Hessian Matrix Tech
黑森矩陣

RoboBaton™

Visual Spatial Computing Modules

Make spatial intelligence accessible

Official Website：www.hessian-matrix.com

Empower various terminals with stereo perception capabilities

RoboBaton, Hessian Matrix Technology's sensing and localization product suite, uses stereo vision and IMU to gather environmental and self-localization data. It calculates and outputs the device's real-time pose. This integrated system, combining sensors, algorithms, and computing platform, provides real-time pose and depth maps. It equips robots with 3D perception for mapping,localization, navigation, and obstacle avoidance in unknown environments. Available in two models: VIOBOT2 and MINI.

RoboBaton Series Products

Same lens module

VIOBOT2

MINI

(Tips: The mini only has an odometer, without depth maps and 3D reconstruction)

Mapping

Generate 3D pointcloud map with accurate metric scale.

Localization

The real-time 3D pose of the device within the mapping environment.

Obstacle avoidance

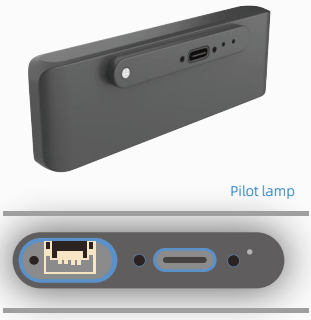
Real-time stereo depth-map estimation analysis for precise obstacle detection ahead.

Navigation

Provide path planning routines for rapid development of primary navigation algorithms.

MINI Introduction

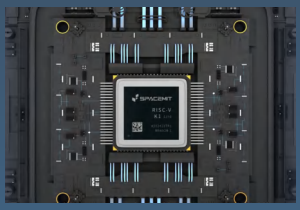
Mini is a front-end localization module applied to robots. It collects environment and its own data through stereo cameras and built-in imu, calculates and outputs the current position and pose of the device itself.



Lens module precision optimization

Improving anti-deformation perpormance with metal reinforcement.

High-performance RISC-V SoC inside

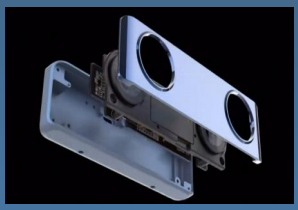


Cutting-edge reduced instruction sets architecture, offering excellent algorithm performance with low latency.

Dual Fisheye Camera

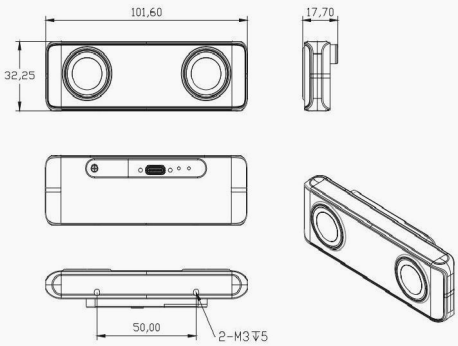
164.7°(D) ultra-wide Filed of View，more texture detail captured leads to better accuracy and robustness.

Compact and light



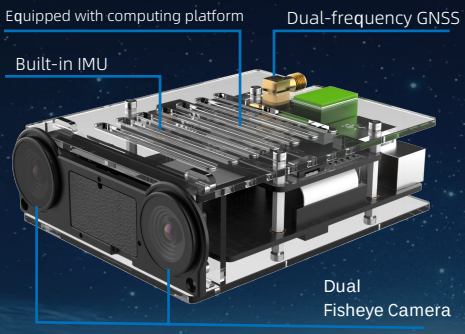
The weight is only 22 grams without the casing.

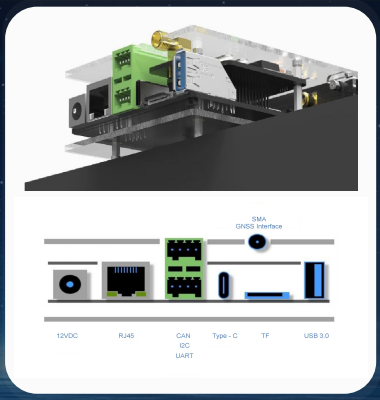
MINI Parameters

Fisheye Camera	Sensor Tech	Global shutter
	Resolution @ frame rate	640x480 @ 40fps
	FOV	164.7°（D）,164.7°（D）,123.8°（V）
	Baseline	60mm
IMU	DoF	3 axis acceleration +3 axis angular velocity
	Frame rate	200Hz
	Hardware synchronization trigger delay	≤0.6ms
Physical interface	Type-C、UART	
Electrical parameter	Power supply	DC5V
	Power Consumption	Full load power consumption <2.7W
Algorithm output	odometer	200Hz
Basic parameter	Ambient temperature	-25℃ ~ 55℃
	Ingress Protection	IP68
	SDK- Support system	windows/linux
	SDK-Transport protocol	HTTP/ROS2
	Dimensions/Weight	 101.6mmX32.25mmX17.70mm/68g

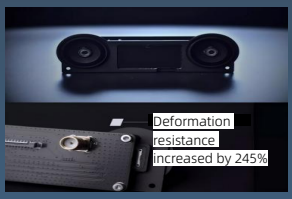
VIOBOT2 Introduction

Viobot2 is a front-end localization module for robots, which uses stereo fish eyes and built-in imu hard time synchronization, coupled with dual-frequency GNSS, to provide continuous and stable navigation and positioning indoors and outdoors.





The same lens module as the mini

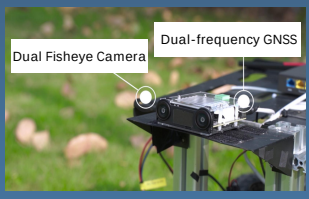


Improving anti-deformation perpormance with metal reinforcement.

Three-dimensional reconstruction algorithm

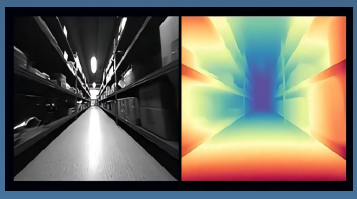
Our self-developed pure vision 3D reconstruction algorithm achieves a processing speed that is 9 times faster than industry-standard counterparts.

Integrated navigation



A multi-sensor fusion system (vision + IMU + GNSS/ RTK) that provides real-time Position and orientation Estimation.

Stereo Depth

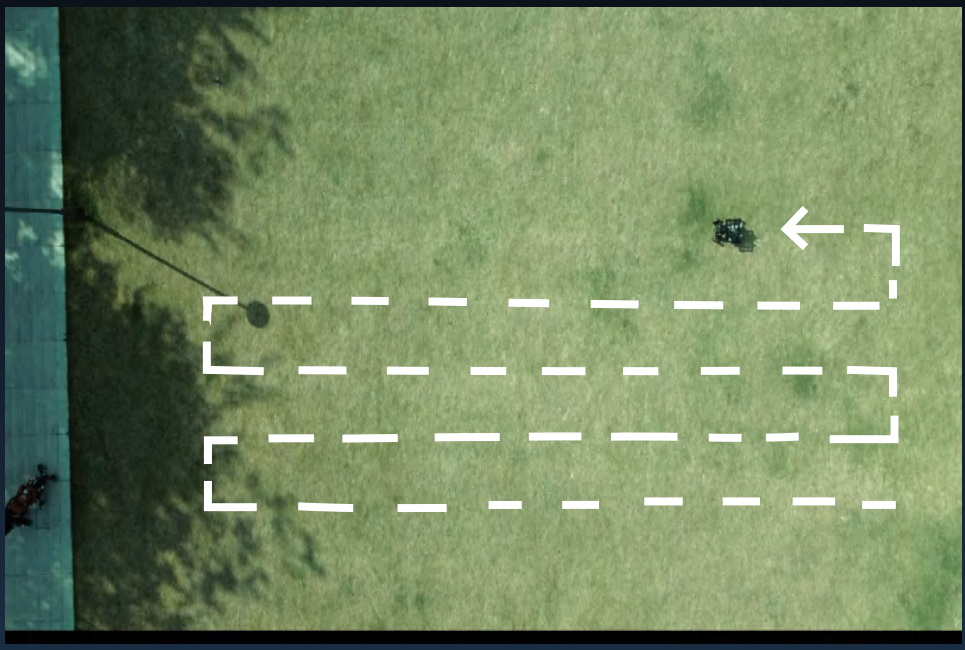


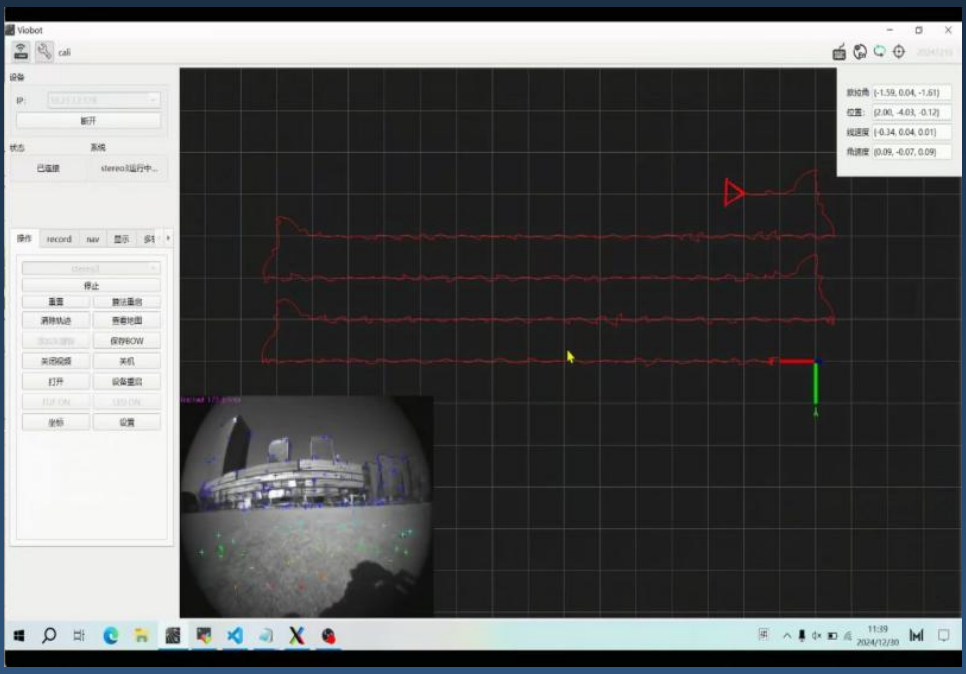
Utilizing a self-developed pure vision algorithm based on deep neural networks to acquire depth maps with a resolution of 384*288, which offers greater stability compared to traditional algorithms.

VIOBOT2 Parameters

Computing platform	CPU	Cortex-A76*4+Cortex-A55*4, up to 2.4GHz
	GPU	Mali-G610 MC4
		Support OpenGL ES1.1/2.0/3.1/3.2
		OpenCL 1.1，1.2，2.0 Vulkan 1.1，1.2
	NPU	6TOPS
	Memory	4GB/8GB
	Storage	32GB
Fisheye Camera	Sensor Tech	Global shutter
	Resolution @ frame rate	640x480 @ 40fps
	FOV	DFOV = HFOV = 164.7°, VFOV = 123.8°（V）
	Baseline	60mm
IMU	DoF	3 axis acceleration +3 axis angular velocity
	Frame rate	200Hz
	Hardware synchronization trigger delay	≤0.6ms
Physical interface	USB2.0/3.0、Type-C、RJ45、CAN、I2C、UART、SMA（GNSS Antenna interface）	
Electrical parameter	Power supply	DC 9~24V
	Power Consumption	11w
Algorithm output	VIO /GVIO Position and Orientation	200Hz
	Depth Accuracy	0.1m-3m
	Resolution @ frame rate	384*288@12fps
Basic parameter	Ambient temperature	-25℃ ~ 55℃
	Ingress Protection	None
	SDK- Support system	windows/linux
	SDK- Transport pr otocol	HTTP/ROS1/ROS2
	Dimensions/Weight	78mm x 101mm x 33mm/138g(withGNSS)/120g(without GNSS)

Field Testing





Application scenario

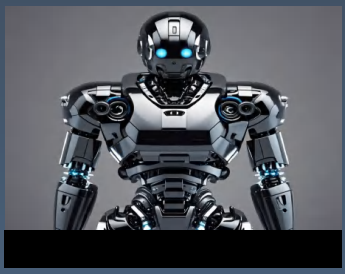
Low-speed delivery robot

Unmanned aerial vehicle

Garden robot

Commercial cleaning robot

Embodied intelligence



Inspection robot

Official communication group

Public account

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