



NEON-2000-JT2 SERIES

NVIDIA® Jetson™ TX2-based Industrial AI Smart Camera
for the Edge

June 2020

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Choose the Right Product

Smart camera-based machine vision systems are expected to grow at a faster rate during the forecast period (2020-2025) as these systems are cost-effective, compact, and flexible, making it is easier to implement changes to systems as required by revised regulations and standards.



Source: MarketsandMarkets.com



Inspection/
Classification



Safety



Security

AI in Computer Vision Market is **Booming**

Market size: \$3.62 billion (2018) to \$25.32 billion (2023) at 47.54% CAGR

Source: Verified Market Research



Asset
Management



Robot
Collaboration

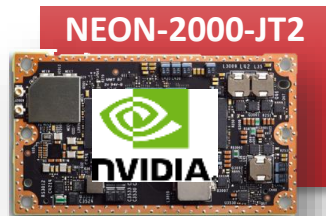


Patrol Robots

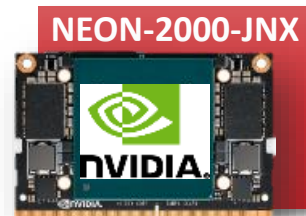
What is NEON?

A series of all-in-one, ready-to-deploy AI smart cameras that reduces AI developers' efforts on integration, validation, development and space limitations.

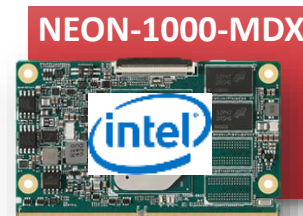
Leveraging SMARC standard and NVIDIA's Jetson series, NEON supports **5** types of AI processors and **4** USB 3 image sensors, that satisfy different needs of AI users and applications



NVIDIA Jetson TX2



NVIDIA Jetson Xavier NX



Intel Movidius Myriad



Intel Keem Bay



NXP IMX8m

What is NEON-2000-JT2?

All-in-one AI-enabled smart camera powered by NVIDIA Jetson TX2 modules

Rich Connectivity Interfaces

FPGA based DI/O design provides accurate H/W triggering and USB Type-C hub reduces cable connections



NVIDIA Jetson TX2 Inside

Powerful integrated NVIDIA Jetson TX2 module ideally supports product classification and defect detection to maximize production efficiency



High Reliability and Capability

CE/FCC/Safety verified, shock, vibration, temp. cycle validated, no reliability issues



Faster Time-to-Market

With pre-installed vision suites and optimized OS, time-consuming process reduced

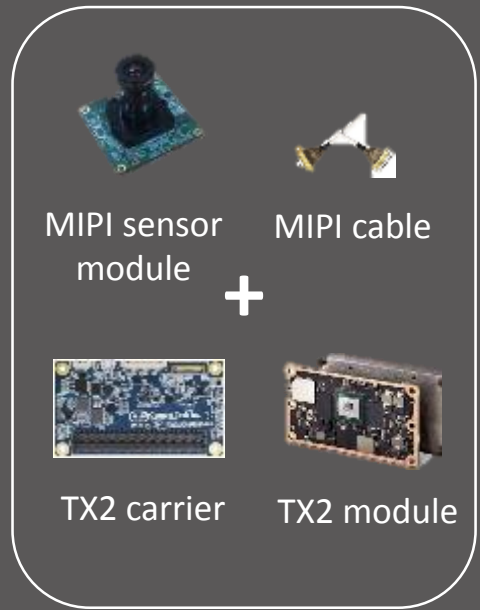
Integrated Camera Sensor Module

Supports 4 types of Basler image sensors to cover various AI vision applications requiring high image quality



Current pain points

Complex camera connections and cabling, low compatibility and reliability, large space requirements



MIPI Sensor Solution



TX2 Box Solution

NEON-2000-JT2 Series AI Smart Camera

All-in-one system, ready-to-deploy, easy cabling, no compatibility issues, saves on efforts of size limitations, installation & maintenance



3 Main Advantages

Enjoy Your Journey in AI Vision Application Development!



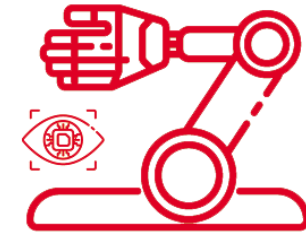
Simplified System Integration

Pre-installed and optimized software environment shortens development time; All-in-one design reduces compatibility and size limitation issues, and installation/maintenance efforts



Worry-free for Reliability Issues

CE/FCC/Safety verified to reduce EMC/ESD issues; shock, vibration and temp. cycle validated for stability



Optimized for Vision Application

Basler camera module and FPGA based DI/O design provides advanced image quality with accurate H/W triggering, ideal for various machine vision applications

Simplified System Integration

ADLINK Value:

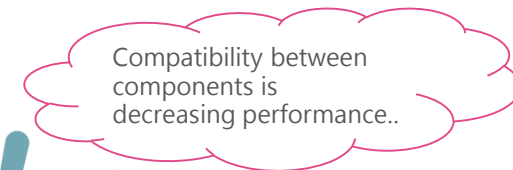
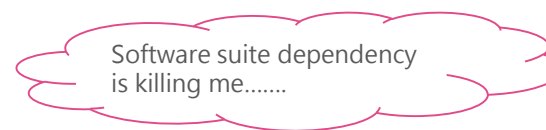
- **Pre-installed** software environment and optimized OS shortens development time
- **All-in-one system**, easy cabling, no compatibility issues and reduced effort to meet space limitation requirements and for installation & maintenance

Customer's Pain Points

- Incompatibility and poor reliability of MIPI, USB 3, GigE cables and components
- Separate components need more space and increase installation & maintenance effort



Video4Linux



Worry-free for Reliability Issues

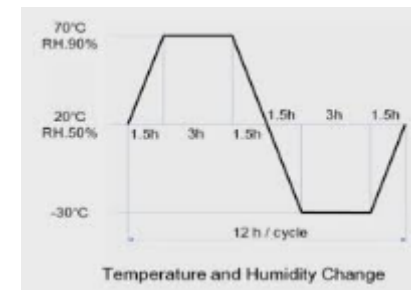
ADLINK Value:

- CE/FCC/Safety verified, reduces EMC/ESD issues
- Shock, vibration and temp. cycle validated means no reliability issues
- Comprehensive thermal tests with YoloV3 algorithm for different Jetson TX2 operating modes

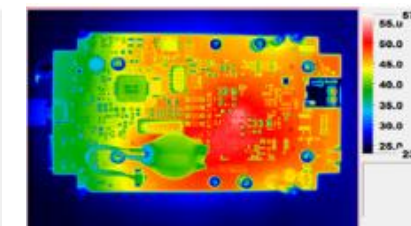
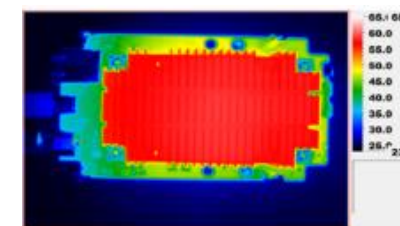
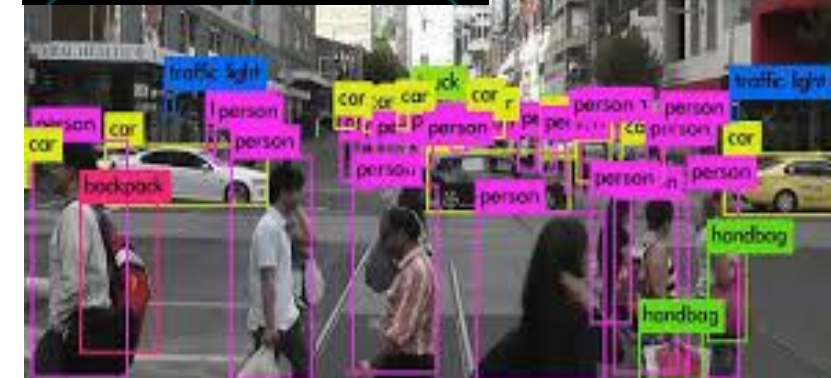
Customer's Pain Points

- EMC/ESD/vibration/thermal issues at field site or during integration
- Unpredictable performance throttling due to the untested thermal solutions

Mode Name	Op. Temp (°C) w/o air flow	Op. Temp (°C) w 0.6m/s air flow
Max-N	35	45
Max-Q	45	50
Max-P Core-All	40	50
Max-P ARM	40	50
Max-P Denver	45	50



YOLOv3



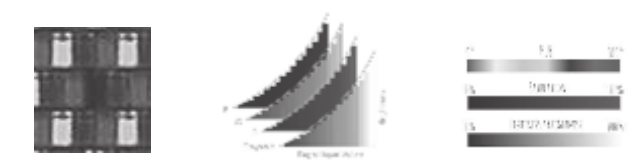
Optimized for Vision Application

ADLINK Value:

- Enhanced image quality from embedded Basler camera module, comprehensive APIs for image sensor adjustment & integration
- Quickly start development with provided sample code and instructions for capturing and inferencing
- Rich I/O connectivity reduces TCO and makes cabling easier

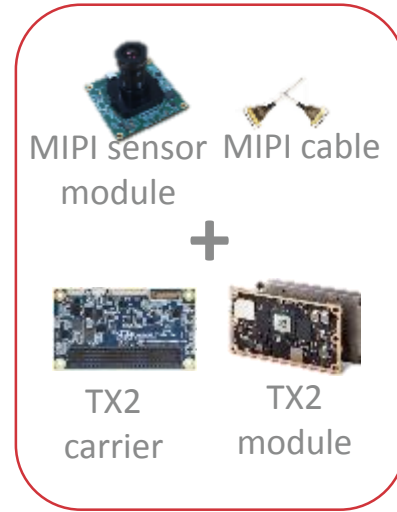
Customer's Pain Points

- MIPI sensor solution provides limited driver and image signal processing support, making integration harder
- TX2 box solution users may encounter frame drop system errors due to incorrect camera settings
- Much effort required to build an entire AI environment resulting in long development process



Limited Gain, Offset, Hue, Gamma, Saturation, Dead Pixel, Shade correction, white balance processing support

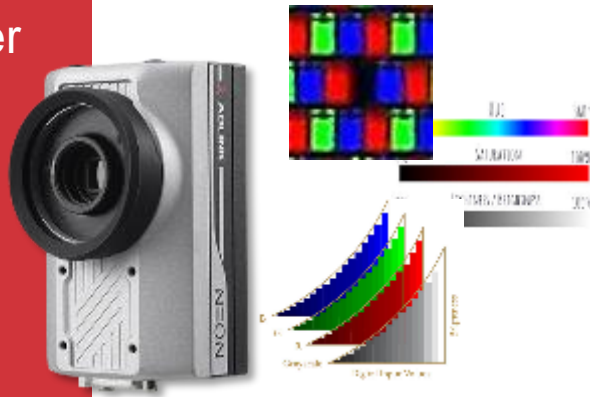
MIPI Sensor Solution TX2 Box Solution



MIPI sensor module + TX2 carrier TX2 module



Ind. camera + USB/GigE Cable TX2 Box PC



Message Log	
Level	Message
Information	Continuous shot on "Basl
Error	Image acquisition on "Ba
Error	Image acquisition on "Ba
Error	Image acquisition on "Ba
Error	Image acquisition on "Ba

Rich I/O Connectivity Interfaces

FPGA based I/O for
Machine Vision

FPGA based DI/O design provides **fixed latency** and programmable control that enables **real-time & accurate H/W triggering** for machine vision applications



Camera Trigger
in Sensors



LED Lighting
Controller



Digital Out
Devices



COM Port

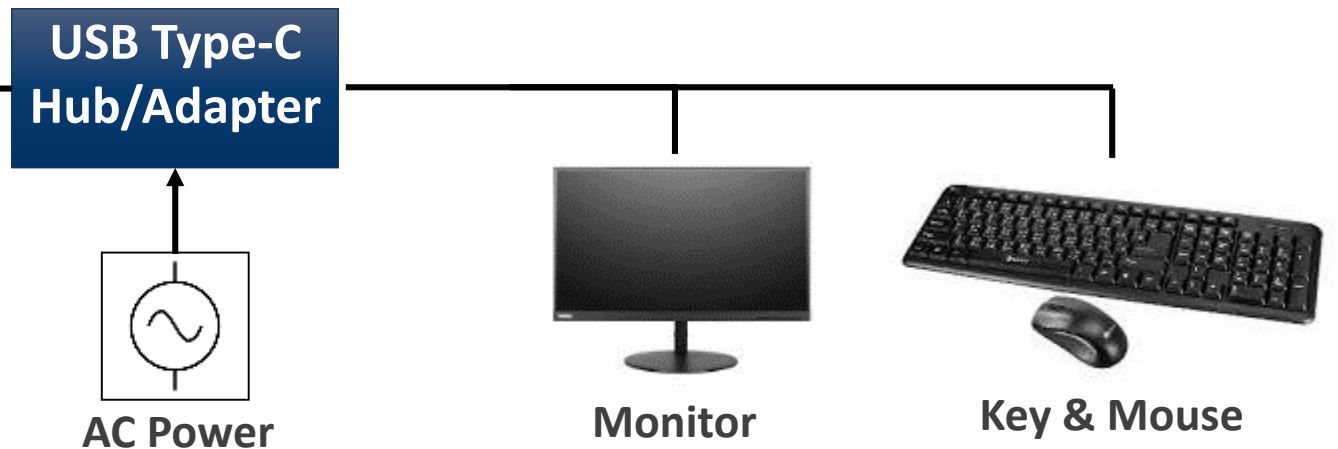


Rich I/O Connectivity Interfaces

USB Type-C reduces
number of cable
connections



USB Type-C hub/adapter: one cable for power, video output and USB signal, reducing cabling complexity



Note: DC power can be also provided by the DC jack. When an AC/DC adapter is connected, the USB Type-C port can provide power to the external hub.

Rich I/O Connectivity Interfaces

Flexible and expandable
for a wide range of
machine vision
applications



C-mount, flexible
support of lenses



Supports 4 types of
Basler image sensors,
wide coverage and easy
system expansion

Friendly design for
flashing the system

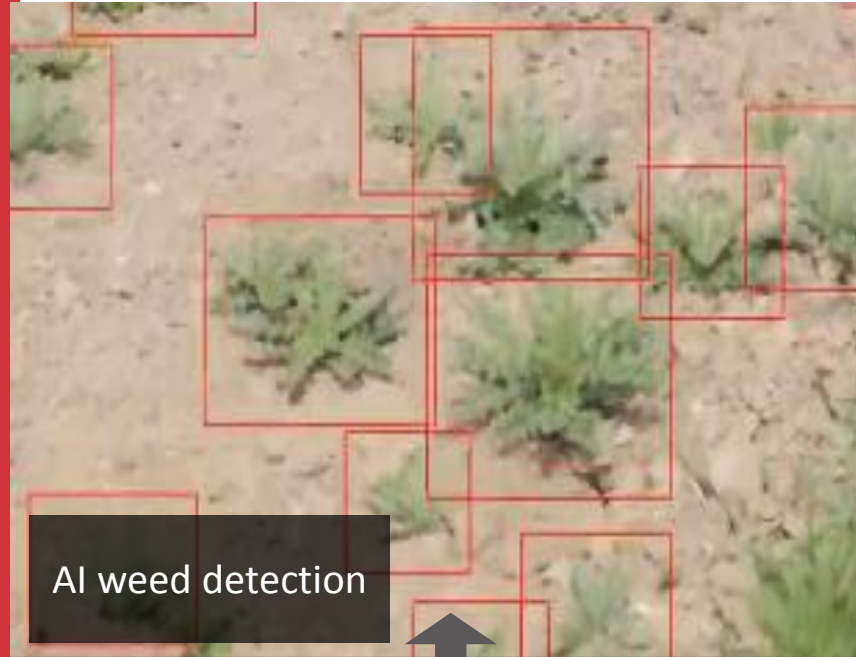


microSD slot for
external storage

Target Applications

Traditional industries

Highly labor-intensive industries, such as food, packaging and farming, are growing quickly in the machine vision market, with requirements mainly in quality assurance and products sorting/classification applications.



AI weed detection

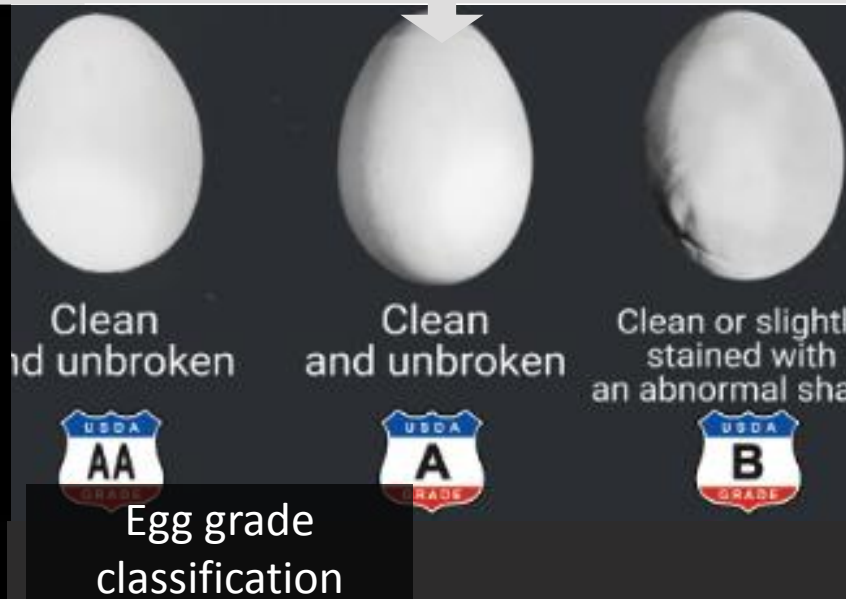
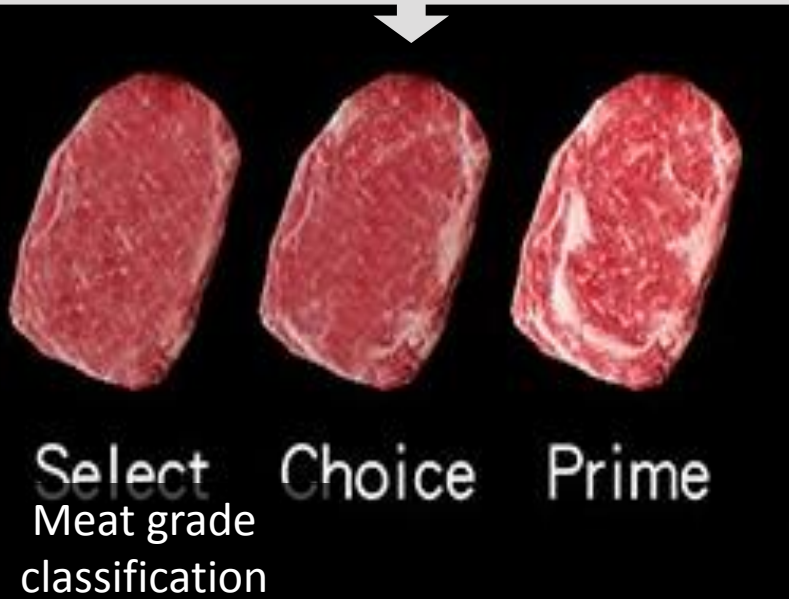


Wood scratches inspection



Object/Defect Detection

Product Classification/Sorting

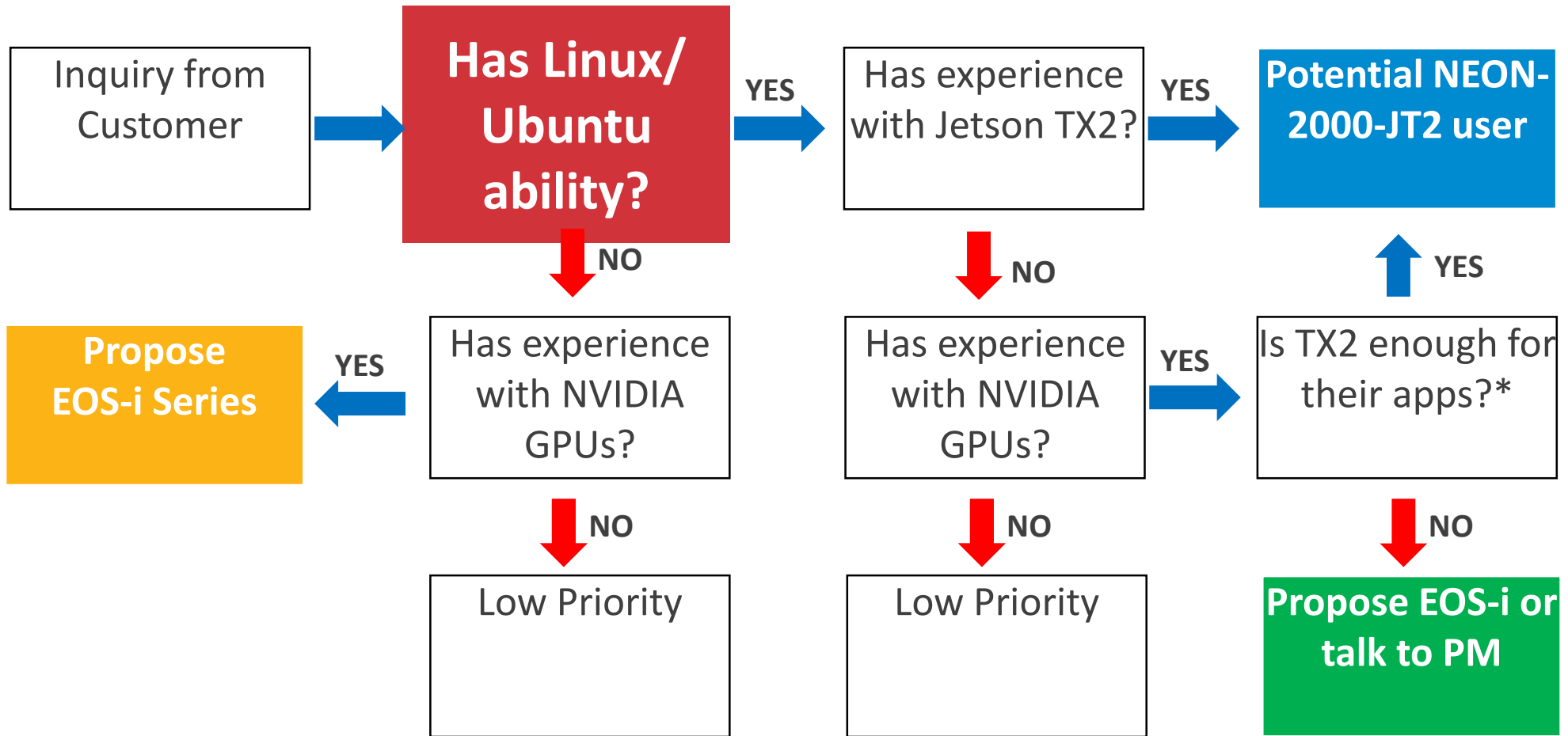


Wood recognition



How to Identify the Right Customers

Linux/Ubuntu ability is a MUST



Note: When customers have experience with NVIDIA GPUs but are not familiar with TX2's computing power, please ask the which GPU is currently used and their target performance, then talk to PM.

Competitor Analysis - 1

With the similar cameras in the current market

Cognex In-sight D900



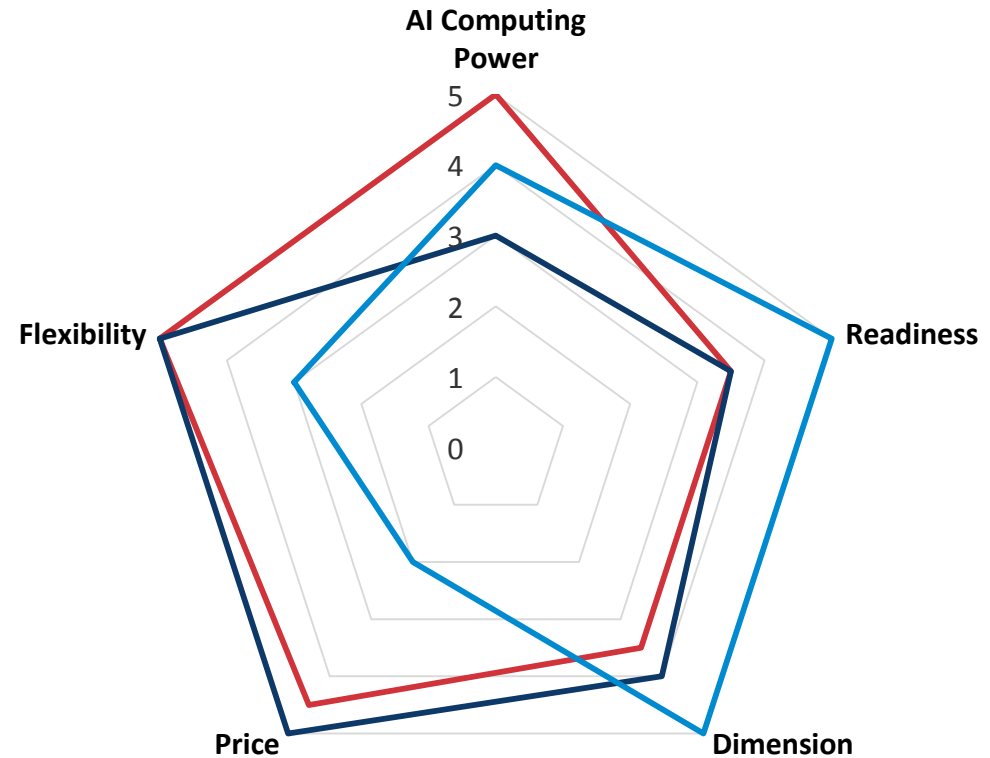
ADLINK NEON-2000-JT2



Advantech ICAM-7000



— ADLINK NEON-2000-JT2 — Advantech ICAM-7000
— Cognex In-sight D900



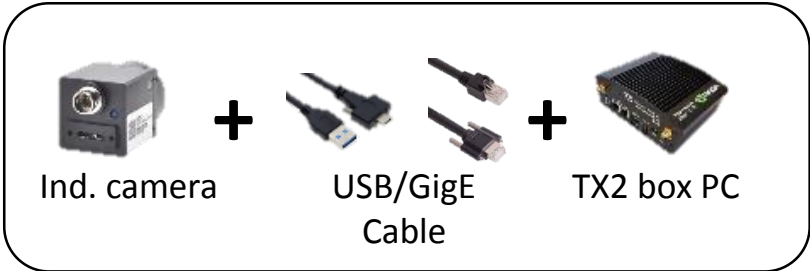
Note: Higher score means higher competitiveness

Competitor Analysis_2

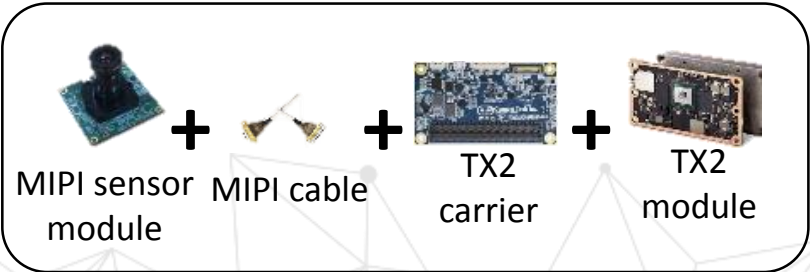
With the current Jetson TX2 solutions



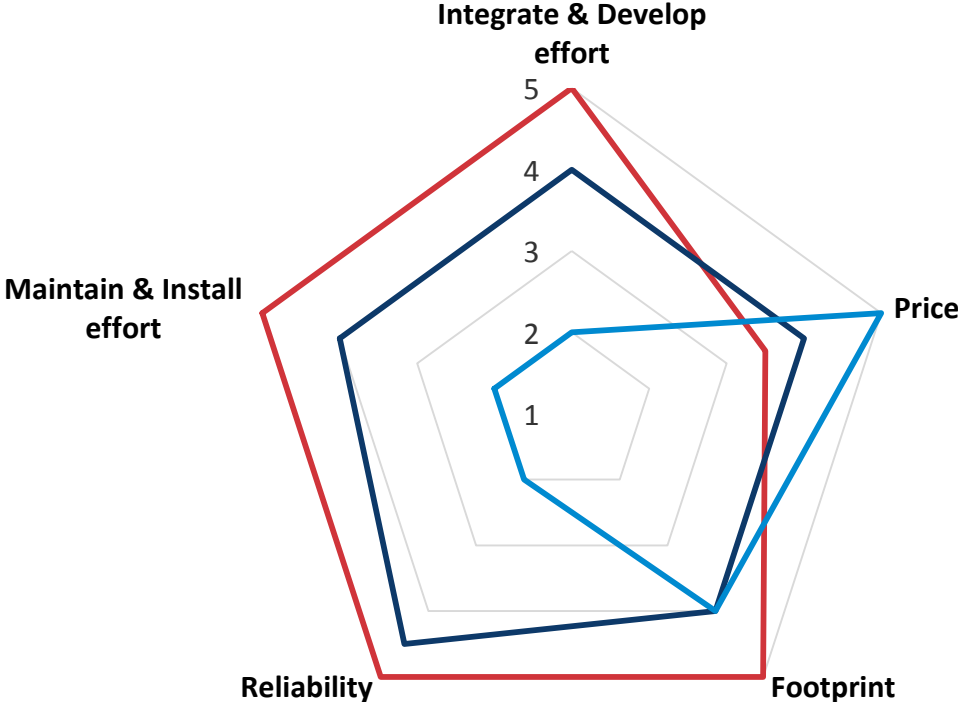
— NEON-2000-JT2 — TX2 box PC Solution — MIPI Sensor Solution



TX2 Box Solution



MIPI Sensor Solution



Note: Higher score means higher competitiveness

Performance Benchmark - NEON-2000-JT2

Network	Frames Per Second	Application
resnet_v1_50	6	Classification
yolo_v3	7	Detection
overfeat	9	Classification
inception_v4	13	Classification
vgg_19	14	Classification
vgg_16	16	Classification
alexnet_v2	17	Classification
vgg_a	24	Classification
resnet_v2_101	26	Classification
inception_v3	27	Classification
resnet_v1_101	29	Classification
resnet_v2_50	49	Classification

Network	Frames Per Second	Application
mobilenet_v1	76	Classification
mobilenet_v2_140	78	Classification
inception_v2	83	Classification
inception_v1	106	Classification
mobilenet_v2	114	Classification
mobilenet	155	Classification
mobilenet_v1_075	178	Classification
mobilenet_v1_050	185	Classification
mobilenet_v2_035	199	Classification
mobilenet_v1_025	236	Classification
lenet	643	Classification

Notes:

1. Batch size: 1
2. FP32
3. Models are optimized for NVIDIA TensorRT
4. Tested under Max-N power configuration.
5. Image resolution follows default setting of each model

Start Your AI Vision with the NEON Starter Kit

NEON-2000-JT2 Kit Option

Starter Kit



Contents:

- (1) NEON-2000-JT2
- (2) USB Type-C Adapter/Hub
- (3) 1.8m USB Type-C cable w/ screw lock
- (4) Power Cord
- (5) Lens
- (6) DI/O Cable
- (7) DIN37 I/O extension board
- (8) 30cm USB Type-C Cable

Lite Kit



Contents:

- (1) NEON-2000-JT2
- (2) USB Type-C Adapter/Hub
- (3) 30cm USB Type-C cable
- (4) Power Cord

NEON-2000-JT2 Series Specifications

Model Name	NEON-201B-JT2	NEON-202B-JT2	NEON-203B-JT2	NEON-204B-JT2
Image Sensor				
Resolution (HxV)	1280x960	1600x1200	1920x1080	2592x1944
Resolution	1.2M	1.9M	2M	5M
Frame Rate (fps)	54	60	30	14
Color/Mono	Color	Color	Color	Color
Shutter	Global	Global	Rolling	Rolling
Sensor Size	1/3"	1/1.8"	1/3.7"	1/2.5"
Pixel Size (µm)	3.75 x 3.75	4.5 x 4.5	2.2 x 2.2	2.2 x 2.2
Sensor Vendor	ON Semiconductor	e2v	ON Semiconductor	ON Semiconductor
Sensor Model	AR0134	EV76C570	MT9P031	MT9P031
Lens Mount	C-Mount			
Image Sensor Trigger Mode	External H/W trigger, S/W trigger, free run			
System				
Computing Platform	NVIDIA® Jetson™ TX2			
Processor	ARM Cortex-A57 and NVIDIA® Denver 2			
Supported OS	Ubuntu 18.04			
GPU	256-core NVIDIA® Pascal GPU			
Memory/Storage	8GB LPDDR4/32G B eMMC (integrated on TX2 module)			
Connectors and Functions				
Ethernet	Supports 10/100/1000 Mbps			
USB Type-C Port	Video output (Display-Port), 1920x1080 @ 30fps			
	1x USB 3 and 1x USB 2			
	Power supply for camera (when connected to USB charger or adapter) Power supply (5 W) for external USB Type-C Hub (when connected to a Type-C hub)			
D-Sub Socket	4x DI and 4x DO			
Micro-USB	1x UART (TXD, RXD, GND)			
microSD Slot	USB OTG (for system flash)			
Wafer Connector	For extended storage			
	For system flash			
Mechanical & Power				
Dimensions	123.3 x 77.5 x 66.81 mm			
Weight	700g			
Power Input	DC jack (12VDC) or USB Type-C (15VDC)			
Power Consumption	<30W (camera only)			
Environmental & Certification				
Operating Temperature	0°C to 45°C			
Storage Temperature	-20°C to 70°C			
Humidity	40% to 75% (non-condensing)			
Vibration	Operating, 5-500 Hz, 5 Grms, 3 axes			
Shock	Operating, 11ms duration, 30G, half sine, 3 axes			
ESD	Contact ± 4kV, Air ± 8kV			
EMC	CE and FCC Class A (EN61000-4/-2)			
Safety	UL and cB			

Ordering Information

Model Name	PN	Spec.
NEON-201B-JT2	93-51046-103E	NVIDIA Jetson TX2, 1/3", 1.2M, Global Shutter,1280x960 54fps COLOR
NEON-202B-JT2	93-51046-113E	NVIDIA Jetson TX2, 1/1.8", 1.9M, Global Shutter,1600x1200 60FPS COLOR
NEON-203B-JT2	93-51046-123E	NVIDIA Jetson TX2, 1/3.7", 2M, Rolling Shutter,1920x1080 30fps COLOR
NEON-204B-JT2	93-51046-133E	NVIDIA Jetson TX2, 1/2.5", 5M, Rolling Shutter,2592x1944 14fps COLOR
NEON-201B-JT2 Lite Kit	90-20061-0110	NEON-201B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable and power cords
NEON-202B-JT2 Lite Kit	90-20061-1110	NEON-202B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable and power cords
NEON-203B-JT2 Lite Kit	90-20061-2110	NEON-203B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable and power cords
NEON-204B-JT2 Lite Kit	90-20061-3110	NEON-204B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable and power cords
NEON-201B-JT2 Stater Kit	90-20061-0030	NEON-201B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable, power cords, Lens, I/O extension board and I/O cable
NEON-202B-JT2 Stater Kit	90-20061-1030	NEON-202B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable, power cords, Lens, I/O extension board and I/O cable
NEON-203B-JT2 Stater Kit	90-20061-2030	NEON-203B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable, power cords, Lens, I/O extension board and I/O cable
NEON-204B-JT2 Stater Kit	90-20061-3030	NEON-204B-JT2 camera, USB Type-C hub/adaptor, USB Type C cable, power cords, Lens, I/O extension board and I/O cable

NEON-2000 Series Release Plan



NEON-2000-JT2 Series
NVIDIA® Jetson™ TX2-based



NEON-2000-JT2-X Series
NVIDIA® Jetson™ TX2-based
with IP67 rated



NEON-2000-JNX Series
NVIDIA® Jetson™ Xavier NX-
based

2020 Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Release						
				Release		
					Release	

Coming soon

The best rugged AI Smart Camera available on the market



NEON-2000-JT2-X Series

NVIDIA® Jetson™ TX2-based Industrial
AI Smart Camera for the Edge with IP67

THANK YOU

