2020 embedded VISION summit

How to Create Your Own AI-Enabled Camera Solution in Days

Carsten Traupe
Director Product Management

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IDS

ABOUT US
PHILOSOPHY

„It‘s so easy!“

Simplicity means efficiency.

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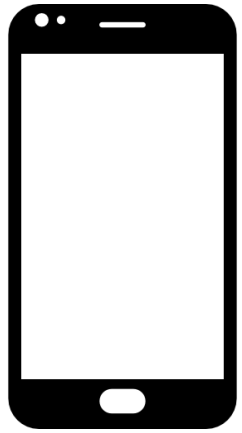

What do
a car and a smartphone
have in common?

Everybody can operate one,
but very few people can develop one!

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Agenda

- NXT ocean at a glance
- Why? “AI everywhere”
- What? Easy-to-use Edge AI Vision System
- Inside? Technical Information
- Examples? Case studies
- Outlook? Roadmap
- How? Design-in-Kit for Trials

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NXT ocean … at a glance

NXT ocean
Complete
Edge AI Vision
Solution

IDS NXT crawler
Image Capturing Software

IDS NXT lighthouse
Cloud-based Annotation & Training System

IDS NXT inference cameras
Edge AI Vision Sensor

NXT rio

NXT rome

deep ocean core

Capture → Annotation → Training CNNs → Inference

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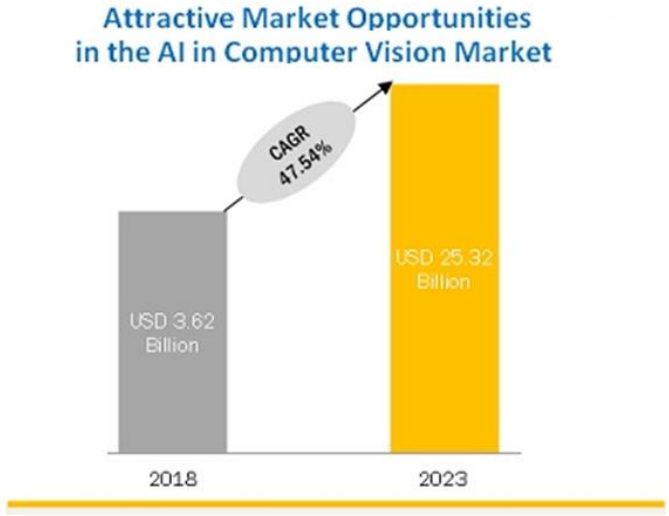
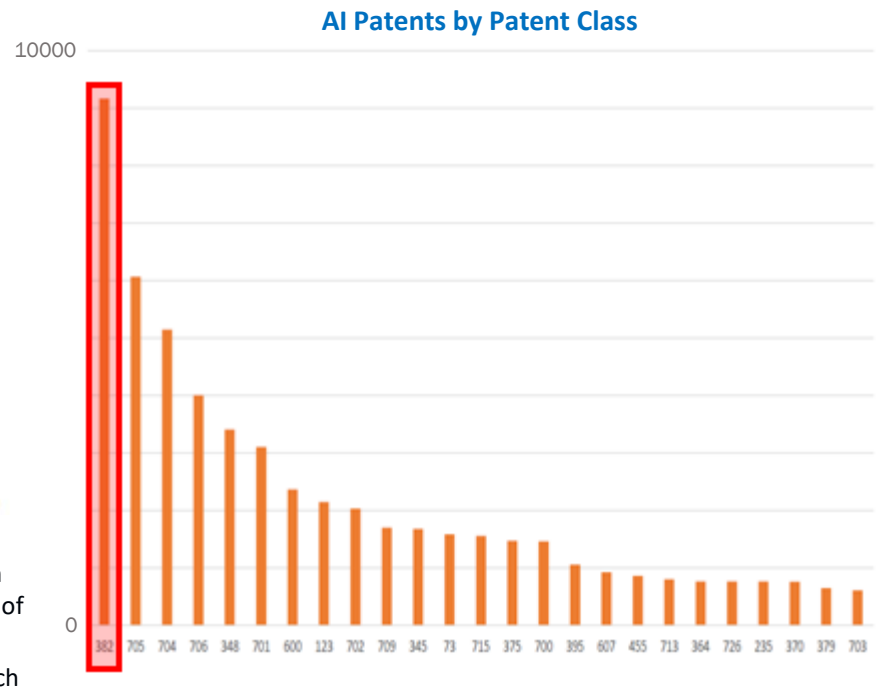
AI everywhere: Edge AI Computer Vision



ATTRACTIVE MARKET OPPORTUNITIES

- Overall market of AI in computer vision at USD 3.62 billion in 2018 and expected for USD 25.32 billion by 2023 at a CAGR of 47.54%
- Launches, partnerships and collaborations by large firms, such as NVIDIA Corporation (US) and Qualcomm Technologies, Inc. (US), provide key opportunities in the AI in computer vision market
- The market growth is attributed to the growing demand for edge computing in mobile devices
- Development of machine learning in vision technology creates several opportunities for the AI in computer vision market

Source: Expert Interviews and MarketsandMarkets Analysis



382 – Image Analysis
705 – Data processing: financial, business practice, management, or cost/price determination
704 – Data processing: Speech, Linguistics, Language Translation, Auto (de)compression
706 – Data processing: Artificial Intelligence
348 – Television
702 – Data processing: Vehicles, Navigation and Relative Location
600 – Surgery
123 – Internal Combustion Engines

AI - Why?

- Extend Computer Vision beyond traditional algorithms

Edge - Why?

- Bandwidth
- Latency
- Privacy

Embedded Vision - Why?

- Compact
- Cost effective
- Vision Sensor paradigm

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Easy-to-Use Edge AI

Features

- Simple Annotation
- CNN Quality Control
- Augmentation
- AI optimization (Pruning)

- Single Device Image Capture & Inference
- In-Camera CNN Simulation
- Industrial Vision equipment (lighting, trigger)

- Integration Factory Automation/ IIoT
- Pre-/ Post-processing traditional Algorithms

Edge-AI
Embedded Vision
Sensor

✓ Additional benefits

Benefits

- ✓ No Hardware Selection Hassle
- ✓ No Investment in Hardware
- ✓ No IT Admin/ Maintenance costs
- ✓ No Hardware Obsolescence

- ✓ In-/ At-line capable Form Factor
- ✓ Consistent for Training & Inference

- ✓ Direct Interface to SPS, no Vision PC
- ✓ Complementary Algorithms complete Image Evaluation Pipeline
- ✓ Hardware tailored CNN Acceleration

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Easy-to-Use Edge AI

NXT ocean
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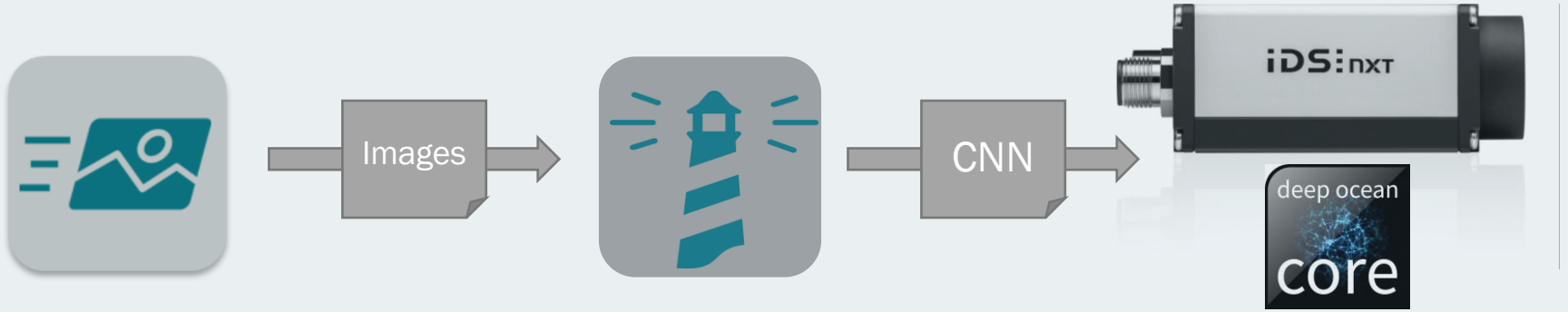
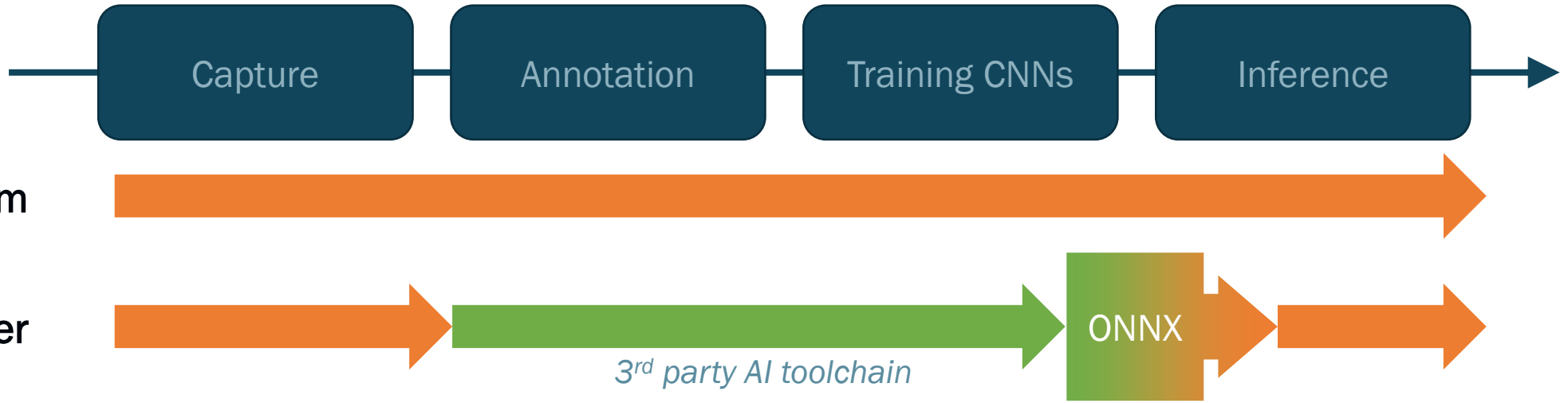
Cloud-based Annotation & Training system

IDS NXT rio/ rome
Edge AI Vision Sensor





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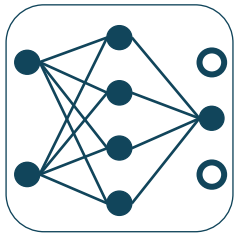
Technical Background Information



DL functions

- MobileNet V1/2
  SqueezeNet
  MnasNet V1
- CNN input resolution
  224 x 224 Px, color & mono
- Classifier & Object Detector
  up to 1000 results
- Live-switchable CNN models from RAM
- Built-in Pruning & Augmentation
- HW-optimized “Deep Ocean Core”

NXT inference cameras

- Industrial C-Mount Lens
- 1.6/ 3.1/ 5.0/ 6.4 MPx color & mono
  (IMX273/ 265/264/ 178)
- IP30 (NXT rio)
  IP67 (NXT rome)
- REST/ OPC UA interface
- Up to 25fps (incl. inference)
- GenICam-like Camera Control

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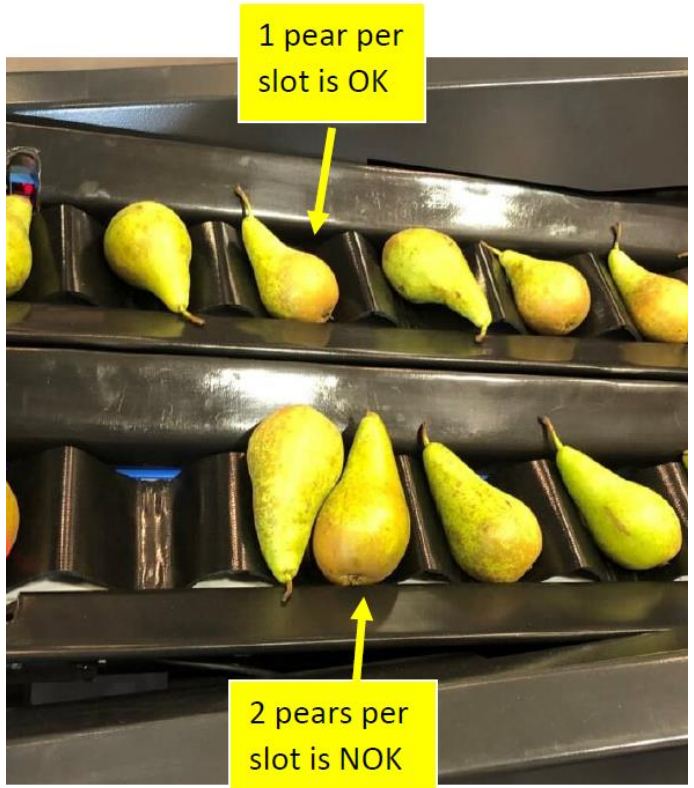
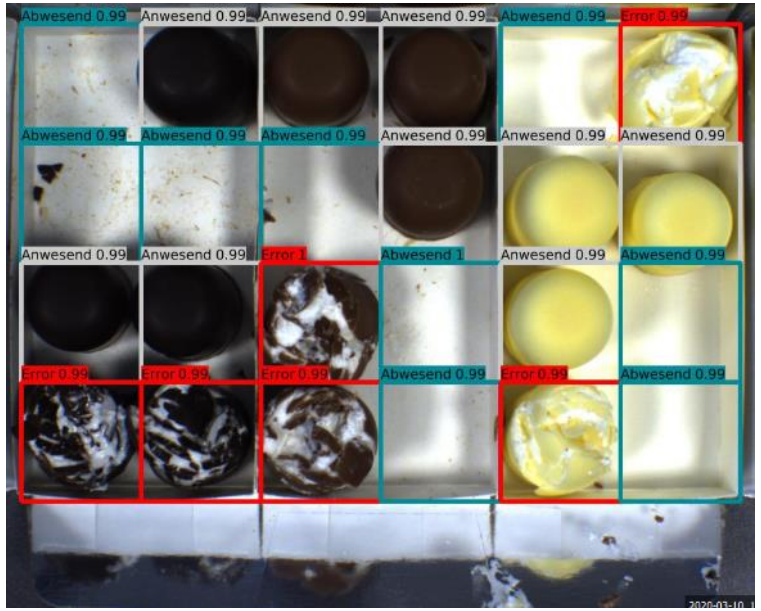
Case Studies

Food Inspection



Packaging Inspection



Horticulture Automation

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Availability

	IDS Next ocean 1.0 launched 2019	IDS Next ocean 1.1 launches Q4 2020	IDS Next ocean 2.0 in preparation
DL/ CNN functions	• Classification Single-RoI	• Classification Multi-RoI • Object Detection	• Heatmaps • Anomaly Detection • ONNX interface • Auto Labeling • Continuous Training Workflow
Solution Integration Factory Automation, IIOT	• REST • Digital I/Os • RS232	• OPC UA • Customer App Development C++	• ProfiNet • Customer App Development Python
Others	• Languages: English, German	• Languages: French, Japanese	• Team Collaboration in IDS lighthouse

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For trials … NXT ocean Design-In Kit

IDS NXT ocean

The all-in-one inference camera solution

Ships from stock, includes

- 1.6MP NXT rio inference camera (IMX265) incl. lens
- 3 month trial license for NXT lighthouse cloud based trainings system
- All required accessories (PSU, cables, mounting plate)
- Software (e.g. NXT Crawler) downloadable from Website
- Article No. AS00029 @ 4100€/ 4920$

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Summary & Take-away

NXT ocean … Edge-AI-Vision solution – “Easy-to-Use“

- Compact industry-camera like housing
  mount, interface, IP rating
- Seamlessly integrated system components
  friction less AI end-to-end workflow,
  ready for first inference within one hour
- Cloud-based training system
  no hardware selection, -cost, -obsolescence
  use case tailored GUI, optimized CNNs
- Integration into Factory Automation systems
  REST , OPC UA, ProfiNet
- Interface for 3rd party CNNs
  ONNX

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Thank you! … Questions?

For further details:

https://en.ids-imaging.com/ids-nxt-ocean.html

Carsten Traupe
Director Product Management

IDS Imaging Development Systems GmbH
Dimbacher Str. 6-8, D-74182 Obersulm, Germany

Email: c.traupe@ids-imaging.de
Web: www.ids-imaging.com

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