04 - Smart Car

Smart Car

Basic Teaching Information					
Teaching facility	AI Module 1s	Teaching mode	Project-based learning	Class duration	90 minutes

Teaching Objectives:

1. Learn to build a two-wheel differential drive car chassis

2. Learn how infrared sensors work

3. Learning basic programming flow control

Smart Car
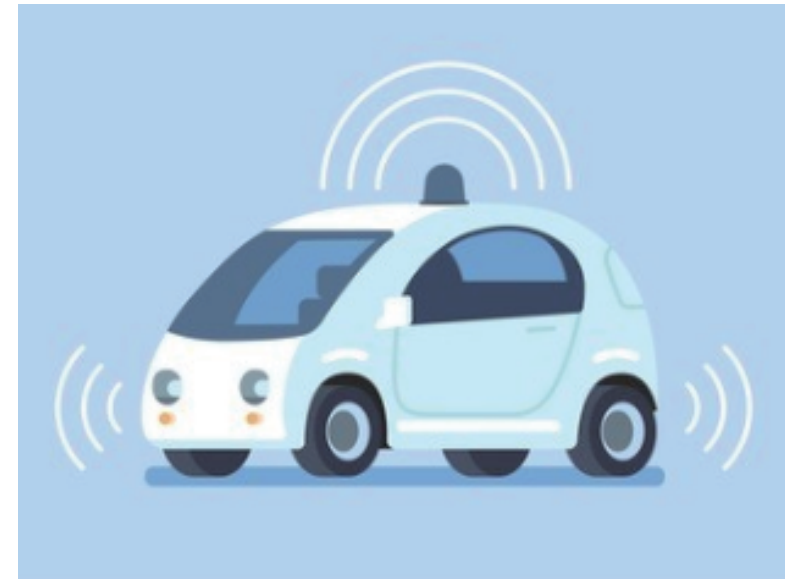
Focus

Car is one of the most common transportation in modern society, it brings great convenience to people. After more than 100 years of development, the car industry has made great progress, but it still needs human to drive. The coming artificial intelligence technology may advance car development further.

Nowadays, self-driving technology seems to be gradually entering people's lives. The use of multiple sensors is a necessary prerequisite for the automatic driving of vehicles.

Exploration

With the development of sensor technology, cars can detect changes in the external environment and run automatically.

1. In this lesson, how can the smart car complete the function of autonomous obstacle avoidance?

The smart car uses infrared sensor to determine if there are obstacles ahead so as to avoid colliding with them. Infrared sensors measure the distance of obstacles ahea front by the principle of infrared reflections against obstacles.

2. How to achieve the function that the car can turn freely?

We can achieve this by using double motor differential turning chassis.

Smart Car

Creation

This lesson does not use the general chassis. Students need to design and build the double motor differential car chassis independently.

1. Build vertical drive using two closed-loop motors and U-beam com bined with half high bevel gears;

2. Combine the two vertical drive structures to form the chassis of the car;

3. Install an infrared sensor in front of the car to detect the distance of obstacles;

4. Two tyres as the wheels of the car;

5. The controller as the robot brain.

Programming

This lesson is a comprehensive application of process programming and sensor.

Through APP programming, with the dual motor control module, start the car and keep moving until the infrared sensor detects the obstacle, then turn off the motor.

Use the sound module to alert, then start the car to go back and turn left, repeat the above actions.
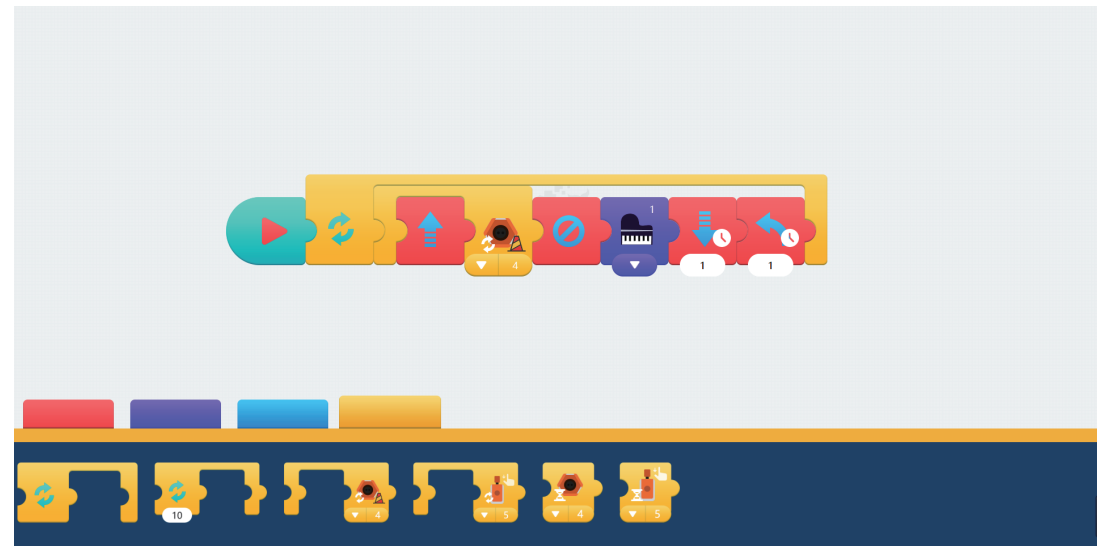
Evaluation

Q: How do the smart car avoid obstacles? What sensors were used? Why can it be used to avoid obstacles?

A: Infrared sensor can be used to avoid obstacles, the distance ahead is calculated by the reflection of the infrared when it meets an obstacle.

Show

Demonstrate the effect of smart car and explain the core knowledge.

Key Point 1: Explain the turning principle of the differential turning structure of two motors.

Explain the principle of obstacle avoidance and distance measurement of infrared sensors.

Key Point 2: Explain the programming logic. Explain the flow control mode and the role of sensor's wait module.