NEW ELECTRONIC TECHNOLOGY

Onboard processing power.

GIGABIT ETHERNET CMOS CAMERAS FOR INDUSTRIAL VISION

GigE PRO

GigEPRO – ONBOARD IMAGE PROCESSING

GigEPRO – re-defining "efficient image processing".

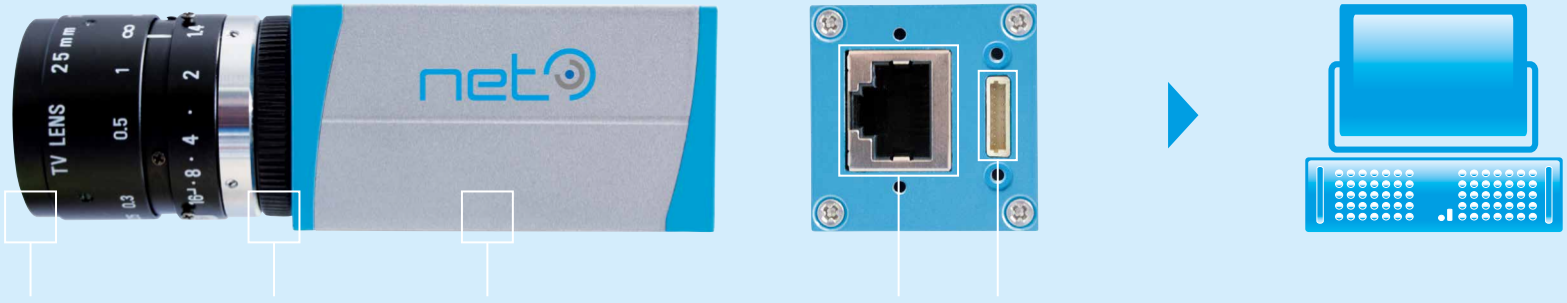
GigEPRO - GigE/CMOS SERIES

NET 's GigEPRO cameras feature advanced real-time image processing functionality and full GigE Vision standard, GenIcam and GenTL compliancy to serve most different industrial applications. With GigEPRO cameras customers can choose from already available NET image processing functions, apply own image processing functions or even decide for a combination of all in order to achieve efficiency improvements in image processing. GigEPRO delivers great benefit to industrial applications by adding image processing functionalities to a solid and compact digital camera. The cameras can realize performance improvements in any industrial application which uses the GigE Vision standard. The NET image pre-processing library offers a set of image processing functions fully described in the GenICam compliant XML standard. Additional specific image processing tasks for custom applications are available on request. The industrial camera is also offered as "open camera" allowing the customer to add image processing functionalities to the camera by himself.

When applying high performance and cost effective microelectronics there is great potential to balance image processing tasks between the camera and the host PC in a more efficient way. The camera is able to take over image processing steps, like pre-processing and extraction, from the host PC and set free or minimize additional processing demand. This applies especially in operations running on full sensor size.

Efficient partitioning of image processing tasks between camera and PC: GigEPRO takes over pre-processing and extraction steps from the host PC

sensor processing >>> customer specific processing >>> GigE transmission up to 100m >>> pre-processing >>> extraction >>> interpretation >>> decision



NET offers a wide range of lenses: high resolution, telecentric, CCTV and more

C-/CS-lens mount

compact and robust aluminum housing: 30 x 30 x 56 mm (picture: 1:1 scale)

ethernet RJ45 connector, Power over Ethernet (PoE)

8 pin connector: digital I/O, power

host PC application

TECHNICAL DATA - GigE/CMOS CAMERAS

PRODUCT OVERVIEW

GigEPRO cameras are equipped with color, monochrome and high quantum efficiency (NIR) CMOS image sensors with resolutions from 0.36 to 10 megapixel. These sensors allow high speed frame rates at full resolution. Its sensors comprise global shutter for fast moving objects and rolling shutter, also with global reset image readout, to capture images with outstanding signal quality. As sophisticated image analysis functions, and overall or global image processing functions become quite complex and might be impossible to perform on a host PC at reasonable cost, the camera is offered with different FPGA options. GigEPRO customers are free to decide on the optimal software and hardware configuration which really improves their specific application goal. Thus, there are virtually no limits to the advanced image processing capabilities of GigEPRO.

MONOCHROME / COLOR	GP1041M	GP1041C	GP4136M	GP4136C	GP4136IR	GP4206M	GP4206C	GP2239M	GP2239C	GP2238M	GP2238C	GP1305C	GP2507M	GP2507C	GP1503M	GP1503C	GP11004M	GP11004C
Resolution (H x V) [px]	752 x 480 / WVGA		1280 x 1024 / SXGA			1600 x 1200 / UXGA		1920 x 1200 / WUXGA		1920 x 1200 / WUXGA		2048 x 1536 / QXGA	2448 x 2048 / QSXGA		2592 x 1944 / QSXGA		3664 x 2748 / WQUXGA	
Sensor	CMOS		CMOS			CMOS		CMOS		CMOS		CMOS	CMOS		CMOS		CMOS	
Image sensor	MT9V032		EV76C560		EV76C661	EV76C570		IMX174LLJ-C	IMX174LQJ-C	IMX249LLJ-C	IMX249LQJ-C	MT9T001	IMX264LLR-C	IMX264LQR-C	MT9P031	MT9P001	MT9J003	
Sensor size	1/3"		1/1.8"			1/1.8"		1/1.2"		1/1.2"		1/2"	2/3"		1/2.5"		1/2.3"	
Pixel size [µm]	6.00 x 6.00		5.30 x 5.30			4.50 x 4.50		5.86 x 5.86		5.86 x 5.86		3.20 x 3.20	3.45 x 3.45		2.20 x 2.20		1.67 x 1.67	
Frame rate [fps]	64		61			52		50		38		12	22		14		7	
Shutter	global		global; rolling; global reset			global; rolling; global reset		global		global		rolling	global		rolling with global reset			
Shutter speed	108 µs - 1 s		10 µs - 1 s			10 µs - 1 s		34 µs - 34 s		34 µs - 34 s		10 µs - 10 s	34 µs - 10 s		10 µs - 10 s		10 µs - 3 s	
Dynamic range [dB]	55		62		63	66		75.6		75.6		61	74		70		65	
Binning	2 x 2 / 4 x 4		2 x 2			2 x 2		-		-		2 x 2 / 4 x 4	-		2 x 2 / 4 x 4		2 x 2 / 4 x 4	
Skipping	-		640 x 512 / 320 x 256 multiple ROIs / user-defined			800 x 600 / 400 x 300 multiple ROIs / user-defined		-		-		-	-		1296 x 972 / 648 x 486			
Aspect ratio	14:9		5:4			4:3		16:10		16:10		4:3	6:5		4:3		4:3	
Gain [dB]	12		24			24		24		24		18	24		18		18	
Lens	C- / CS-mount																	
Scanning system	progressive scan																	
Trigger	external, software, timer based, counter based																	
Strobe	sensor, trigger, software, timer based, counter based																	
Interface	Gigabit Ethernet according to GigE vision standard / 1Gbps																	
Dimension (WxHxD) [mm]	30 x 30 x 56																	
Power consumption [W]	2.5 to 4 (depends on hardware option)																	
Operating temperature	0 to +45° C																	
Power supply	PoE or 9 - 24VDC on AUX connector																	
Cable connector	8 pin (power supply 9-24 V + digital I / O)																	
Digital input / output	opto decoupled (3.3 to 24 V) single input (hardware trigger), dual output (hardware strobe)																	

APPLICATION & SOFTWARE

Ask us for a matching vision solution!

APPLICATION OVERVIEW

NET's GigEPRO cameras target a wide application range in industrial vision. The camera design qualifies i.a. for alignment control, surface- and printing inspection, edge and contour analysis, bar code and data matrix, access control, security encryption, traffic control and many others.

IMAGE PROCESSING FUNCTIONS

The NET image pre-processing library offers a set of image processing functions to GigEPRO. All library functions are described in the GenICam compliant XML standard camera description file:

- Geometric correction (GC)
- Flatfield correction (FFC)
- Bayer channel compensation (BCC)
- Canny edge detection
- 2D down scaling
- High Dynamic Range (HDR) image mapping

Many image processing tasks can't be carried out with a single generic function covering all customer needs. Therefore NET offers specific image processing tasks on request, amongst others the following typical classes of image processing tasks:

- Image segmentation: thresholding, boundary based, region based, template matching, texture based, color based
- Binarization: global/local linear or adaptive threshold, edge level
- Laser 3D algorithms: threshold, maximum and COG
- Barcode & 2D matrix detection
- Image compression: JPEG and RL (Run Length)
- 1D and 2D image filtering

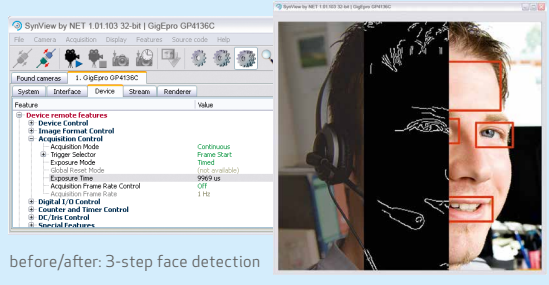
CAMERA CUSTOMIZATION

GigEPRO features the concept of an "open camera". This allows experienced customers and system integrators to customize the camera with proprietary in-house algorithms and the development of products targeted for niche machine vision applications. The development and test of customer algorithms takes place on a development platform, which NET supplies together with a development toolkit to program embedded core within cameras.

SOFTWARE DEVELOPMENT KIT (SDK) & 3RD PARTY SOFTWARE

SynView, the included SDK, is compliant with GigE Vision, GenTL and GenIcam (with XML files) standards and runs under Win 7/8/10 and Linux. It supports the programming languages C, C++, .NET environment and enables quick integration into existing customer systems. The setting and evaluation of image data is achieved by means of various functionalities for camera calibration, preview, image evaluation and code examples. NET supports all GenTL consumer image processing libraries, i.a. Adaptive Vision Studio, Halcon, VisionPro, LabView Vision, and MATLAB.

SynView – quick image setting and evaluation



before/after: 3-step face detection

About NET New Electronic Technology GmbH

NET has more than 20 years of experience in supporting customers' applications with smart camera technology and custom camera solutions. NET adds value to the applications of OEMs, system integrators and machine builders through custom vision solutions and a portfolio of cameras and components with unique features. The company offers both know-how in vision technologies and an extensive portfolio.

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