

AIoT AutoVi 2



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- AI and IoT Convergence Practice Equipment based on Autonomous Driving Vehicle Platform
- Main Module, Edge Supercomputer Supporting All Popular AI Frameworks
- Provides 8M Pixel Wide-Angle Camera and Exclusive Bracket capable of Angle Adjustment
- Provides Gigabit Ethernet, Dual-Band Wi-Fi (2.4GHz, 5GHz) and Bluetooth 4.2
- Supports Various IoT Sensor Modules using Breadboard and Dedicated Extended Interface
- Satisfies Software Package and Required Service Type based on ROS2 Development Environment
- Adopts 4WD Structure Vehicle Frame Consisting of CNC Metal Mount Steering System, Shock Absorber and Carbon Fiber Chassis
- Supports Real Car-Like Driving Mechanism and Deep Learning-based Autonomous Driving Technology
- Adopts Large-Capacity Battery that Allows Practice while Charging
- Supports Soda OS and Pop Library, Exclusive AIoT Operating System
- Supports C/C++ Development Environment based on an Interpreter for Introductory Programming including Python 3
- Supports Web Browser-Based Learning Environment that Enable to Train Python 3 and C++ Simultaneously on PC and Tablet
- Supports Distributed Name Check based on DNS-SD, Network Service Publishing and Discovery
- Supports Open Integrated Development Environment based on Visual Studio Code for Professional Application Development
- Provides Learning Contents for Self-Driving Vehicle based on Artificial Intelligence and Deep Learning

© Software Specifications

	List	Specifications
Soda OS	Linux Kernel	aarch64 4.x
	Lightweight Desktop	X-Server, Openbox, lxdm, Tint2, blueman, network-manager, conky pcmanfm, lxterminal
	CLI	Zsh with Oh-My-Zsh, Tmux, Peco, Power Level 9K Thema, Powerline fonts
	Tool Chain	GCC (c, c++), JDK, Node JS, Python3, Cling
	IDE	Visual Studio Code, NeoVim, Geany
	Connectivity	SSH Server, Samba Server, Remote Desktop Server, mDNS(avahi) Bluez, MQTT Server(Mosquitto), Blynk Server
	Multimedia	PulseAudio, sox (lame, oggenc), snowboy, Google Assistant OpenGL ES, CUDA, OpenCV 4
	Data Science & AI	Numpy, Matplotlib, Pandas, Scipy, Seaborn Scikit-learn, TensorFlow, Keras, PyTorch, TorchVision, OpenAI Gym
Pop Library	Output Object	Led, Laser, Buzzer, Relay, RGBLed, DCMotor, StepMotor, Oled PiezoBuzzer, PixelDisplay, TextLCD, FND, Led Bar
	Input Object	Switch, Touch, Reed, LimitSwitch, Mercury, Knock, Tilt, Opto, Pir, Flame LineTrace, TempHumi, UltraSonic, Shock, Sound, Potentiometer, Cds SoilMoisture, Thermistor, Temperature, Gas, Dust, Psd, Gesture Co2, Thermopile, Microwave, Lidar
	Multimedia Object	AudioPlay, AudioPlayList, AudioRecord, Tone, SoundMeter
	Voice Assistant Object	GAssistant, create_conversation_stream
	AI Object	Linear Regression, Logistic Regression, Perceptron, ANN, DNN, CNN, DQN Pilot with AutoCar & SerBot
PC linkage development environment	Jupyter Lab	Python3 and Cling support IPython Widgets Terminal support Pop Library support
	Visual Studio Code	Remote SSH Python3 and Debugging support Terminal support Pop Library support

Hardware Specifications

List		Specifications
Body	Size	195 x 420 x 220mm(W x D x H)
	Weight	4.3Kg
	Battery	14.8V/7000mA
	Wheels	4 Wheels with Shock Absorber
	Motor 4 wheel drive Motor1ea	Rated speed 185 RPM (with Body Gear) Max Speed 0.85m/s
	Steering Servo Motor	Stall torque: 9.4 kgf·cm Operating speed: 0.17 s/60°
	Ultrasonic sensor	Front 2ea, Rear 2ea · Sensor operates at 40Hz · Range as 15cm · Maximum Range of 400 cm
	LED	Front 2ea, Rear 2ea
Main Module	TFT LCD with Touch Screen	Size: 5 inch Resolution: 960x544 Touch: 5-Points, Capacitive Interface: HDMI
	CPU	6-core ARM v8.2 64-bit 6MB L2 + 4MB L3 Max Freq: 6-core@1900MHz
	GPU	384-core NVIDIA Volta™ GPU with 48 Tensor Cores Max Freq: 1100MHz
	Memory	16GB 128-bit LPDDR4x@ 1600MHz
	Storage	16GB eMMC 5.1, NVMe 256GB SSD 1ea(M.2)
	Video Encoder	2x464MP/sec(HEVC), 2x4k@ 30(HEVC) 6x 1080p@ 60(HEVC), 14x 1080p@ 30(HEVC)
	Video Decoder	2x690MP/sec(HEVC), 2x4k@ 60(HEVC), 4x4k@30(HEVC) 12x1080p@ 60(HEVC), 32x 1080p@ 30(HEVC), 16x 1080p@30(H.264)
	CSI Camera	Up to 6 cameras(36 via virtual channels) 12 lanes MIPI CSI-2, D-PHY 1.2(up to 30 Gbps)
	Connectivity	Dual Band Wireless WiFi 2GHz/5GHz Band, 867Mbps, 802.11ac Bluetooth 4.2 10/100/1000 Base-T Ethernet
	Display Interface	HDMI 2.0
Base Board	USB	4x USB 3.0, USB C Type(OTG) 1ea
	PMIC Block	constant-current /constant-voltage Li-Ion battery charger controller LED indicate - Full Charge/Charging/Over Current
	Controller	ARM®32-bit Cortex®-M CPU CAN FD Communication Power Check, Battery Temperature Check
	Motor Driver	12V Operating Voltage Total DC Current up to 4A Overtemperature protection
	IMU sensor	Gyroscope Range: ±125°/s to ±2000° Accelerometer Range: ±2g/±4g/±8g/±16g Magnetic field range: ±1300uT(x-, y-axis), ±2500uT(Z-axis) Interface: I2C Supply Voltage: 3.3V
	Illuminance Sensor	Sensor : CdS Operating Voltage : 3.3V
	Ultrasonic Sensor	Front 2ea, Rear 2ea
	Sound	Audio Driver Block 1ch Microphone Omni-directional Sensitivity: -42dBV Stereo Speaker 2W
Option	Camera	Image Sensor: Sony IMX219 Resolution: 8M pixel native resolution sensor (3280 x 2464 pixel static images) Video: 1080p30, 720p60 and 640x480p90 Linux integration: V4L2 driver available Focal length: 3.04 mm Angle of view: 160 degrees Focal ratio (F-Stop): 2.35 Tilt Angle 120° Adjustable
	LiDAR	Distance Range : 12m Angular Range : 0 ~ 360degree Distance Resolution : <0.5(0.15 ~ 1.5meters) Angular Resolution : 0.9degree Sample Duration : 0.25 millisecond Sample Frequency : 4KHz Scan Rate : 10Hz

☉ Training Contents

Introduction of AIoT AutoVi

- Configuration of AIoT AutoVi
- Experiment Environment for AIoT AutoVi

Deep Learning-based Autonomous Driving Technology

- Overview of Autonomous Driving Technology
- Basic Autonomous Driving Practice
- Remote Operation Practice
- Crash Avoidance Practice
- Practice Following the Object
- Transfer Learning Practice
- Advanced Autonomous Driving

Data Processing Technology

- Numpy for Fast Multidimensional Matrix Calculation
- Pandas for Time Series and Tabular Data Analysis
- Matplotlib for Data Visualization

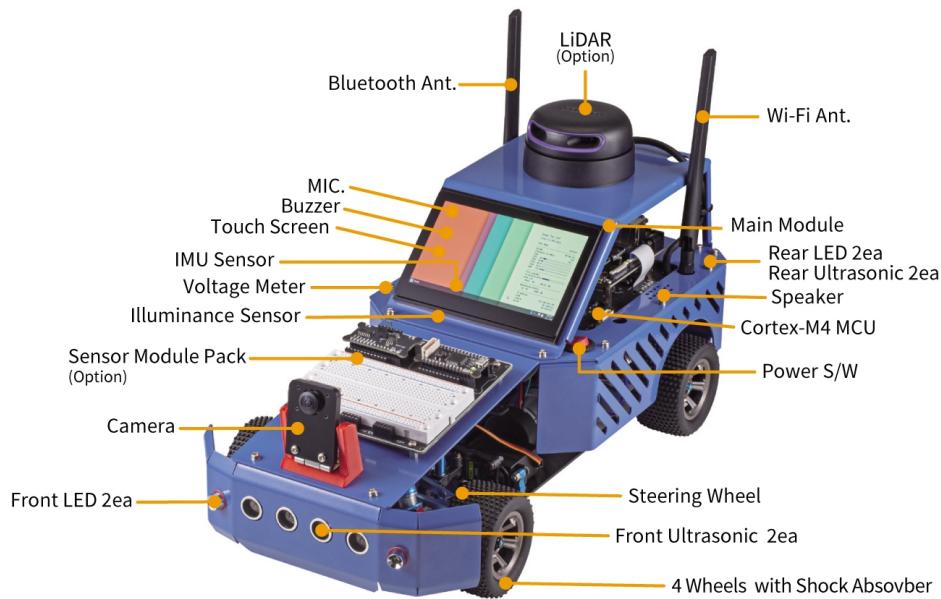
ROS2

- Development Environment for ROS2
- Subscription and Publication
- Service Application
- Action Interface
- Parameter Application
- Multiple Executions

Artificial Intelligence Technology

- Supervised and Unsupervised Learning
- Pop.AI-based Linear and Logistic Regression Theory and Practice
- Pop.AI-based Perceptron Theory and Practice
- Pop.AI-based ANN, DNN, and CNN Theory and Practice
- Reinforcement Learning DQN based on Pop.AI and OpenAI DQN Theory and Experiment
- Understanding TensorFlow

☉ Layout



☉ Components

