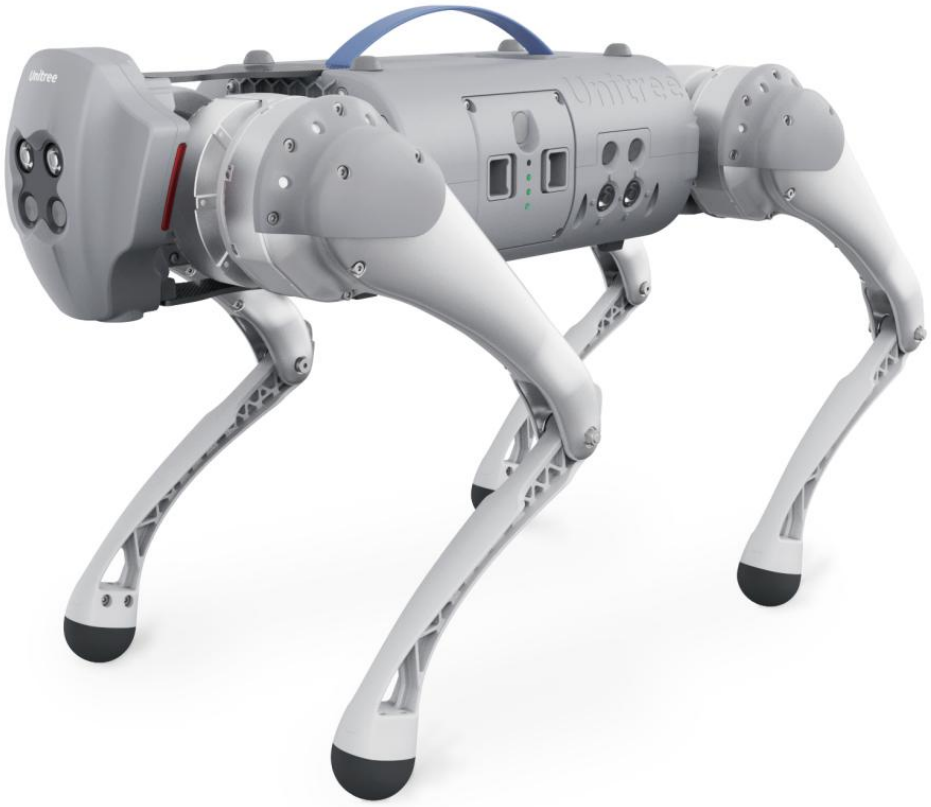
Go 1

Go Wherever You Will Go



Unitree

Unitree Robotics

Go1

Physical Characteristics

Basic information

Dimensions	LxWxH(Stand)	0.645*0.28*0.4m
	LxWxH(Folded)	0.54*0.29*0.13m
Machine	（with battery）12 kg	
Load	5kg（EDU version）3kg（other version）	
Maximum speed	3.7 m/s（Air version 2.5m/s）	
Operating time	1-2 h	
Maximum angle climb	35°	
DOF	Total 12, one leg 3	
Power Outputs	5V、12V、24V etc.	
Abundant External Interface	HDMI*3; Gigabit Ethernet port*1; USB*3; Integration Interface *1	
Protected Mode	Fall protection, overheat, emergency stop protection	
Warning	Low voltage, High temperature, Short circuit, overcharge	
Foot Force sensor	4 (only EDU)	
Control	Remote/slide-follow/automous	

Brain System

Main board

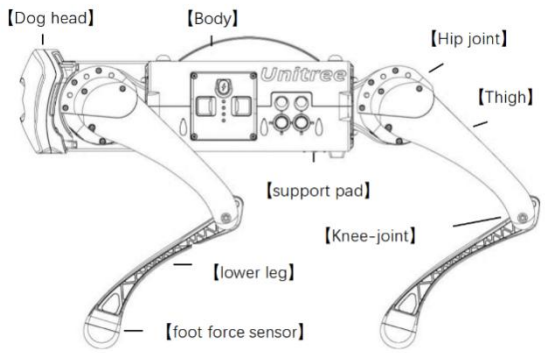
Controllers	Basic Motion	×1
	Motion	×1, 4core@1.5GHz, memory DDR4L 2GB, flash memory 32GB
	Sensory controller	×1 or ×3,Nano
Processor upgrade	EDU version machine support changing Nano to NX	
Heat-dissipating method	cooling fin +fan	

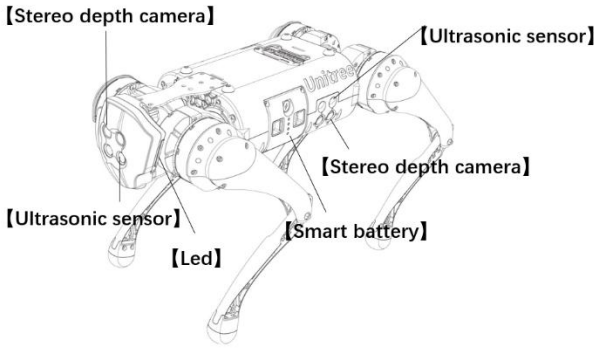
software

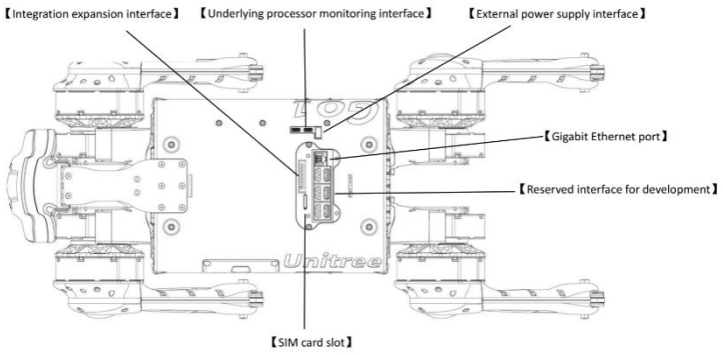
Real-time operating systems	Motion control: Ubuntu Environmental Perception: Ubuntu-ROS
Framework	ARM
Programming	C++or C, Python, Graphical programming

Connect

Network	GE/WiFi	4G or 5G
Data	USB	Integration Interface
Others	HDMI	Bluetooth transfer image







MEN-MACHINE interaction

Remote control handle

Type	Unitree Go1
Detachable rocker	2
Charging port	Type C
LED	Power display and charging status
Battery life	4 h

Smaller controller (UWB)

Angular positioning accuracy	±5°
Positioning distance	0.1-3m
Sampling rate	50 Hz
Control mode	rocker*1, button*4, antenna*1
Battery life	4h

Speaker

Sound track	left& right
Rated resistance	4 Ω
Diameter	23.7 mm
Scope of influence	380Hz-10KHz
Power rating	2 W
Sensitivity	82 DB
Quantity	1
secondary development	Support

Mobile phone APP

Virtual joystick buttons	Support
Image Retransmission	Wifi/4G/5G
Simulator	immersive robot dog simulator features
Function	RGB, depth map switch

Light

Secondary development	support
LED	64-color ambient light

Environmental sensors

Fish-eye Stereo Depth Cameras

Sets	5
Totally Units	10
Single depth camera lens angle	150*170
Fish-eye AI Perception	Human Recognition

Ultrasonic sensory

Mileage	5-200cm, 20-200cm (tail)
Measurement accuracy	±(1+S*3%)
Temperature compensation	Support

Foot force sensors

Dimension	1
Quantity	4
Resolution ratio	5g

High precision laser radar

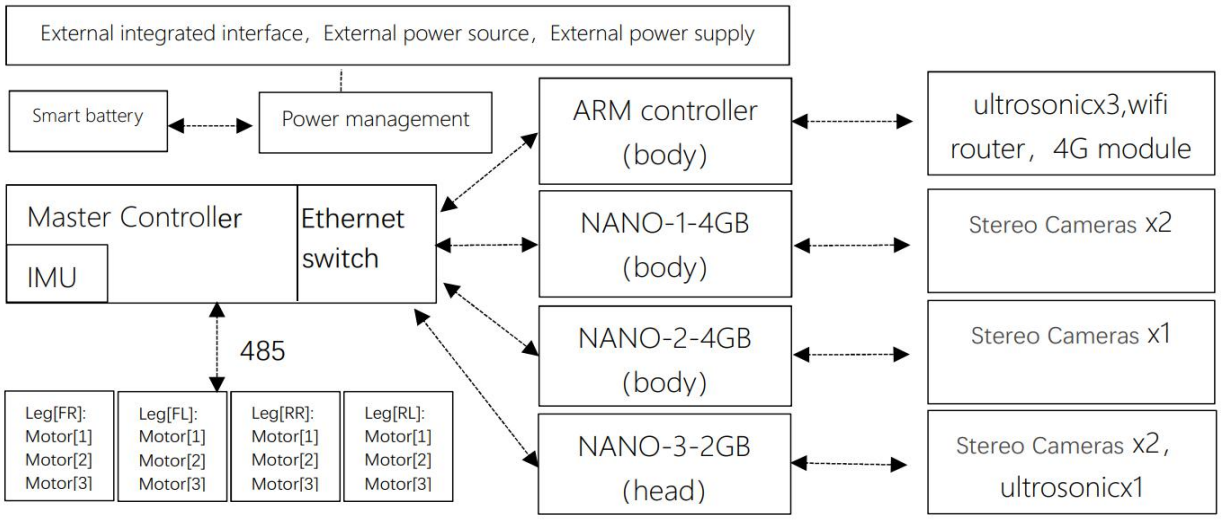
Radar type	2D lidar	3D lidar (16line)
Measuring distance	≤40m	Reach 100m
Operating voltage	5v	9-18V
Operating temperature range	-5℃～ 45℃	-10 ℃ ～ +60℃
Weight	165g	830g
Equiped functions	Navigation planning, dynamic obstacle avoidance, autonomous positioning, map construction and other functions. Support secondary development	

Inertial measurement unit (IMU)

Body IMU quantity	1
DOF	6
Dynamic accuracy	1°

User-friendly interface

- User PC could use ethernet to connect directly to the robot's built-in motion controller, sensory controller and underlying controller
- The robot base controller, robot on-board controller and user PC can communicate freely with each other to facilitate real-time transfer of visual perception and other data.
- Robot on-board sensors are fully open, available for secondary development
- Develop the underlying control: All motors and sensors of the robot can be read and controlled in real time, facilitating the direct use of open source robot algorithms
- Develop high-level control: could send high-level motion commands such as backward, forward, left, right and left movement directly to the robot



Break global speed record in same class

Powerful and reliable power system

Intelligent Side-follow System

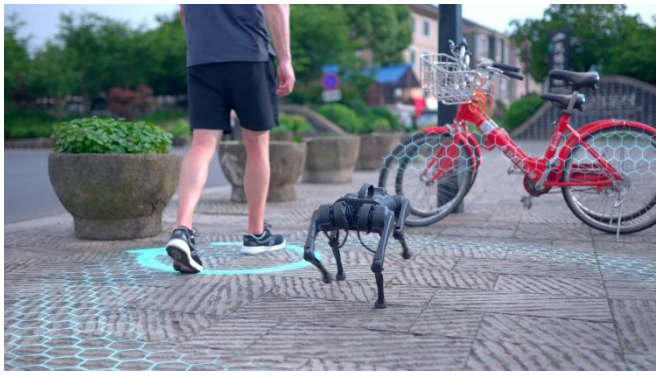
Adopt Patented Wireless Vector Positioning and Control Technology

- Robot walks alongside its human master, which is much better than the conventional following mode. Besides, the human-machine interaction is both harmonious and safe.
- No need to worry about the robot since it's right beside you.
- Capable of helping robot choosing better route in complex environment

Super Sensory System

Full View Coverage

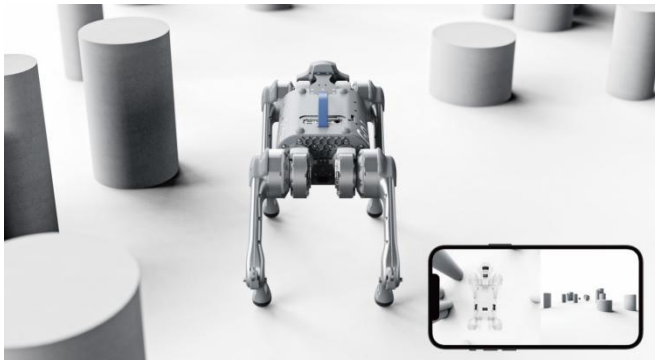
- 5 Sets Fish-eye Stereo Depth Cameras + Ai Post-processing + 3 Sets Hypersonic Sensors
- 1 set fish-eye stereo Depth deception angle≈150×170°
- 1set fish-eye stereo depth perception ≈ 4 sets intel real sense perception angle
- So：5 sets fish-eye stereo Depth perception ≈ 20 sets intel real sense perception angle
- Fish-eye AI perception：body recognition etc.



Go 1 built-in Powerful AI

16 core CPU+ GPU (384Core, 1.5TFLOPS)

- For comparison, the Nvidia TX2 only has CPU (4 cores) +GPU(256Core, 1.3TFlops)



Parameter

（I）Hardware platform

- weight（with battery） 12kg±1.5kg
- L*W*H 0.645*0.28*0.4m
- Load capacity: 5kg
- Sufficient range of motion in all joints：
  Lateral hip swing joint：-40~+40°
  Anterior hip swing joint：-218~+45°
  Knee joint：+24~+132°
- Equip foot force sensor: provide foot force sensor feedback inferface
- Equip HDMI*3; Gigabit Ethernet port*1;、USB*3;、2 TYPE-C、1 SIM card slot、1 back Integration Interface *1. Abundant Teaching and research development interface
- fastest running speed 3.7m/s
- Built-in super Ai （ 16 cores CPU+ GPU （384Core,1.5TFLOPS））

•Equipped with abdominal power interface, supporting the expansion of wireless or touch autonomy charging function

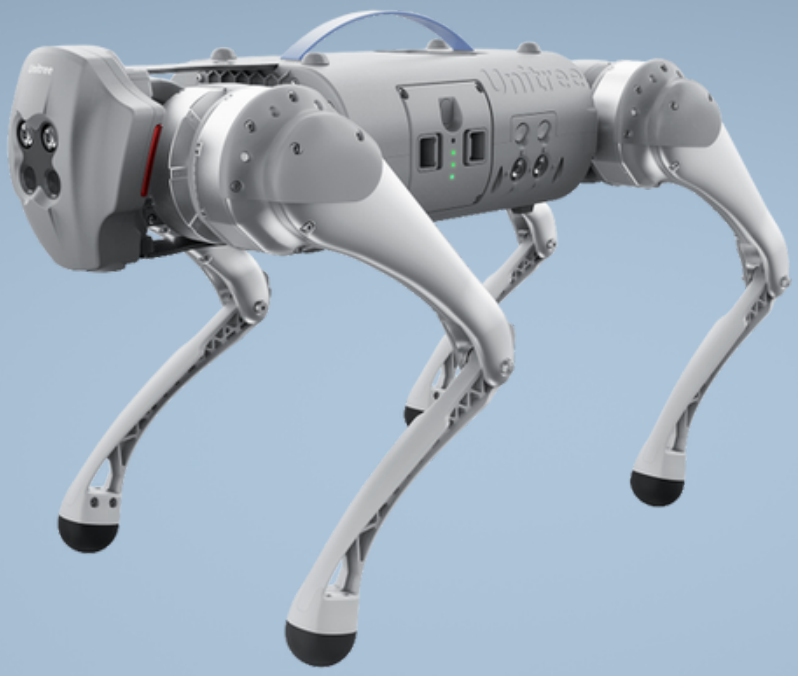
- Legs and body connection with omnidirectional flexible cushioning structure, can absorb the impact from all around

（II）Motion control hardware and software

- built-in ARM controller： motion controller 4cores @1.5GHz。memory DDR4L 2GB，flash memory 32GB
- fastest funning speed 4.7m/s（world record）
- With jumping air turn 90 ° / tap dance / space step / double leg stand and other functions
- Machine dog with good buffering function，owning the ability that to fall from a height of 1 meter without damage and to continue walking within 2 seconds

（III）Perception module

- Super Dynamic side-follow Autonomous Obstacle Avoidance System
- Built-in wireless vector positioning system
- Built-in 3 Nano controller
- Built-in 4 ultrasonic probe
- Built 5 Sets Fish-eye Stereo depth camera， Open 5 groups of fisheye binocular depth camera RGB map and point cloud map. Single group camera perception angle about 150°*170°
- built-in 1 3W loudspeaker
- built-in 4G module(include GNSS)： 4G remote control/image transformation/shout-out， GPS/BeiDou data acquisition
- God's eye view， APP immersion robot dog simulator function



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