

AI_Artificial Intelligence

AI Nvidia RoboEX nano



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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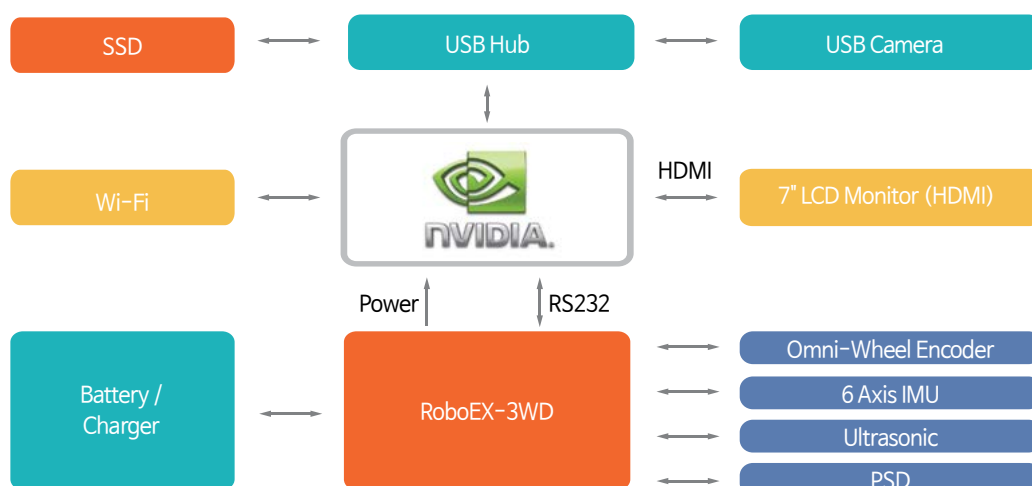
Product Overview

You can learn from basic theory of artificial intelligence to algorithms using TensorFlow which is used for various fields of machine learning. You can also experience high-performance services such as object and letter recognition through learning, face recognition and edge detection through image processing.

Product Features

- With this product, you can experience from 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.
- Provides practical exercises for Neural Network.
- It is able to experience high levels of computation speed through high-performance GPU.
- Provides real-time image processing service using the attached camera.
- The robot driver module enables to learn technologies regarding DC motor required for robot design, and omni-wheel control to be moved in all directions.
- It is possible to acquire the technology using the ultrasonic sensor and the infrared distance sensor (PSD), and 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, it is possible to generalize the motor control required for operation definition and the method of acquiring status information from the sensors.

Block Diagram



Hardware Specifications

Module	Category	Specifications
Nvidia Jetson nano	CPU	ARM Cortex-A57 Quad core 1.43 GHz
	GPU	128-core Maxwell
	Video	- 4K@30, 4K 1080p 30, 9x 720p 30 (H.264 / H.265) Encoder - 4K@60, 2x4K@30, 8x1080p@30, 18x720p @30 (H.264 / H.265) Decode
	Memory	4 GB 64 bit LPDDR4 25.6 GB/s
	Display	HDMI 2.0 , eDP 1.4
	CSI	1x MIPI CSI-2 DPHY lanes
	Data Storage	Micro SD
	Other	GPIO, I ² C, I ² S, SPI, UART
	USB	4x USB 3.0, USB 2.0 Micro-B
	Connectivity	1 Gigabit Ethernet, M.2 Key E
	Size	100mm x 80mm x 29mm
RoboEX 3WD	Contoroller	32 bit ARM Cortex-M3 ATSAM3 X 8EA-AU MCU up to 84 MHz
	Flash Memory	512 KB
	SRAM	64 + 32 KB
	DFU Controller	Low Power AVR 8 bit Microcontroller ATmega16U2-AU (DFU)
	EXT-Interface	0.8 MM 2Raw 40 Pin Connector 2EA
	Program Interface	Micro-USB Type (DFU)
	User Interface	Character LCD (16x2), Buzzer 1EA, Function Button 5 EA, 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 60 MM Active Type / 6MM Motor Shaft Hole
	Battery	11.1V @ 5200 mA 3EA
Size	310 mm x 310 mm x 305 mm	

Software Specifications

Module	Category	Specifications	Module	Category	Specifications
AI	TensorFlow	TensorFlow 1.13.1	RoboEX 3WD	AndroX Studio	- Eclipse Platform : Kepler (4.3)
	keras	keras 2.2.4			- Arduino Platform : 1.0.5
Nvidia Jetson nano	OS	Ubuntu 18.04			- Java SDK : Java SE Runtime Environment (build 1.6.0_26-b03)
	CUDA	CUDA 10.0			- Android NDK : Release R8E
	cuda	cuda 7.3.1			- Android SDK : Android 4.2 (API 17)
	Multimedia	OpenCV 3.4.0			- ADT : 22.0.1
	Others	- Python 3.6 - ROS Melodic			- Android SDK Tools : 22.0.1
RoboEX 3WD	AndroX Studio	- 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
					- Installer : 1.4

Training Contents

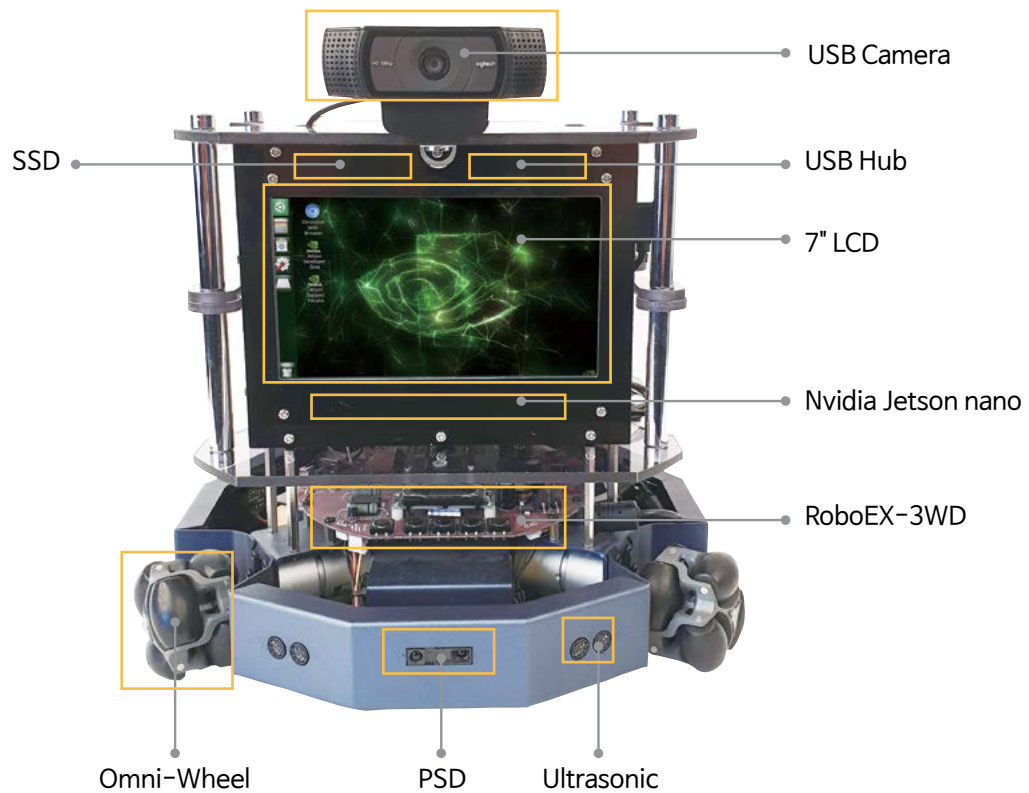
1. Deep Learning Using AI Nvidia RoboEX nano

- AI / Machine Learning / Deep Learning
- Introduction to the Device
- Deep Learning Using TensorFlow
- Image Processing

2. Robot Control with AI Nvidia RoboEX

- RoboEX 3WD
- Robot OS
- Connecting RoboEX 3WD and Jetson Board
- Moving & Tracking

Layout



APPS

