Product name： OpenBot

Product model：

Project No：

1、Product description

We utilized smartphone to equip robots with widespread sensor kits, powerful computing power, the most advantage communication channels, and enter the growth software ecosystem. We designed a small-sized electric automobile as the car body for standard Android smartphones. We developed a software which allows smartphones moving with this body, it proves that system function is powerful and could afford the senior robots' workload, such as following the tracks of people and real time autonomous navigation in unstructured environment. Control experiments shows that method has good robustness on different smartphones and robots.

According to the different products' characteristics, we classify the OpenBot cars into two types: arduino TT motor and esp32 520 motor, different types support different functions, performance and appearance.

2、Arduino TT motor

2.1 Appearance

3D picture
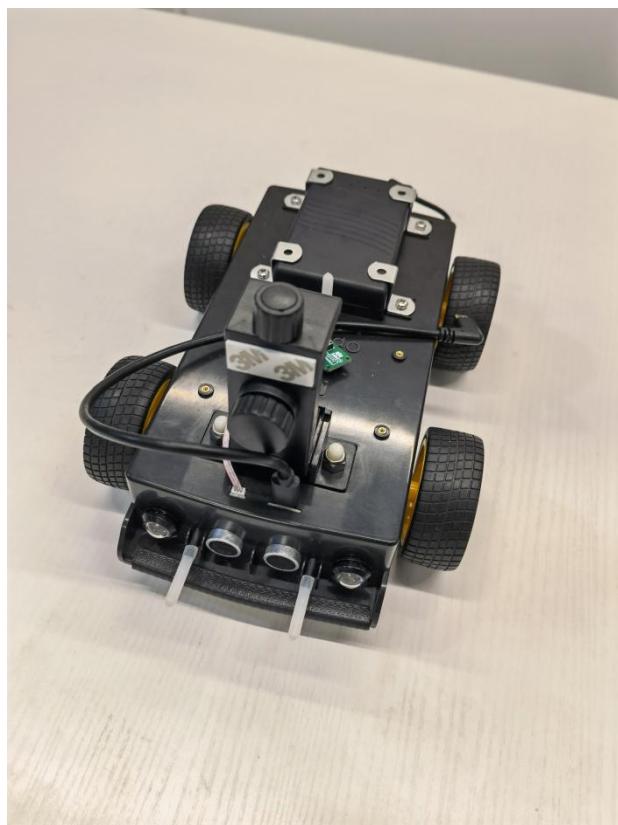
Physical picture

2.2 Function

Arduino TT motor Function introduction of model intelligent car

2.2.1 Obstacle recognition

The car can recognize the obstacles in front through the mobile app, and send the signal to the Arduino microcontroller through USB to control the movement or stop of the car.

2.2.2 Follower

In the following personnel mode, the trolley will follow the designated personnel and keep a certain distance.

2.2.3 Intelligent cruise

The user can set the cruise route of the car through the app. After determining the route, the car will cruise repeatedly in the route set by the user.

2.2.4 collision detection

When the vehicle encounters a collision in front or behind, the vehicle will stop running immediately.

2.2.5 Speed detection

The car can detect its own running speed and return the data to app display.

2.2.6 lighting

The car can use front and rear lights, and can walk on the ground in a dark environment.

2.2.7 Status display

The user can read the current status of the trolley according to the LED light on the top.

2.2.8 Mobile steering

The operator can use the handle or app to control the movement and steering of the trolley.

2.2.9 remote control

The trolley is equipped with a remote controller, which can remotely operate the traveling direction of the trolley.

2.3 performance

Name	Content
Charging time	Arduino TT motor：2.5 hours
Usage time	Arduino TT motor：Maximum speed 1 hour
speed	Arduino TT motor：730 / min
Voltage	Arduino TT motor：3V

2.4 Assembly

2.4.1 Mobile phone bracket

There is a mobile phone bracket above the car, and the user can place the mobile phone on the bracket and connect the USB interface.

2.4.2 ultrasonic sensor

There is an ultrasonic sensor in front of the trolley. If there is an obstacle within 7cm in front, it will send a signal to stop the trolley.

2.4.3 Collision sensor

There are two collision sensors at the front and rear of the trolley, which will send a signal to stop the trolley when encountering an obstacle.

2.4.4 Speed measuring device

The wheel is equipped with a speed measuring device, which can measure the current Trolley Speed and send it to app.

2.4.5 Eagle eye headlamp

The front and rear of the trolley are equipped with eagle eye headlights to provide lighting function.

2.4.6 LED light

The top of the trolley is equipped with LED lights to read the current status of the trolley.

3、esp32 520 motor

3.1 Appearance
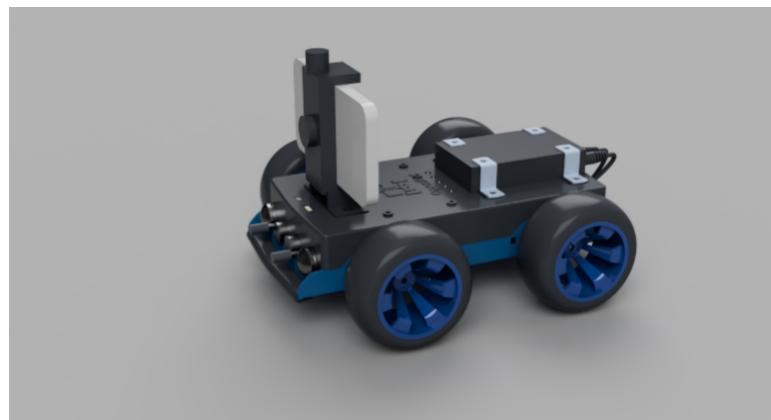
3D picture
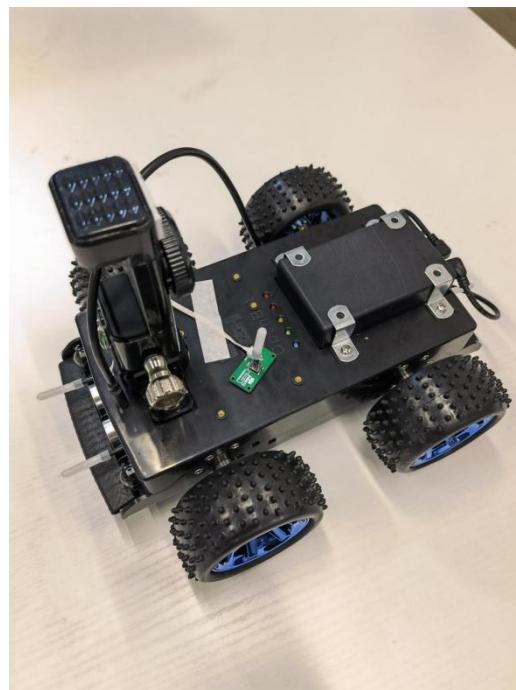
Physical picture

3.2 Function

Introduction of Arduino TT motor intelligent car function

3.2.1 Obstacle recognition

The car can recognize the obstacles in front through the mobile app, and send the signal to the Arduino microcontroller through USB to control the movement or stop of the car.

3.2.2 Follower

In the following personnel mode, the trolley will follow the designated personnel and keep a certain distance.

3.2.3 Intelligent cruise

The user can set the cruise route of the car through the app. After determining the route, the car will cruise repeatedly in the route set by the user.

3.2.4 collision detection

When the vehicle encounters a collision in front or behind, the vehicle will stop running immediately.

3.2.5 Speed detection

The car can detect its own running speed and return the data to app display.

3.2.6 lighting

The car can use front and rear lights, and can walk on the ground in a dark environment.

3.2.7 Status display

The user can read the current status of the trolley according to the LED light on the top.

3.2.8 Mobile steering

The operator can use the handle or app to control the movement and steering of the trolley.

3.2.9 remote control

The trolley is equipped with a remote controller, which can remotely operate the traveling direction of the trolley.

3.2.10 Wifi

Esp32 520 motor vehicles support WiFi connection

Wi-Fi main features：

802.11 b/g/n

802.11 n (2.4 GHz) speeds up to 150 Mbps

Wireless multimedia (WMM)

Frame aggregation (TX / RX A-MPDU, Rx A-MSDU)

ACK (immediate block)

Reorganization

Beacon automatic monitoring (hardware TSF)

four × Virtual Wi Fi interface

At the same time, it supports infrastructure BSS station mode / SoftAP mode / hybrid mode

Please note that when esp32 scans in station mode, the SoftAP channel will change at the same time

Antenna Diversity

3.2.11 Bluetooth

Esp32 520 motor vehicles support Bluetooth connection

Main features of Bluetooth

Bluetooth v4 2 complete standard, including traditional Bluetooth (BR / EDR) and low power Bluetooth (ble)

Supports standard class-1, class-2, and class-3 without the need for an external power amplifier

Enhanced power control

Output power up to + 9 dBm

The nzif receiver has a ble reception sensitivity of – 94 DBM

Adaptive frequency hopping (AFH)

Standard HCI based on SDIO / SPI / UART interface

High speed UART HCI up to 4 Mbps

Support Bluetooth 4.2 br / EDR and ble dual-mode controller

Synchronous connection oriented / extended synchronous connection oriented (SCO / ESCO)

CVSD and SBC audio codec algorithm

Bluetooth piconet and scatternet

Multi device connection supporting traditional Bluetooth and low-power Bluetooth

Support simultaneous broadcast and scanning

For more performance details, please refer to the technical documents on Lexin's official website:
https://www.espressif.com/sites/default/files/documentation/esp32_datasheet_cn.pdf

3.3 Performance

Name	内　　　容
Charging time	*esp32 520 motor：* 2 hours
Usage time	*esp32 520 motor：* Maximum speed 30 minutes
speed	*esp32 520 motor*： 530 / min
Voltage	*esp32 520 motor*： 3V-12V

3.4 Assembly

2.4.1 Mobile phone bracket

There is a mobile phone bracket above the car, and the user can place the mobile phone on the bracket and connect the USB interface.

2.4.2 ultrasonic sensor

There is an ultrasonic sensor in front of the trolley. If there is an obstacle within 7cm in front, it will send a signal to stop the trolley.

2.4.3 Collision sensor

There are two collision sensors at the front and rear of the trolley, which will send a signal to stop the trolley when encountering an obstacle.

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The wheel is equipped with a speed measuring device, which can measure the current Trolley Speed and send it to app.

2.4.5 Eagle eye headlamp

The front and rear of the trolley are equipped with eagle eye headlights to provide lighting function.

2.4.6 LED light

The top of the trolley is equipped with LED lights to read the current status of the trolley.

FCC Warnning:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection againstharmful interference in a residential installation. This equipment generates, uses and can radiateradio frequency energy and, if not installed and used in accordance with the instructions, maycause harmful interference to radio communications. However, there is no guarantee thatinterference will not occur in a particular installation. If this equipment does cause harmfulinterference to radio or television reception, which can be determined by turning the equipmentoff and on, the user is encouraged to try to correct the interference by one or more of thefollowing measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.