



Your Global Automation Partner

Mit KI-gestützter Vision die Produktions- und Qualitätssicherung digitalisieren

Turck GmbH, Beierfeld | 03.12.2025 | Raphael Penning, M.Sc.

Smart automation solutions for production and logistics



Automotive



Chemicals



Intralogistics (Packaging)

» and many **other** industries



Food & Beverage



Pharma & Biotech



Mobile Equipment

Changing the perspective: Vision is needed!

Intralogistics @ Turck: Factory automation



Gates are set up to record goods as forklifts pass through

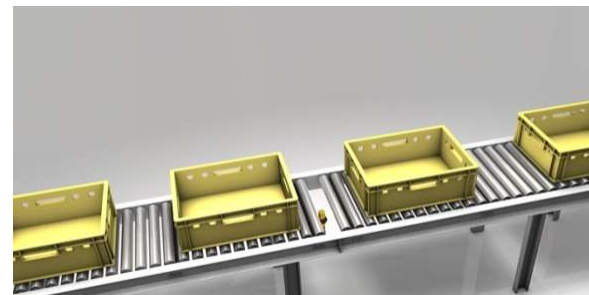


Decentralized I/O modules with integrated logic control the motors of the roller conveyors

Identification

Object detection/
signal processing

New applications emerge for Turck: Image processing



Content/ damage
inspection



Code/OCR reading,
Object orientation

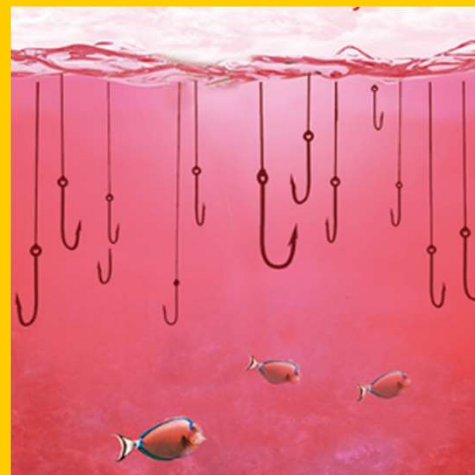
Turck goes Vision for the first time!



Analyse customer pains



Use newest technology



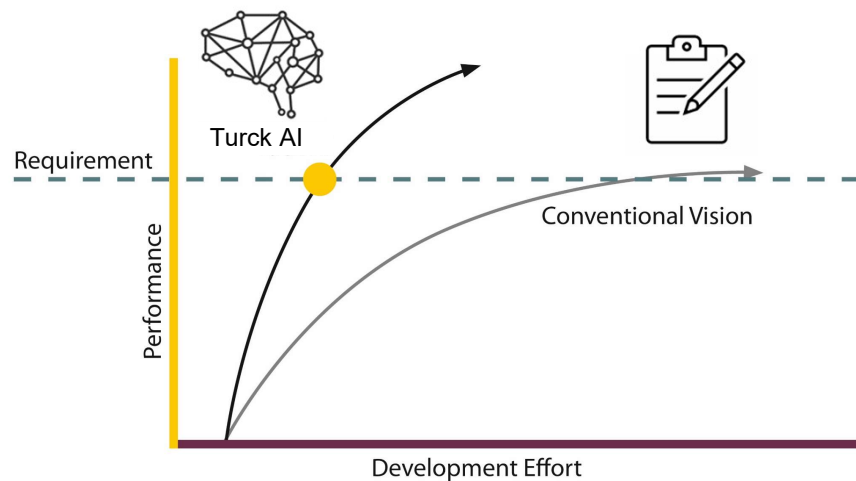
Provide better total solution

» **AI Based Vision!**

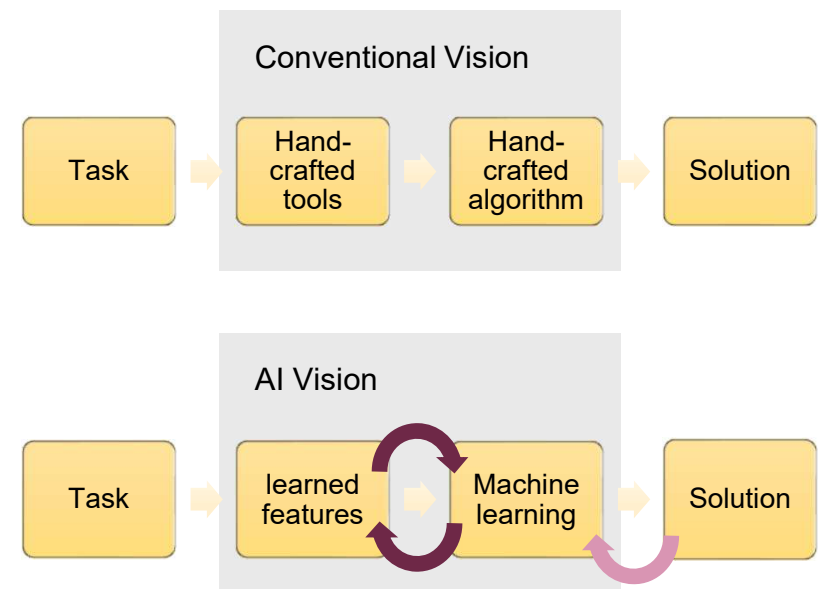
MIT KI-GESTÜTZTER VISION DIE PRODUKTIONS- UND
QUALITÄTSSICHERUNG DIGITALISIEREN

Why AI? - AI makes the difference!

Artificial intelligence vs. Conventional Rule-Based Vision



- Making difficult **applications easier**, where machine vision has failed in the past
- Make the **impossible possible**, where machine vision has failed in the past



TURCK Intelligent Vision – TIV12MG-Q110N

Intelligent, AI-based, all-in-one vision solution – significant and powerful

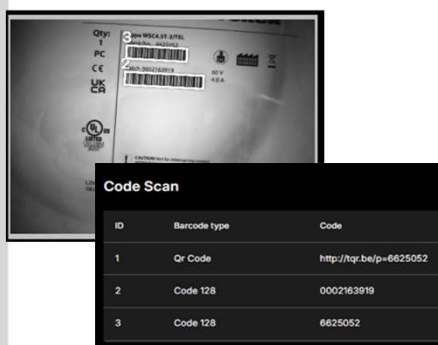
- **Powerful and future-proof** hardware
 - Best chipsets on the market
 - Modular concept for future expansions
- **All-in-one solution** thanks to M12 Power, Ethernet and trigger inputs as well as external lighting
- Easy **operation** thanks to TAS/web server integration
- Self-learning AI-based vision features
 - Read the **difference check, classifier, detector** and bar code without an additional computing unit
- Customer-specific **solution adaptations**
 - e.g. determination of object rotation
 - Advanced imaging solutions



General features: Four pre-installed apps (three AI-based)

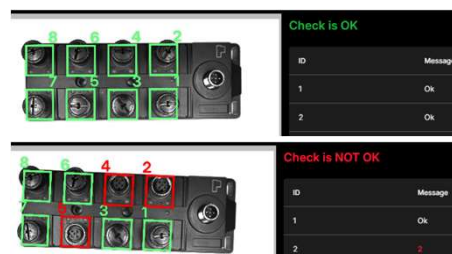
Code reading

- 1D and 2D reading
- Combination of "detector" and code reading possible
- Determine which codes are to be read.



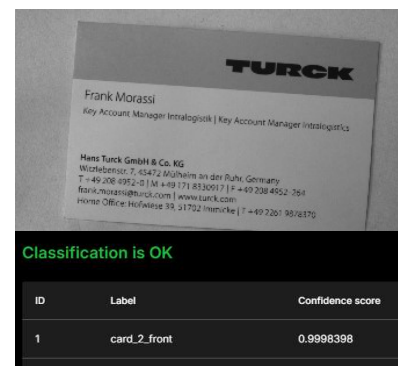
Difference Check

- Find a difference in an image based on training data.
- Simple training procedure for which no prior knowledge is required. Only "good/bad"



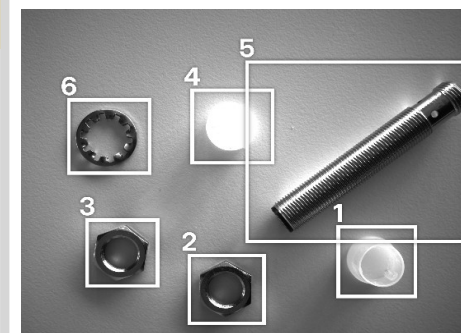
Classifier

- Images can be divided into different classes.
- Identifies which class is visible in the image



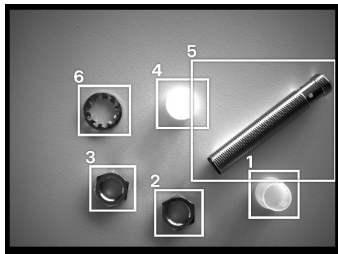
Detector

- Objects can be divided into different classes.
- Identification of how many objects are visible in the image within a defined class.

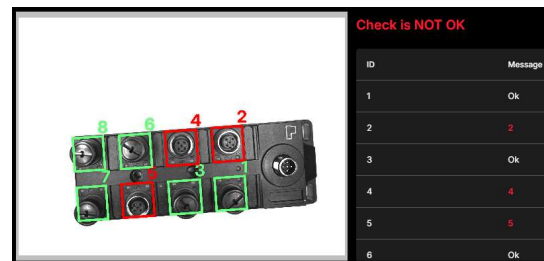
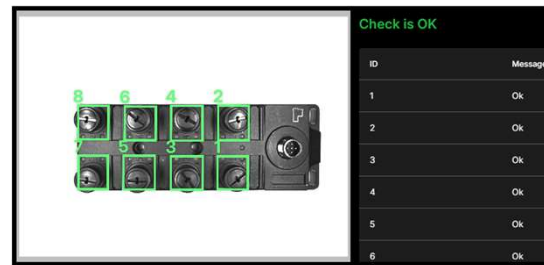


Use cases within a digitalized production

Commissioning/ Packaging



Mobile quality gates



Digitalized information

- AI based decision OK/nOK, plus “confidence score”
- Number of Objects and positions.
- Ethernet based communication
- Image storage via FTP-Server
- One device – several NN/tasks
- Improving NN by adding more pictures during the process

AI camera ensures error-free kitting



Challenge

- In manual picking processes, errors often occur when compiling sets.
- Incorrectly equipped kits lead to high costs and image problems.
- Full automation is often uneconomical for small quantities or a large variety of variants

Solution

- The **AI-based TIV camera** is taught-in using just a few training images – without any programming.
- It reliably detects whether a set has been assembled correctly – even with minimal deviations or similar components.
- Several valid variants (e.g. M12 vs. M18 sensor kits) can be flexibly taught.

AI camera ensures error-free kitting

Benefits

- **Error-free set test** directly at the workplace
- **High flexibility** with changing set configurations
- **Fast feedback** via OK/NOK signal to PLC or visualization
- **More cost-effective** than fully automated robot solutions
- **Easy integration** without programming



AI camera guarantees error-free picking



Challenge

- In manual final assembly, many inspection positions must be checked.
- Different states can be correct (e.g. component present or correctly positioned).
- Incorrect equipment leads to reworking, scrap and high costs.
- Quality control must not be complex during commissioning.

Solution

- The TIV camera uses a **difference check** with several test regions (ROIs).
- Teach-in takes place with at least 10 images each for "OK" and "NOK" – **without programming**.
- The camera automatically detects deviations and evaluates each test region individually.
- Result (OK/NOK) is transmitted directly to the PLC or visualization systems.

AI camera guarantees error-free picking

Benefits

- **Intuitive commissioning** without complex rule definition
- **AI-based error detection** – detects more than the human eye
- **High flexibility** when changing products thanks to fast teach-in phase
- **Visual feedback** for employees in the event of errors
- **Automated rejection of** faulty products possible



TIV – Customer's values and benefits

Save money

- Simple and quick commissioning without complex after-sales service
- No System integrator needed
- No edge computer needed

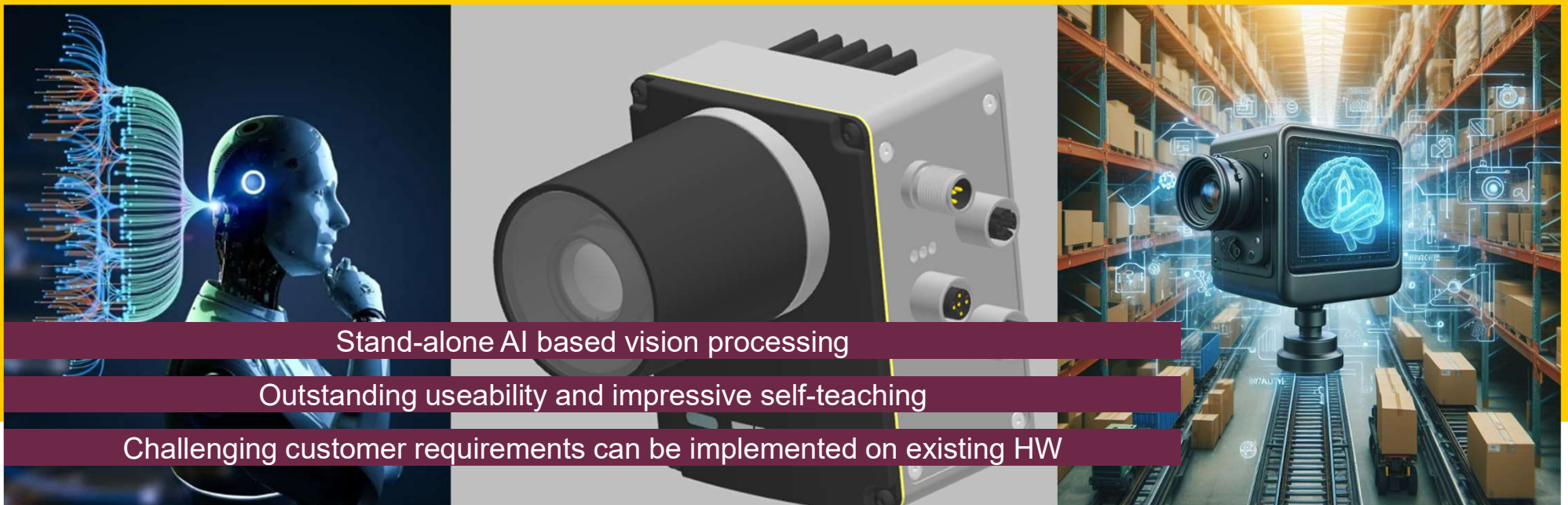
Decentralized

- Stand-alone solution with direct connection option for important accessories like trigger Sensors, Lighting, etc.
- Cyber Safe (On premise) no internet connection needed

Future Ready

- Future-proof through upgradeability
- Additional modular functions per Apps for solution integration
- f.e. Anomaly detection

Turck Intelligent Vision – A new AI-driven vision journey



» **Powering the Future of Automation with AI-driven Vision!**

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