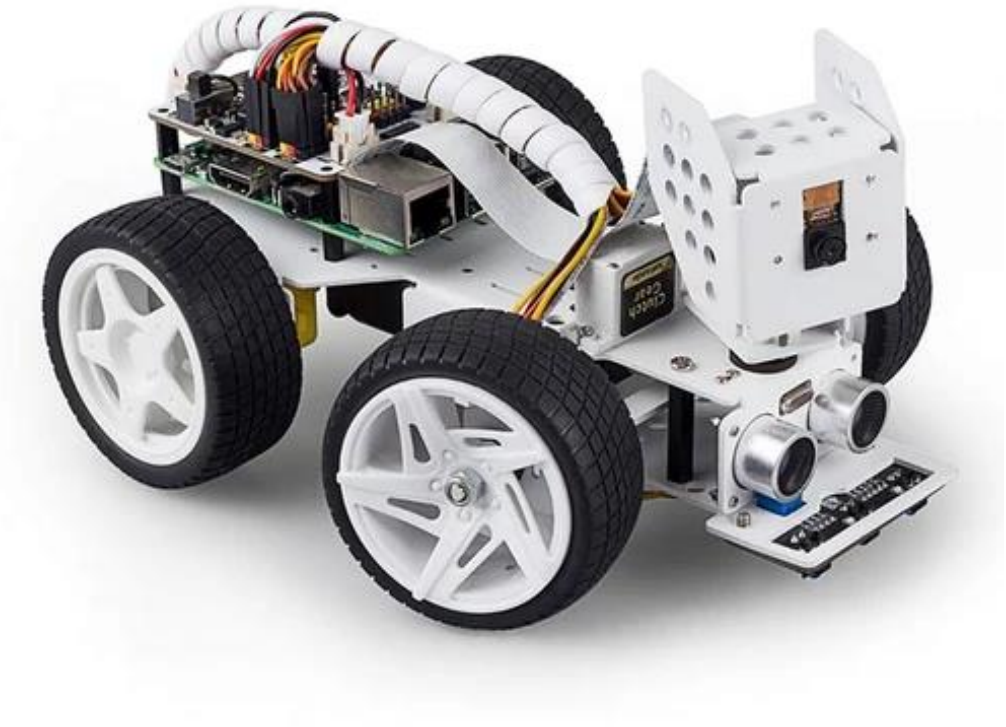
PiCar-X

General Information



1-Description

SunFounder PiCar-X is an AI self-driving robot car for Raspberry Pi, on which RPi works as the control center. It is a tech toy to build a small robot to explore many learning activities. It is built with a robust finished aluminum body and include a Robot HAT board based on raspberry pi development. Picar-X is easy to be controlled and includes multiple Playing Modes.

The mounted camera module, ultrasonic module, and line tracking module can separately realize the functions of color detection, face detection, automatic obstacle avoidance, automatic line tracking, etc. Taking the SunFounder-designed Robot HAT for Raspberry Pi as the driving module, it integrates the motor driving, servo driving, and presets ADC, PWM, Digital pins for the function extension. A speaker has already been inserted in the Robot HAT to realize TTS (Text-to-Speech), sound effects, background music, etc.

2-Main Components

PiCar-X includes the following main components:

- Aluminum Body
- Four Wheels
- Two TT Motors
- Battery Holder
- Robot HAT with Speaker
- Camera Module
- Ultrasonic Module
- Grayscale Module
- Cross Servo Arm
- Double-Side Servo Arm
- One-Side Servo Arm
- Three Servos

3-Main Functions

3-1-Line Tracking & Cliff Detection

The three-channel grayscale module integrated in PiCar-X prevents the car from falling off the cliff when it moves freely, also for implementing walking along the line.

Figure 1. *Cliff Detection by PiCar-X [1]*

3-2-Obstacle Detection

PiCar-X has ultrasonic Sensor that can be used for experiments such as obstacle avoidance and automatic follow. Distance value can be read with the devices.

Figure 2. *Obstacle Detection and avoidance by PiCar-X [1]*

3-3- Real-time Video Transmission

The mounted camera in PiCar-X is capable of 2592*1944-pixel static images and supports 1080p30, 720p60, 480p60/90 video. With a 180°wide angle, it can capture wider visual scenes. Besides, four wheels with powerful motors, shows strong flexibility on back and forth. It can be realized 360° turning.

Figure 3. *Video Capture by PiCar-X [1]*

3-4-AI Detection (Color/Face Recognition)

PiCar-X can separately realize the functions of color detection, and face detection. However, only one color can be detected for one time. Support colors are red, orange, yellow, green, blue, and purple.

Figure 4. *Color/Face Recognition by PiCar-X [1]*

3-5- Music and Sound Effects

A speaker has already been inserted in the Robot HAT to realize TTS (Text-to-Speech), sound effect, and background music. A funny interaction may be developed with this function; such as, programmable text message "hello" to play when it sees friends. There are camera and music modes that give the car the sense of science and technology.

Figure 5. *Color/Face Recognition by PiCar-X [1]*

3-6-Python & Blockly Visual Programming

PiCar-X guides you to grasp the blockly Python program skill. It comes with the free Ezblock Studio APP compatible with iOS, Android, PC, Phone, and Tablet. You can learn the block-based coding skills while developing critical thinking skills.

Figure 6. *Python Programming for PiCar-X [1]*

References & Useful Links

[1]. SunFounder Website for PiCar-X

https://www.sunfounder.com/collections/featured-products/products/picar-x

[2]. Raspberry Pi Basics

https://picar.readthedocs.io/en/latest/chapters/tutorials/raspberry_pi_basics.html

[3]. PiCar-X's Documentation

https://docs.sunfounder.com/projects/picar-x/en/latest/

[4]. PiCar-X Examples

https://github.com/sunfounder/picar-x

[5]. PiCar-X Sample Files

https://github.com/asgariha/PiCar-Sample-Files

[6]. PiCar-X Commands for Writing Python Codes

https://docs.sunfounder.com/projects/picar-x/en/latest/python_move.html

[7]. Installation of code visual studio

https://code.visualstudio.com/

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https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

[9]. Finding the IP Address of your Raspberry Pi

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[10]. How to connect raspberry pi to wifi

https://raspberrypihq.com/how-to-connect-your-raspberry-pi-to-wifi/

[11]. Setup WiFi Network on Raspberry Pi 3: Wireless Settings (Video)

https://www.youtube.com/watch?v=DLapTt3anX8

[12]. Common Linux Commands

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