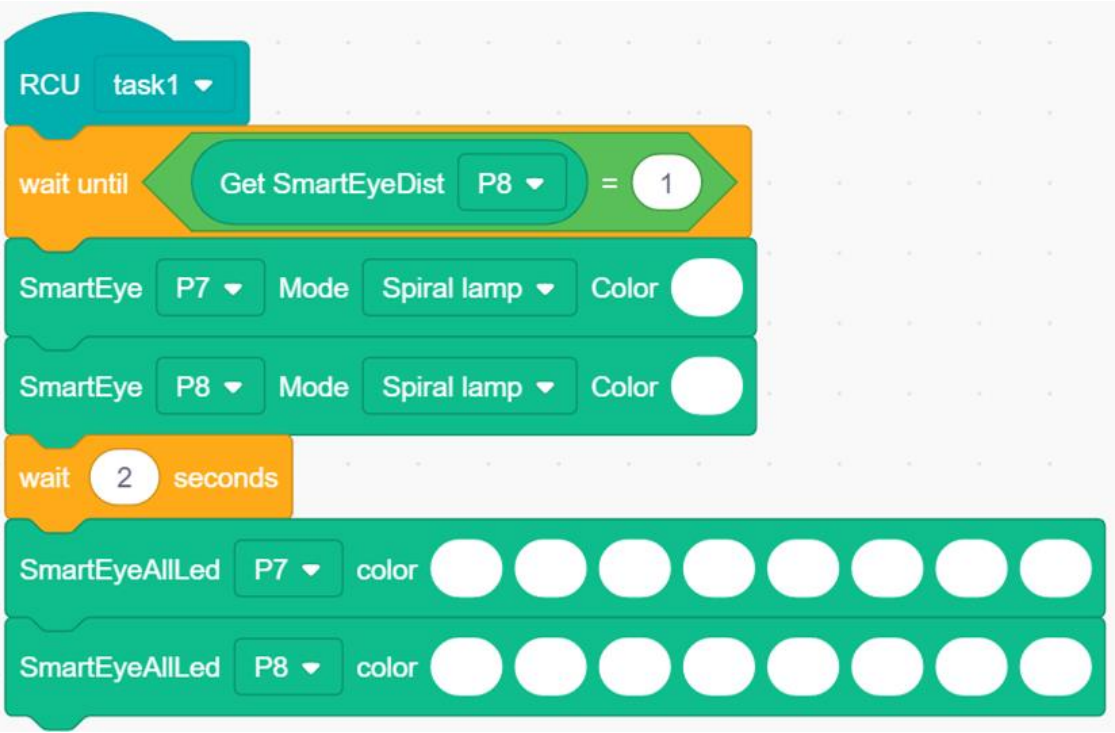
Practice | Programming



After the smart eye robot is started, you need to use an object to activate it first, and the eyes will light up white when starting. Store the current smart eye data through variables, and judge whether there are obstacles in front of the two eyes respectively.

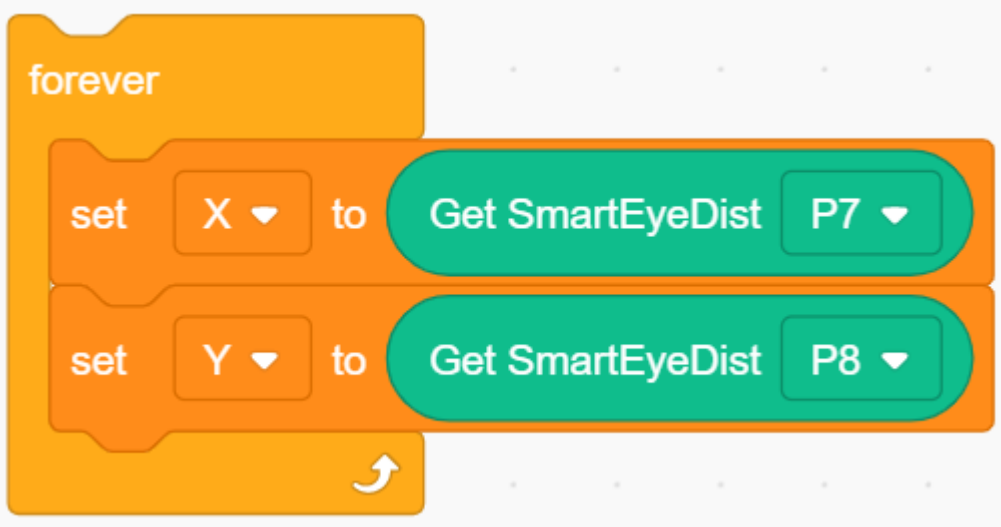
When the robot detects an obstacle, the robot moves backwards and lights up in different colors.

Practice | Programming



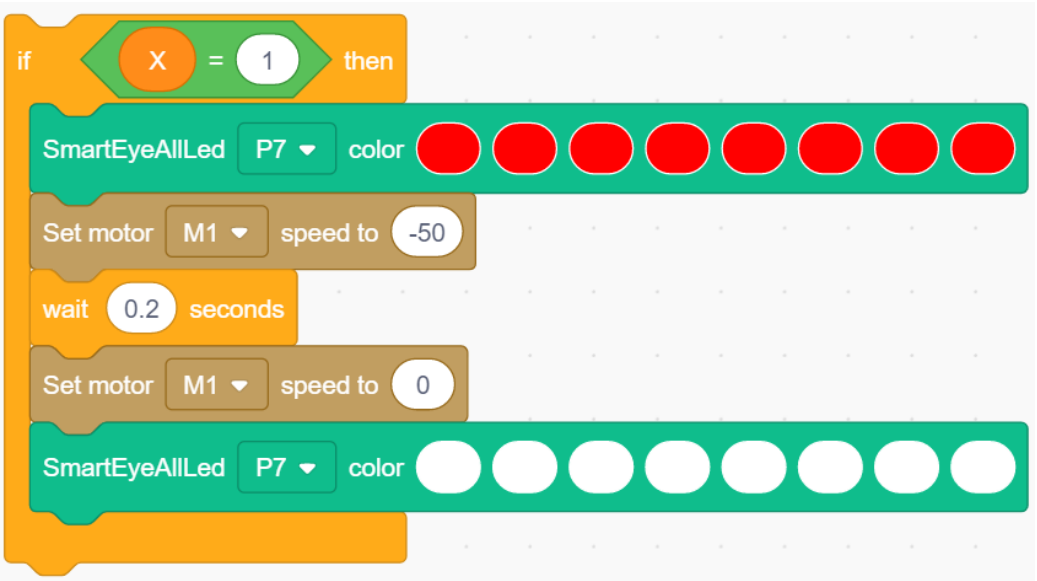
Initial activation

When there is an object in front of the intelligent eye, activate the robot, and the white light of the wisdom eye will be on.



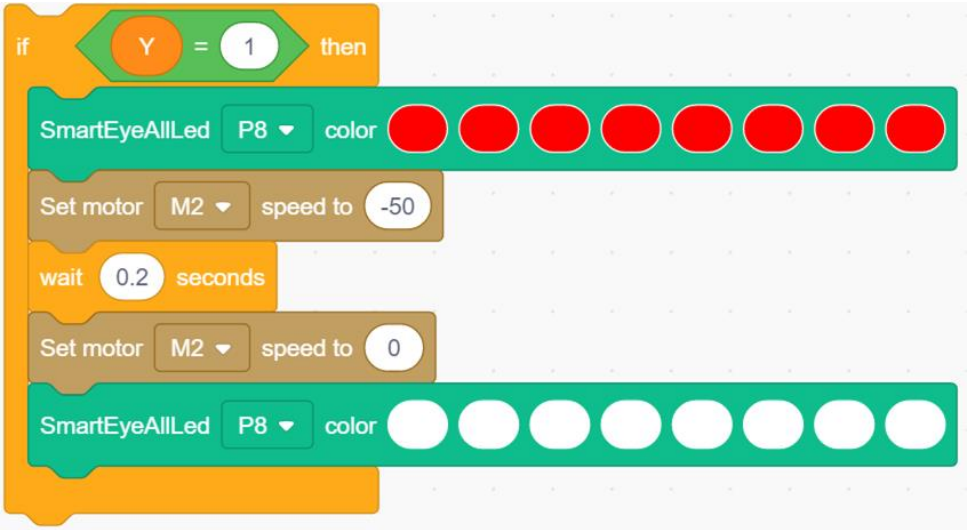
Read the data

Repeatedly read sensor data into a variable.



Object Detection

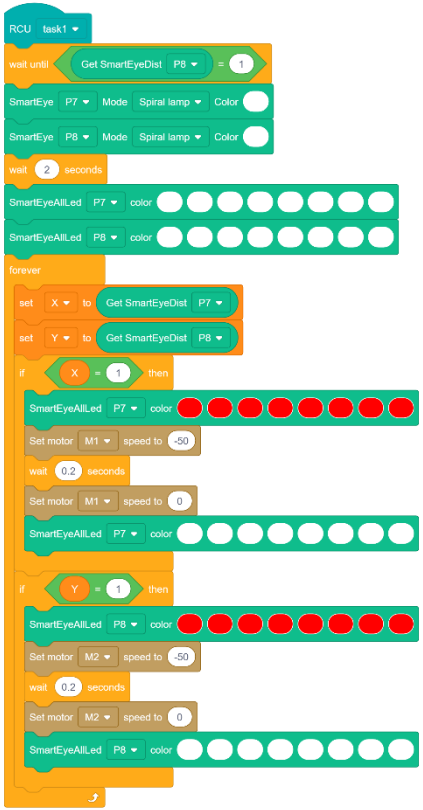
Determine whether there is an object in front of the P7 sensor. If there is an object and the X value is 1, the M1 will rotate in the opposite direction to realize the backward function. During the backward process, the smart light will light up red and then white.



Object Detection

Determine whether there is an object in front of the P8 sensor. If there is an object and the Y value is 1, the M2 will rotate in the opposite direction to realize the backward function. During the backward process, the smart light will light up red and then white.

Practice | Programming

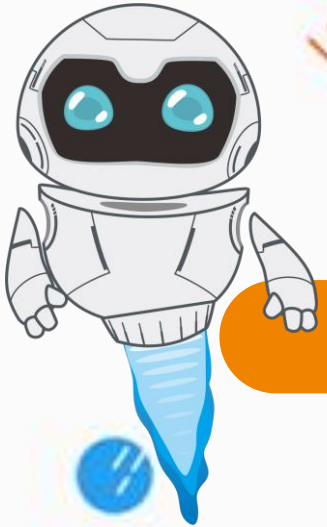


Integrate programs

Integrate the above programs according to the flowchart.

Practice | Programming





Results

Program Optimization

This lesson realizes the program that the intelligent robot retreats by itself after detecting an object.

Next, modify the program so that the smart eye moves forward and turns on the green light after seeing the object.

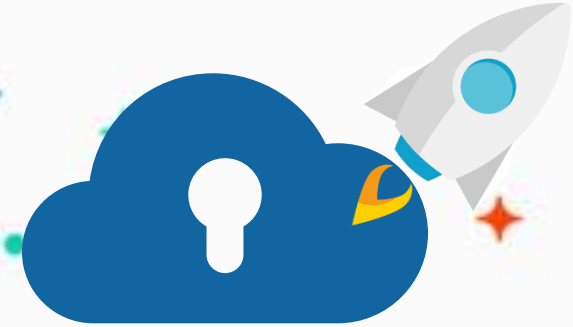
Requirements: After the smart eye sees the object, the motor rotates forward to let the robot move forward, and the green light of the eye is on during the movement.

Further Reading



Robot vision refers to not only taking visual information as input, but also processing this information, and then extracting useful information for robots.

Today's vision technology has been able to recognize human gestures and facial expressions, that is, the functions of the human-machine interface can also be realized.



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Thanks!

LECTURER: