

Multi-functional Smart Car

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i. *Points of this Section*

- ii. *After learning lesson 0~5, I think you have a deep understanding of the various functions of the robot car. Now, it's time for us to combine*
- iii. *all functions together injecting the soul into the robot car, and achieve a more dazzling operation.*

iv. *Learning Objectives:*

- a.  *Learn how to combine app with the car to ensure rocker control function by using bluetooth.*
- b.  *Learn how to combine app with the car to ensure Graphical Programming by using bluetooth.*

v. *Preparations:*

2. *A vehicle (equipped with battery) A USB cable*

- a.
3. *A Bluetooth*

- b. *module An iPhone or tablet*



I . Rocker control

STEP1: Upload the program

Open the code file in the path “\Elegoo Smart Robot Car Kit V3.0 Plus\Lesson 6 SmartCar_Multi_function\Rocker_Control” and upload the program to the UNO board.



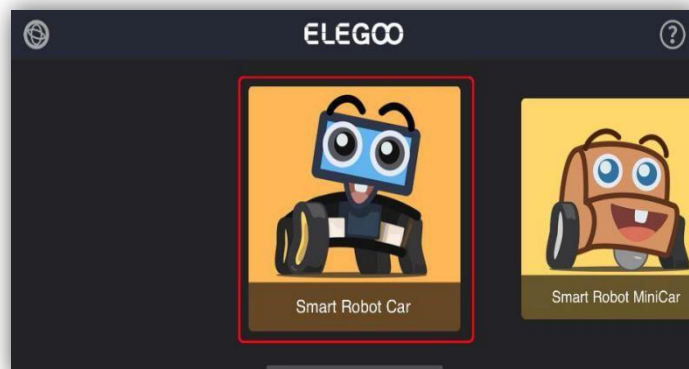
Disconnect it from the computer, and then switch on the car's power supply.

(TIPS: The Bluetooth module should be pulled out when you upload the program, or it will be failed to upload the program.)


STEP2: Open the "Elegoo BLE Tool" App.



STEP3: Select the "Smart Robot Car".

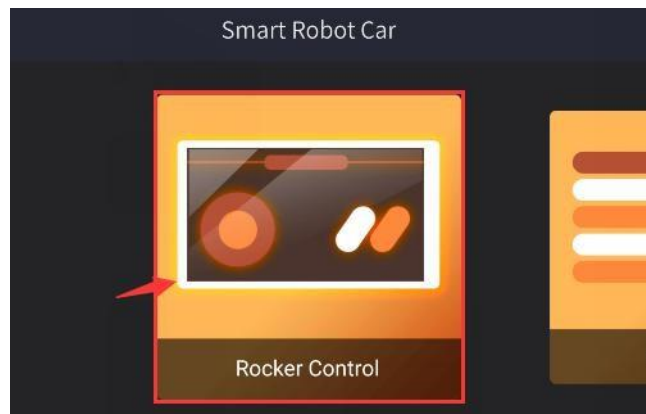


STEP4: Connect Bluetooth

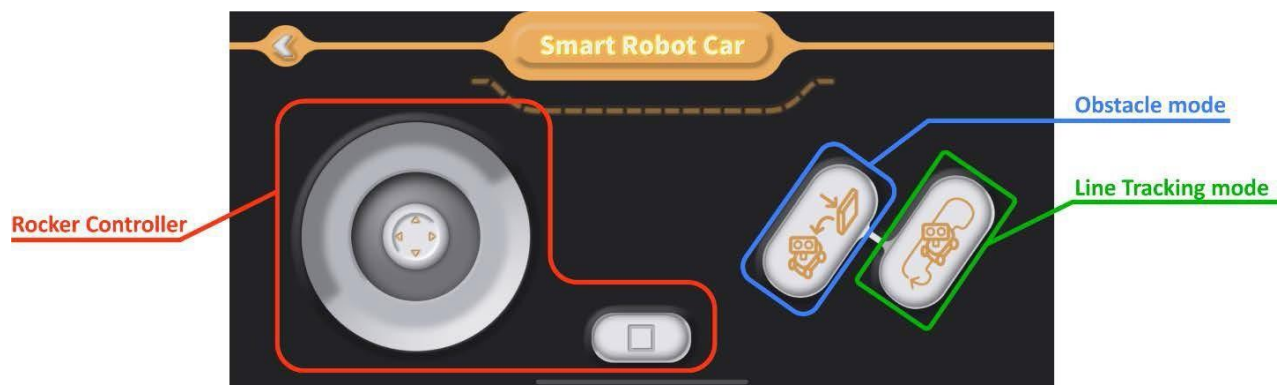
Click Smart Robot Car to enter the control page. Then tap the “” icon to enter the Bluetooth searching interface. **Refer to Lesson 2 for details.**



STEP5: Please Click "Rocker Control".



STEP6: Introduction of Interface Function



The main functions in the Rocker Control panel are divided into three parts:

Rocker controller: You can freely control the movement of the Smart Car, press the square button to stop the car.

Obstacle mode: The car will turn into the obstacle avoidance mode, which is the same as the function in Lesson4.

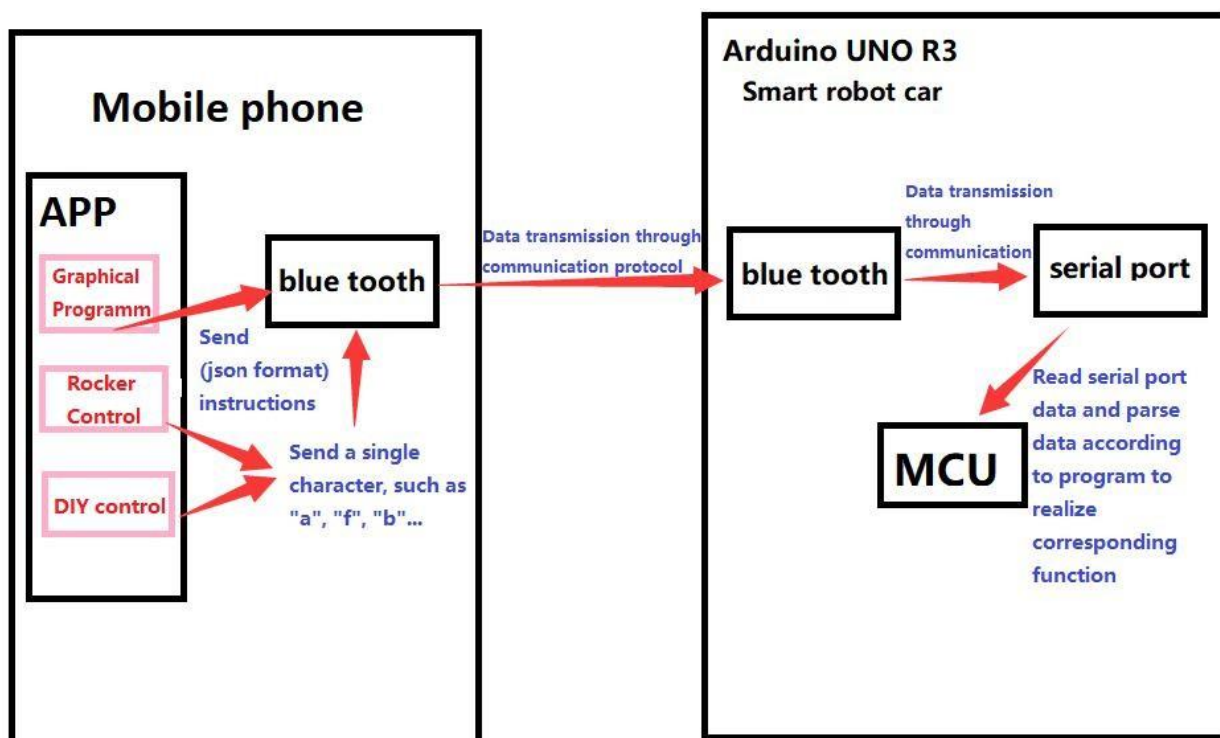
Line tracking mode: The car will turn into the line tracking mode, which is the same as the function in Lesson 5.

II. Graphical Programming

Principle:

Every function of graphical programming in APP is realized by sending a string (Json data format) to Bluetooth on Robot Car Development Board through Bluetooth on mobile phone. Then Bluetooth on Robot Car Development Board sends the string to serial port. In the program, the string is removed by reading the data received by serial port. The key content of the implementation function in the fixed format is parsed out, and then the corresponding function is realized if the strings of the implementation function are identical.

The string (Json data format) is roughly formatted as follows: {"N": 2, "D1": 1}



Robotic cart instruction based on graphical programming (Json format)

"Car 3.0 + instruction V2" details are as follows:

Ultrasound module

command	{ "N":21, "D1":parameter 1 }
function	Check if an obstacle is detected
return	{false} : No obstacles were detected {true} : Obstacles detected {Ultrasound numerical value}
Description of parameters	1: Query whether obstacles are detected 2: Query the Value of the Ultrasound Sensor

Tracing module

command	{ "N":22, "D1":0 }
function	Query Trace Sensor for Black Line Detection
return	{ false} : No black line detected {true} : Black line detected
Description of parameters	parameter D1 0 : left tracking sensor 1 : Intermediate tracking sensor 2 : Right tracking sensor

Sport mode

command	{ "N":1, "D1":parameter 1, "D2":parameter 2, "D3":parameter 3 }
function	Sets the direction and speed of motor motion
return	{ok}
Description of parameters	parameter 1 (select the corresponding motor) 0 : All motors 1 : left front motor 2 : Right front motor 3 : left rear motor 4 : Right rear motor parameter 2 (selected direction of motor rotation) 0 : stop 1 : Forward 2 : Reverse 3 : no processing parameter 3 (the selected motor speed value)

	Speed value range: 0~255 parameter 4 Duration of motor rotation User input value, 0-20 seconds
command	{“N”:4,”D1”:parameter 1,”D2”:parameter 2,”T”:parameter 4}
function	Sets the direction and speed of motor motion
return	{ok}
Description of parameters	parameter 1 (selected direction of motor rotation) 1: turn left 2: Turn right 3: Advance 4: Back parameter 2 (the selected motor speed value) Speed value range:0~255 parameter 4 Duration of motor rotation User input value, 0-20 seconds

command	{“N”:40,”D1”:parameter 1,”D2”:parameter 2 }
function	Sets the direction and speed of motor motion
return	{ok}
Description of parameters	parameter 1 (selected direction of motor rotation) 1: turn left 2: Turn right 3: Advance 4: Back parameter 2 (the selected motor speed value) Speed value range: 0~255

Clear mode

command	{“N”:5 }
function	clears all functions being executed
return	{ok}
Description of parameters	

Remote switching mode command

command	{“N”:3,”D1”:parameter 1 }
function	switch car mode
return	
Description of parameters	parameter 1 1 : Tracking mode 2 : obstacle avoidance mode

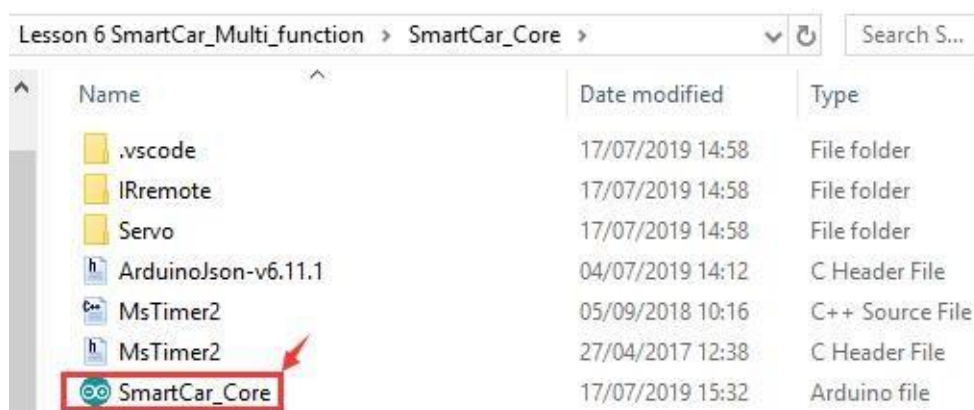
Rocker move command

command	{“N”:2,”D1”:parameter 1 }
function	The car moves in a certain direction. The default maximum speed.
return	{ok}
Description of parameters	parameter 1 1: turn left 2: Turn right 3: Advance 4: Back 5: Stop

III. Specific Operation:

STEP1: Upload the program

Open the code file in the path “\Elegoo Smart Robot Car Kit V3.0 Plus\Lesson 6 SmartCar_Multi_function\SmartCar_Core” and upload the program to the UNO board.

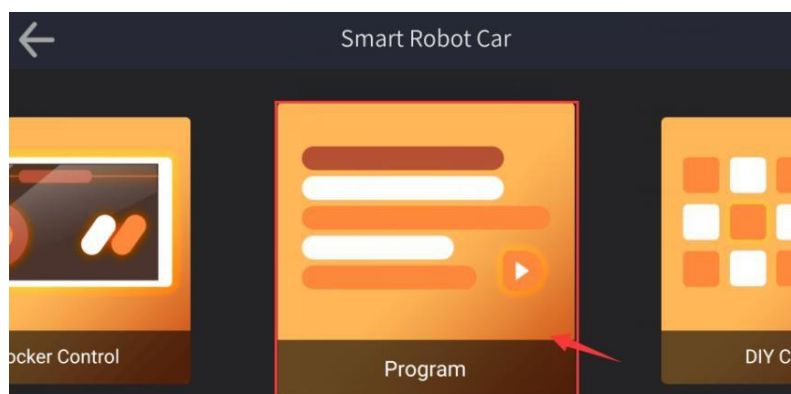


Disconnect it from the computer, and then switch on the car's power supply.

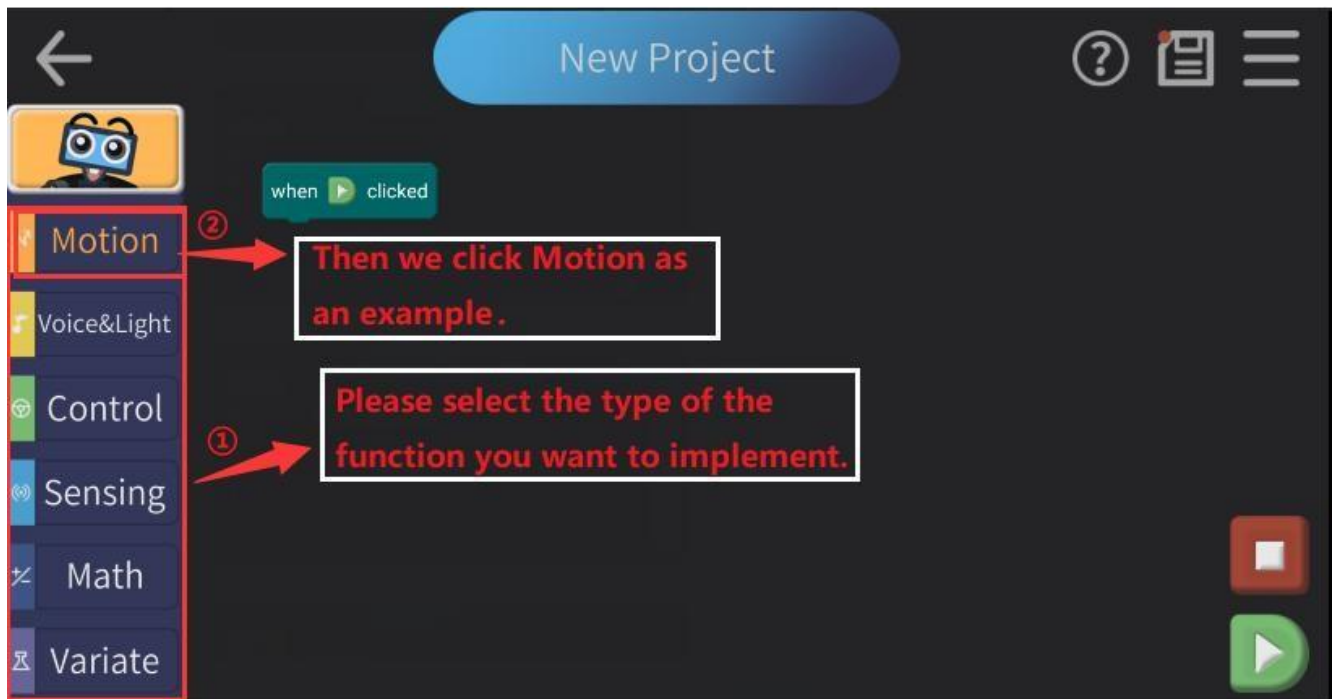
(TIPS: The Bluetooth module should be pulled out when you upload the program, or it will be failed to upload the program.)

STEP2,3,4: The same as the previous chapter.

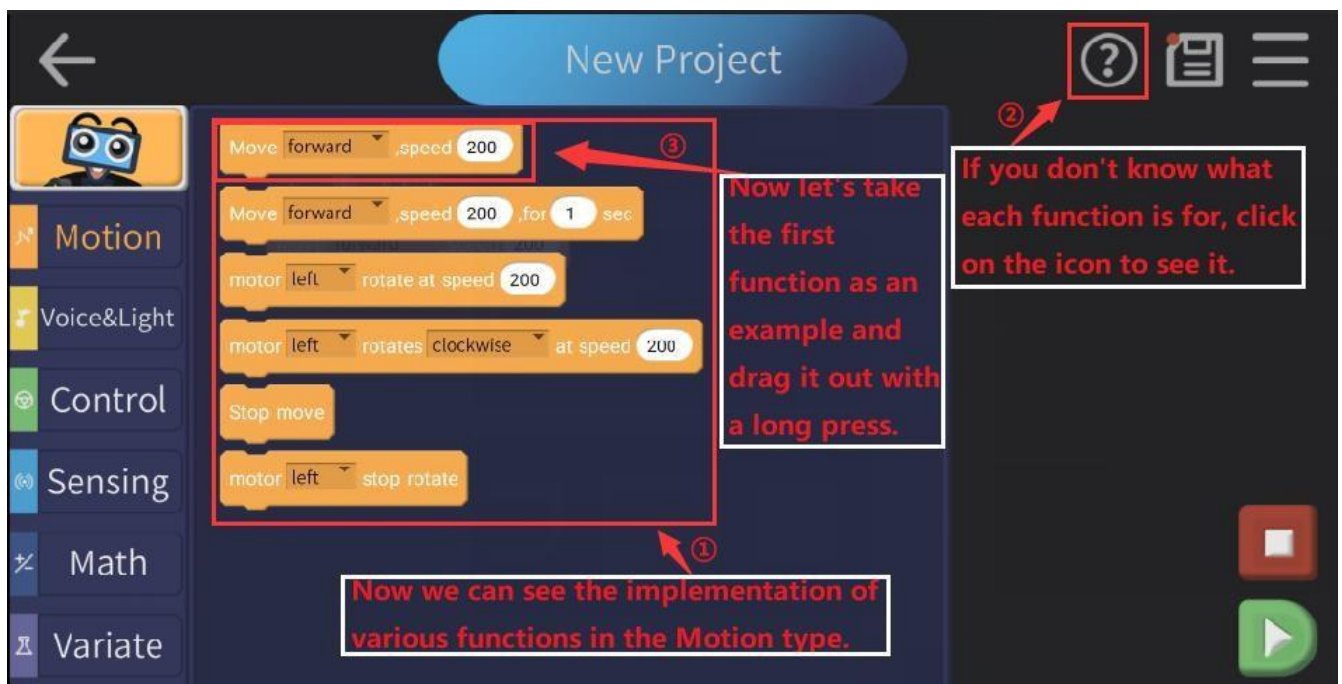
STEP5: Please click "Program".



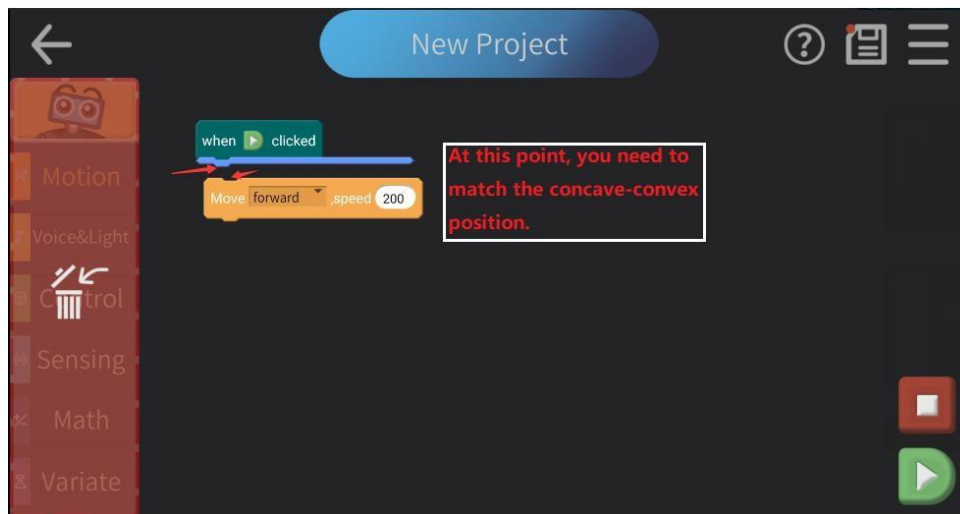
STEP6:



STEP7:



STEP8:



STEP9: Finally, we can see the "ELEGOO".

