# SEEN

Discover Artificial Intelligence



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Company



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# **Reifen Kiefer**





# Business Units with their own ki basic technologies



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# Business Unit



# Object detection with deep learning



# Warum object detection ?



Object detection with Deep Learning enables the precise **identification** and **localization** of objects in images, and thus addresses a wide range of industrial requirements.

Everything a human can recognize, AI can do too, just more **reliably** and **faster** 



# Produkte / Anwendungen object detection



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# Object detection with deep learning

Use case 1 Single Shot Tire Scan







#### **Customers**:

- Tire logistics company
- Wheel storages
- Garages / Workshops
- (...)

#### Now:

Manual extraction of tire data very slow and prone to errors

Tire Scan fully automates this process



Acquisition of all data of a tire side surface possible as mobile and also stationary solution. From stationary cameras to smartphones or tablets

Extract data in seconds



interface to EAN database



Improvement of jobs and processes in the area of tire trade and logistics as well as fleet checks

# Tire Scan – how it works







### Tire Scan – User Examples







An example of a current customer use case:

Inbound inspection with automated delivery note reconciliation.

incorrect deliveries can be identified directly

**Total time < 1,1s** (on-site, cloud speed depends on upload speed)

#### Use case 2:

- Use of a camera bridge to get a complete overview of all delivered tires
- No more tires too old go to the OEM
- Total time < 1,1s (on-site, cloud speed depends on upload speed)</li>



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# Object detection with deep learning

Use case 2 Stack Scan



# Stack Scan – Detecting large amount of objects



### Customers:

- Producing companies •
- Logistic companies
- (...)

### Now:

Manual counting or reading of data very lengthy and difficult

Stack Scan reads all required **data** from a high-resolution image.



Acquisition of data from very large images with very many objects



Readout of all data in seconds vs. very slow manual capture



Connection to databases / interfaces



Optimization of process flows in goods receipt, logistics and goods issue











An example of a customer application of the Stack Scan system including 64MP camera system.

#### Goal:

Capture the number and read out all information of all barcodes simultaneously.

#### **Before:**

Manual reading of the barcode and thus counting of all tires (approx. 5 min). 24 temporary jobs in 20 logistics centers in Europe.

#### Now:

All tires are counted **automatically** and all barcodes are read <3s

No employees necessary anymore



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# **Document Data Extraction**





Currently, many documents are read digitally or **analogously by humans**, the **important/necessary information** is **extracted and manually transferred** into the respective IT system.



Disadvantage: Very time-consuming and therefore high costs.

A large number of providers digitize documents and sort them according to characteristics. All of them fail above a certain document complexity.



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# Document Data Extraction

Use Case D-Scan 

# **Document Scan**



Customer:

- Company
- Authorities
- Banks/Insurances
- (...) •

### Now:

Manual reading through very documents, sorting large based on keywords

**Our Document Scan System** reads all data in a multistage process.



Fully automated processing of documents using artificial intelligence



AES encryption of the data for secure transmission to our servers



ISO27001 certified data center located in Germany (can be changed at any time)



Processing of all relevant data in less than 90 seconds



Use of a large language model for data extraction

# detection

### Document Scan

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# Document Scan – User Example





**Garnishment** and **transfer** documents are very timeconsuming to process and do not generate business for banks.

**Previously**: **Manual** reading of the resolutions and transfer of up to 120 data points to the IT system.

Now: All data points are read out **simultaneously** in a **multi-stage process** 

Computation time: <20s





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# Industrial Automation mit machine learning





**Currently**, many industrial processes are set **manually**, are **uncontrolled** or run with rigid parameters without the possibility to react. The result is a **non-optimal result** or a **non-optimal use** of resources.



In the machine learning process, a **neural network** learns to **independently achieve goals** by interacting with a machine's power electronics. An industrial PC hosts the controller software

Standard machine configuration



**Digital twins** are virtual replicas of physical assets. They enable real-time simulation and monitoring, leading to **better performance**, fault diagnosis and more efficient maintenance. This **reduces costs** and **improves efficiency** by basing decisions on accurate digital models.

01.11.2023



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# Industrial Automation mit machine learning

Use case machine Learning



# Industrial Automation - ML for equalization of material on assembly lines



#### Customer:

- Recycling industry
- (...)

#### Now:

**Manual** adjustment of many machines and systems; here in the recycling area

X-ML algorithms automatically adjusts the machine parameters and finds the optimal process parameters



Virtual simulation and testing through AI

Performance monitoring and predictive maintenance

Process optimization and control through Big Data analyses

Training and competence development

Life cycle management of industrial machine systems

# Industrial Automation- User Example Disc Spreader (ML)



Goal: homogenization of material distribution of waste on assembly lines

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#### Algorithm:

Deep q-learning (reinforcement learning)

#### Implementation :

- Development of an actuator system
- Development of a sensor system (here camerabased)
- Development of a training test bench
- Development of cloud-based data management for worldwide learning of all installed systems
- Integration ML Controller via OPCUA

#### Result :

Optimal distribution and significant increase in recycling rates



# Thank you for your attention

