

2.Ultrasonic avoid

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1. Learning objectives

Use the ultrasonic module to combine with the car to achieve ultrasonic obstacle avoidance.

2. Experimental preparation

The car wiring has been installed and installed correctly

3. Implementation principle

Use ultrasound to obtain the distance between the car and the obstacle. When the distance between the car and the obstacle is less than the distance we set, the car turns left to avoid the obstacle.

4. Code analysis

Source code path:

/home/pi/project_demo/05.Comprehensive_gameplay/2.ultrasonic_obstacle_avoidance.ipynb

```
#!/usr/bin/python3
# -*- coding: UTF-8 -*-
import sys
sys.path.append('/home/pi/project_demo/lib')
#Import Mecanum Car Driver Library
from McLumk_wheel_Sports import *

# Constants related to the ultrasonic sensor
NEAR_DISTANCE = 200 # Define near distance threshold (millimeters)
FAR_DISTANCE = 425 # Define far distance threshold (millimeters)

def car_avoid():

# Reading distance from ultrasonic sensor
diss_H =bot.read_data_array(0x1b,1)[0] diss_L =bot.read_data_array(0x1a,1)[0]
dis = diss_H << 8 | diss_L # Printing distance #print(f"Ultrasonic Distance:
{dis} mm") time.sleep(0.05) # Read the distance every 1 second if dis <
NEAR_DISTANCE: print(f "Obstacle is very close, distance: {dis} mm")
move_backward(speed) time.sleep(0.1) elif NEAR_DISTANCE <= dis <= FAR_DISTANCE:
print(f"Obstacle is at medium distance, distance: {dis} mm") stop_robot()
time.sleep(0.2) rotate_left(speed) time.sleep(0.15) elif FAR_DISTANCE < dis:
print(f"No obstacle, distance: {dis} mm")
move_forward(speed)
```

```

else:
    print("Unknown situation, stopping")
    stop_robot()
    time.sleep(0.2)

speed = 20 # Set vehicle speed

try:
    # Turn on the ultrasonic ranging function
    bot.Ctrl_Ulatist_Switch(1)
    time.sleep(0.1) # Give the ultrasonic sensor some time to measure
    while True:
        car_avoid()

except KeyboardInterrupt:
    # When the user interrupts the program, ensure all motors stop
    bot.Ctrl_Ulatist_Switch(0)
    time.sleep(0.1)
    stop_robot()
    print("Ending")

```

5. Experimental results

We put the car on the ground and run the program. The car will keep moving forward. When there is an obstacle in front and the distance is less than the set distance, the car will turn left to avoid the obstacle.