

AI _ Artificial Intelligence

AI Nvidia RoboEX

You can learn from the basic theory of AI (Artificial Intelligence) to algorithms using TensorFlow for machine learning and deep learning. And with Nvidia's high-performance GPUs, you can experience high levels of image processing and machine learning.



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Product specifications and appearance of this catalog are subject to change without notice for quality improvement.

V2.0.0



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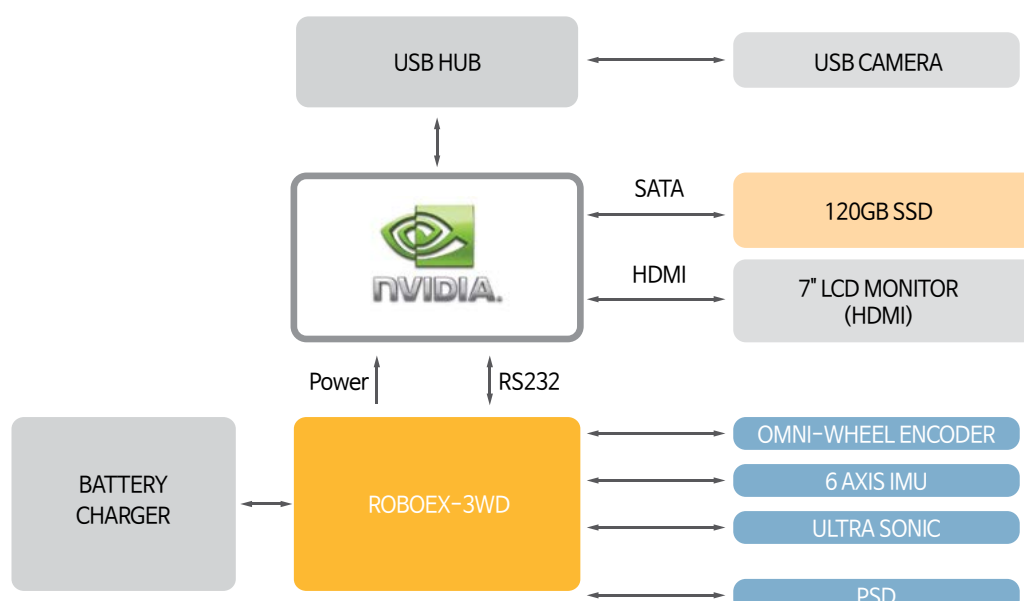
Product Overview

It is a product that can learn from basic theory of artificial intelligence to algorithms using TensorFlow which is used for machine learning in various fields. In addition, you can experience high-performance services such as object and character recognition through learning, face recognition and edge detection through image processing.

Product Features

- With this product, you can experience the basic theory for machine learning to the algorithm for implementation.
- You can learn about deep learning which is the basis of machine learning.
- Provides services for machine learning and deep learning using TensorFlow for high performance numerical computation.
- It is able to experience high levels of computation speed with high-performance GPU.
- Provides real-time image processing service using the attached camera.
- The robot driver module enables the DC motor required for robot design and omni-wheel control technology to be moved in all directions.
- It is possible to acquire the technology using the ultrasonic sensor and the infrared distance sensor (PSD), and it is able to learn various things such as object detection and obstacle recognition by intelligent robot application.
- By adopting Arduino, an open electronic control platform, the robot driver module minimizes the specificity required for hardware control, and can generalize the method of acquiring status information from the motor control and sensors required for operation definition.

Block Diagram



Hardware Specifications

Module	Category	Specifications
Nvidia Jetson TX2	CPU	HMP Dual Denver 2/2 MB L2 + Quad ARM A57/2 MB L2
	GPU	NVIDIA Pascal, 256 CUDA cores
	Video	4K x 2K 60Hz Encode (HEVC) 4K x 2K 60Hz Decode (12-bit Support)
	Memory	8GB 128bit LPDDR4 59.7GB/s
	Display	2x DSI, 2x DP 1.2 / HDMI 1.0 / eDP 1.4
	CSI	Up to 6 Cmeras (2 Lane) CSI2 D-PHY 1.2 (2.5 Gbps/Lane)
	PCIE	Gen 2 1x4 + 1x1 OR 2x1 + 1x2
	Data Storage	32GB eMMC, SDIO, SATA
	Other	CAN, UART, SPI, I ² C, I ² S, GPIOs
	USB	USB 3.0 + USB 2.0
	Connectivity	1 Gigabit Ethernet, 802.11ac WLAN, Bluetooth
RoboEX 3WD	Contoroller	32bit ARM Cortex-M3 ATSAM3X8EA-AU MCU up to 84MHz
	Flash Memory	512KB
	SRAM	64 + 32KB
	DFU Controller	Low Power AVR 8bit Microcontroller ATmega16U2-AU (DFU)
	EXT-Interface	0.8MM 2Raw 40Pin Connector 2EA
	Program Interface	Micro-USB Type (DFU)
	User Interface	Character LCD(16x2), Buzzer 1EA, Function Button 5EA, Status LED 2EA, Power LED 1EA
	Communication	- CAN 2.0 Part A & CAN 2.0 Part B - LIN 1.3 & 2.0
	Motor	RG35GM 11Type DC12V 1/50 with Encoder DC-Motor
	Motor Driver	L298P Dual Full Bridge Driver
	Sensor	- MPU-6050 3Axis Accelerometer - TMP36GT9 Low Voltage Temperature Sensor - Encoder With DC-Motor - MA40S4R / MA40S4S Ultrasonic Sensor - GP2Y0A21YK Distance Measuring Sensor
	Wheel	Omni Wheel 60MM Active Type / 6MM Motor Shaft Hole
	Battery	11.1V @ 5200mA 3EA
Size	310mm x 310mm x 390mm	

Software Specifications

Module	Category	Specifications	Module	Category	Specifications
AI	TensorFlow	TensorFlow 1.7.0	RoboEX 3WD	AndroXStudio	Arduino Platform : 1.0.5
	keras	Keras 1.2.2			Java SDK :
Nvidia Jetson TX2	OS	Ubuntu 16.04			Java SE Runtime Environment (build 1.6.0_26-b03)
	CUDA	CUDA 9.0			Android NDK : Release R8E
	cuda	cuda 7.0.5			Android SDK : Android 4.2 (API 17)
	Multimedia	OpenCV 3.4.0			ADT : 22.0.1
	Others	- Python 3.5 - ROS kinetic			Android SDK Tools : 22.0.1
RoboEX 3WD	AndroXStudio	Launcher : 2.0			Remote Explorer : 5.1.1
		ARM Cross Toolchain : GCC 4.6.3 for Windows (Newly build the source code)			Remote Shell : 0.62
		Host Toolchain : GCC 4.5.3 (Built-in cygwin)			Remote Viewer : 2.7.1
		Cygwin : 1.7.17			Serial Packet Monitor : 1.2
		Make : GNU Make 3.82.90			Application Package : 1.2
		Eclipse Platform : Kepler (4.3)			Installer : 1.4

Specifications

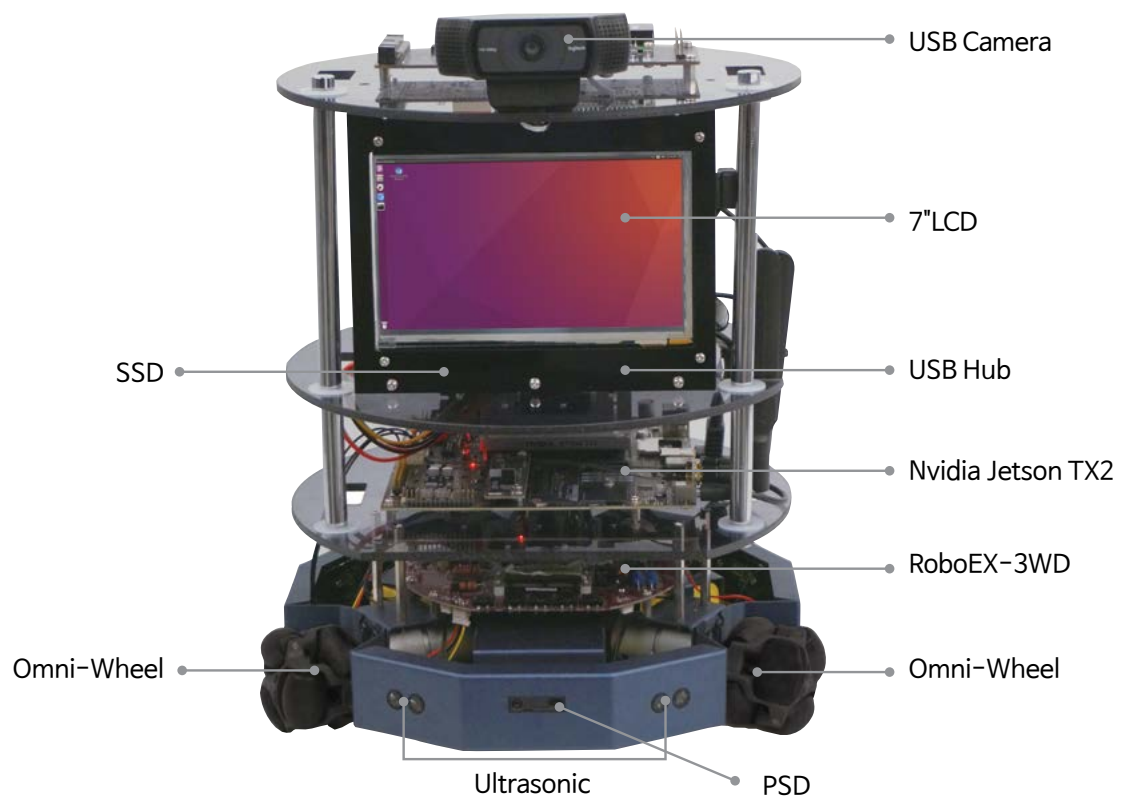
Book1 Deep Learning with AI Nvidia RoboEX

- AI / Machine Learning / Deep Learning
- Introduction of Equipment
- Deep Learning using TensorFlow
- Image Processing

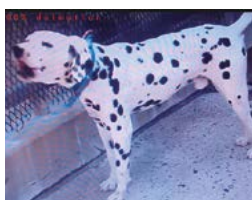
Book2 Robot Control with AI Nvidia RoboEX

- RoboEX 3WD
- Robot OS
- Connecting RoboEX 3WD to Jetson board
- Moving & Tracking

Layout



APP



Puppy Recognition



Handwriting Recognition



Face Recognition



Lane Recognition



Object Recognition