„It’s so easy!“

Simplicity means efficiency.
What do a car and a smartphone have in common?

Everybody can operate one, but very few people can develop one!
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
NXT ocean ... at a glance

IDS NXT crawler
*Image Capturing Software*

IDS NXT lighthouse
*Cloud-based Annotation & Training System*

IDS NXT inference cameras
*Edge AI Vision Sensor*

NXT ocean
Complete Edge AI Vision Solution

Capture  Annotation  Training CNNs  Inference
AI everywhere: Edge AI Computer Vision

ATTRACTION 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

AI - Why?
- Extend Computer Vision beyond traditional algorithms

Edge - Why?
- Bandwidth
- Latency
- Privacy

Embedded Vision - Why?
- Compact
- Cost effective
- Vision Sensor paradigm

ATTRACTIVE MARKET OPPORTUNITIES

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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
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

Cloud-based CNN training & annotation

Edge-AI Embedded Vision Sensor

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

Additional benefits
Easy-to-Use Edge AI

NXT ocean
Complete
Edge AI Vision
Solution

IDS NXT crawler
Image Capturing Software

IDS NXT lighthouse
Cloud-based Annotation & Training system

IDS NXT rio/ rome
Edge AI Vision Sensor

Capture
Annotation
Training CNNs
Inference

Turnkey System

AI Engineer

ONNX

3rd party AI toolchain

© 2020 IDS Imaging Systems Development
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
### Availability

<table>
<thead>
<tr>
<th></th>
<th>IDS Next ocean 1.0 launched 2019</th>
<th>IDS Next ocean 1.1 launches Q4 2020</th>
<th>IDS Next ocean 2.0 in preparation</th>
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<tbody>
<tr>
<td>DL/ CNN functions</td>
<td>• Classification Single-RoI</td>
<td>• Classification Multi-RoI</td>
<td>• Heatmaps</td>
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<td>• Object Detection</td>
<td>• Anomaly Detection</td>
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<td>• Classification Multi-RoI</td>
<td>• ONNX interface</td>
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<td>• Object Detection</td>
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<td>• Heatmaps</td>
<td>• Continuous Training Workflow</td>
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<td>Solution Integration</td>
<td>• REST</td>
<td>• OPC UA</td>
<td>• ProfiNet</td>
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<tr>
<td>Factory Automation, IIOT</td>
<td>• Digital I/Os</td>
<td>• Customer App Development C++</td>
<td>• Customer App Development Python</td>
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<td>• RS232</td>
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<td>Others</td>
<td>• Languages: English, German</td>
<td>• Languages: French, Japanese</td>
<td>• Team Collaboration in IDS</td>
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<td>lighthouse</td>
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For trials ... NXT ocean Design-In Kit

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$
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
Thank you! … Questions?

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