

VISION CONNECT

Quality Control Using AI

PIERER
INNOVATION



PIERER
INNOVATION

LET SUCCESS MAKE THE NOISE

6,088
Employees

375,492
UNITS SOLD

58%
MADE IN AUSTRIA



PRODUCT INNOVATION ALONE IS NOT ENOUGH

SMART SERVICES AND DIGITAL TRANSFORMATION IN ALL AREAS

**COMPETENCE CENTER FOR TRENDS, TECH, SOFTWARE-DEVELOPMENT,
BUSINESS MODELING AND DATA SCIENCE**

DIGITAL PRODUCTS

Enhancing the physical experience with digital services

BUSINESS MODELLING

Development and identification of new business segments

DEVOPS

Agile software development, connected bikes infrastructure

SMART COMMERCE

Transition from a B2B to a B2C business along the customer journey










SCOUTING

Trend and technology foresight, supporting all stakeholders within Pierer Mobility

HACKATHONS & INNO CAMPS

INNOVATION LAB

Just show it:

-  None
-  Eraser
-  Highlight
-  Circle
-  FreeForm
-  MagicWand
-  Polygon
-  Rectangle
-  Sausage

▶ Just press „Play“



Choose your solution

Give Input (if needed)

Set up output/recipes

Test and fine-tune

The screenshot displays the DFN.AI web interface with a navigation bar at the top containing 'Home', 'Files', 'Networks', 'Training', 'Decisions', 'Tuning Center', and 'Settings'. The main content area is titled 'Choose Network Type' and features a grid of eight AI solution cards, each with a visual example and a brief description:

- Image Classification:** A network that determines which objects are present on an image. Example: A grid of images showing penguins, flamingos, ducks, and a combined penguin/flamingo image.
- Image Segmentation:** A network that predicts to which class a pixel belongs. Overlapping instances cannot be separated. Example: Penguins on a beach with a 'rock' label and a 'penguins' label.
- Object Detection:** A network that finds objects on images and predicts their bounding boxes. Overlapping instances can be separated. Example: Penguins with bounding boxes labeled 'penguin 90', 'penguin 87', and 'penguin 89'.
- Instance Segmentation:** A network that finds objects on images with pixel accuracy and bounding box prediction. Overlapping. Example: Penguins with colored masks and bounding boxes labeled 'penguin 90', 'penguin 87', and 'penguin 89'.
- Anomaly Detection:** A network that detects any deviations from a norm on an image. Example: A 'penguin OK' image and a 'penguin NOT OK' image (with a flamingo) both with bounding boxes.
- Keypoint Detection:** A network that detect keypoints which can be used to measure different properties of objects. Example: A warning sign with a bounding box and the word 'PENGUINS'.
- Text Detection:** A network that finds characters or words on an image. Example: A warning sign with a bounding box and the word 'PENGUINS'.
- Super Resolution:** Upscale a low resolution image to higher resolutions with the help of our AI. Example: A flamingo image shown at 'low resolution' and 'high resolution'.

The Windows taskbar at the bottom shows the search bar with the text 'Zur Suche Text hier eingeben', system icons, and the date/time '19:53 18.09.2022'. A DFN.AI logo is visible in the bottom right corner.

Choose your solution

Give Input (if needed)

Set up output/recipes

Test and fine-tune

Annotation-Tool [d64cb792-d019-4c04-8951-d07773df6ed8.png]

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Zahnräder

None
Eraser
Highlight
BoundingBox

Activate positive / negative annotations
Convert all predictions to annotations

Zahnräder (12) 1

94.73%
97.7%
96%
94%
90%
96%
95%

95.75%
94.62%
98.24%
97.81%
87.13%

Predicted Annotated Training Set Save & Next

Training (Idle) Start Stop
Autoprediction (Idle) Start Stop
new predictions available

Show Network Details

DEK

Choose your solution

Give Input (if needed)

Set up output/recipes

Test and fine-tune

Annotation-Tool [IMG_5835.jpg]

Navigation: Home | Files | Networks | Training | Decisions | Tuning Center

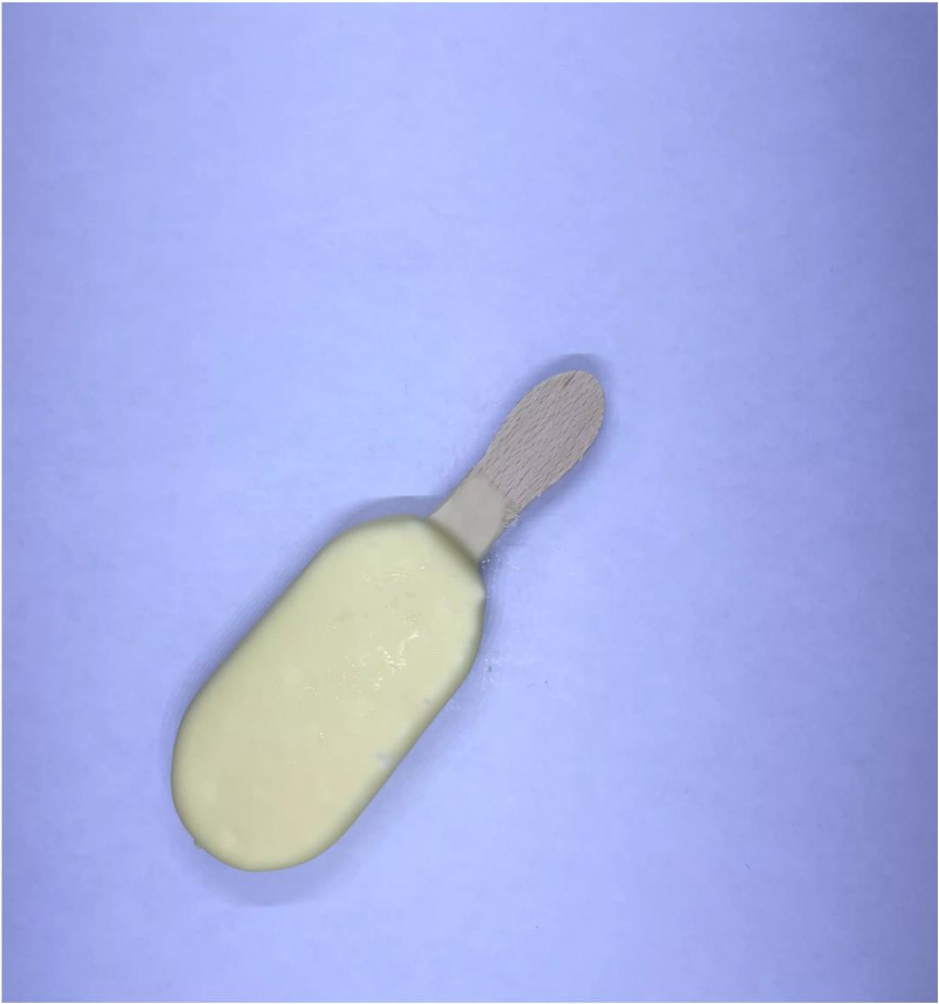
Labels: Eissorten

LABELS: User Annotated

Weiß	100%	1
Vollmilch	1%	2
dunkel	0%	3
mandel	1%	4

2/7

Buttons: Predicted, Annotated, Training Set, Save & Next



Training (Idle) [Start] [Stop]

Autoprediction (Idle) [Start] [Stop]

new predictions available

Show Network Details



Choose your solution

Give Input (if needed)

Set up output/recipes

Test and fine-tune

DEFON

Home Files Networks Training Decisions Tuning Center Settings

Test Center [sn01195474440454734263_EL_plain_rot000__07_defects.png]

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Recipe: Save

Prediction Filters: Bucket Sorting

Single Area \geq 1268 px Not OK 2

Total Count \geq 1 Not OK 1

Single Probability \geq 100 % Not OK 3

+ Add sorting rule Reset filters

Name	probability	area	
crack	96.08%	14705	✓

All 1 Relevant 1 Irrelevant 0 Selected Label 1 None

Bucket: Not OK 2 View Full



Prediction Stats Image Info

Training (idle)

Predict All

Show Network Details

Choose your solution

Give Input (if needed)

Set up output/recipes

Test and fine-tune

Recipe

Recipe

Bucket Distribution

Bucket	# Items	Loss	Est. Value
OK	7	0,00 € (0%)	700,00 €
Not OK 1	20	400,00 € (20%)	2.000,00 €
Not OK 2	11	660,00 € (60%)	1.100,00 €

Rule

crack/crack: area \geq 9358.37 \rightarrow Not OK 2

Rule Histogram Distribution

Relevant Networks

crack

Predict All

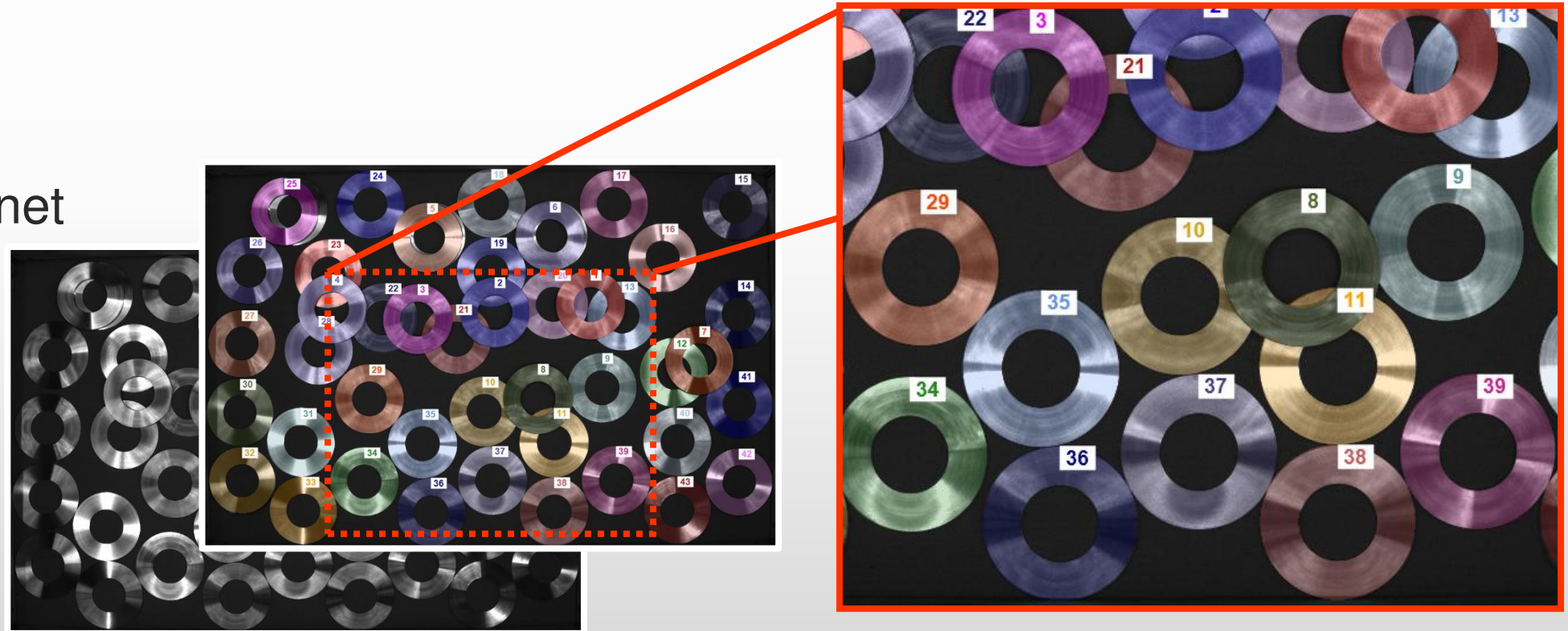
crack > cracks

sn01195474474064843641_FL | sn01195474474064834839_FL | sn01195474440454734263_FL | sn01195474440454731060_FL | sn01195474401911879047_FL | sn01194633377859279604_FL

HIGHLY COMPLEX IMAGE EVALUATION

simply implemented

Can DENKnet
count?



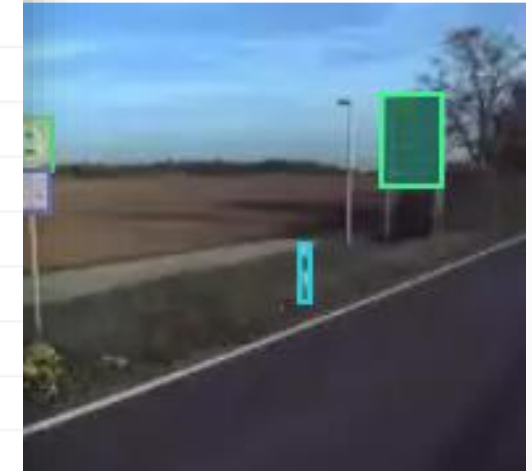
HIGHLY COMPLEX IMAGE EVALUATION

simply implemented

Can DENKnet
many different
classes?



1000-11	26
1000-20	51
1000-21	43
1000-22	2
1000-31	17
1000-32	16
1000-33	2
1001-30	53
1001-31	138
1002-xx	45
1004-30	176
1004-31	20
1006-31	23
1007-34	48
1010-51	35
1010-58	27
1012-50	19
1020-30	29
1022-10	61
1026-35	27
1026-36	23
1031-5x	14
1040-32	46
1042-3x	77
1053-30	18
1053-31	15
1053-33	26



HIGHLY COMPLEX IMAGE EVALUATION

simply implemented

Can DENKnet
good-bad?

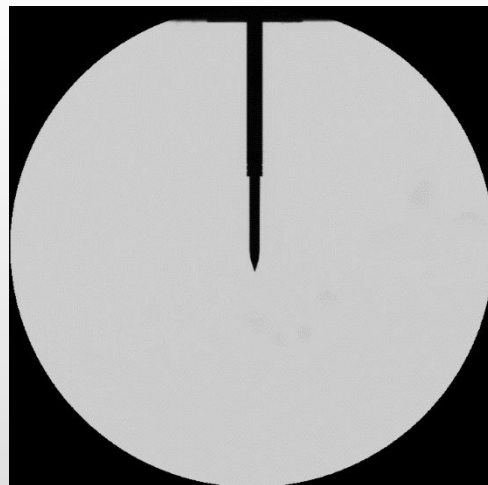
Image evaluation with 21
images created

Quality

LABELS AI Annotated all none

Good 100% 1

Bad 0% 2

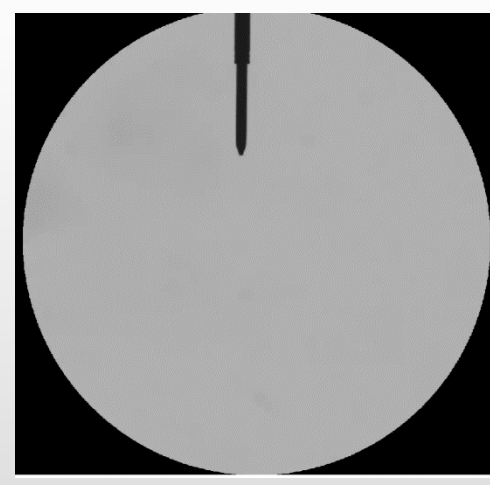


Quality

LABELS AI Annotated all none

Good - 1

Bad 100% 2

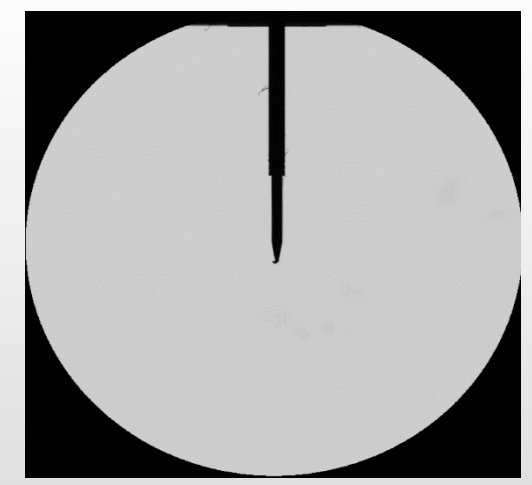


Quality

LABELS AI Annotated all none

Good - 1

Bad 100% 2



HIGHLY COMPLEX IMAGE EVALUATION

simply implemented

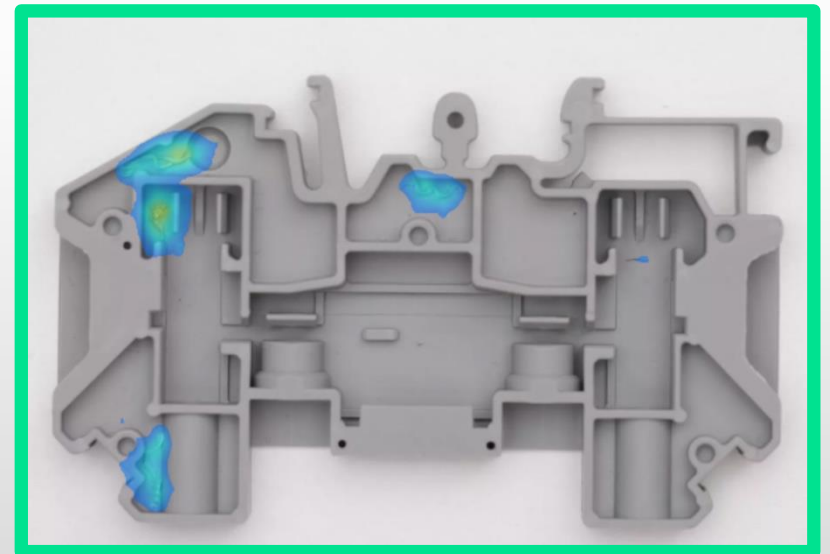
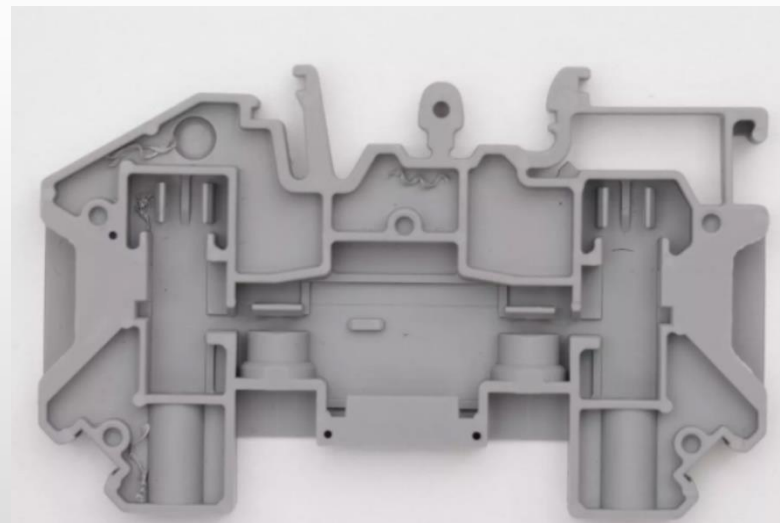
Can DENKnet
OCR?



HIGHLY COMPLEX IMAGE EVALUATION

simply implemented

Can DENKnet
deviations?

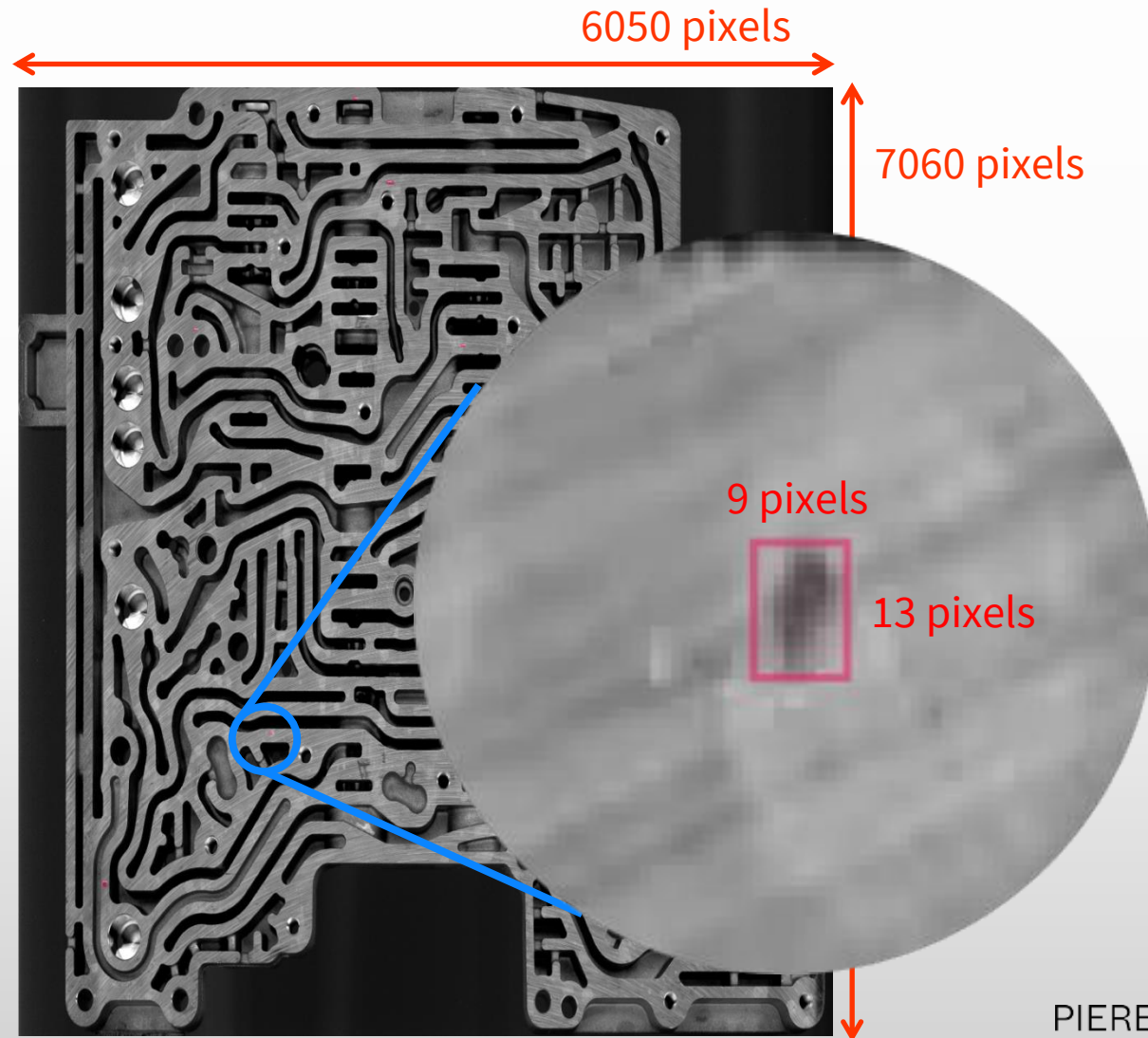


HIGHLY COMPLEX IMAGE EVALUATION

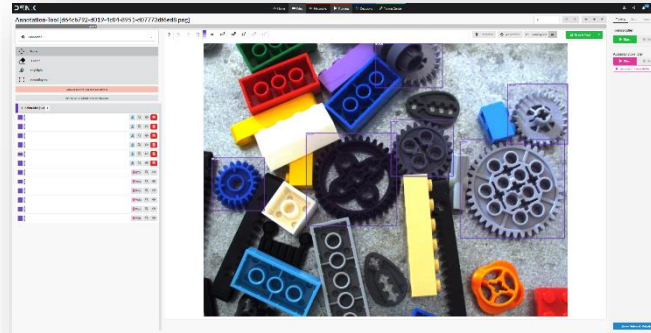
simply implemented

Can DENKnet
tiny?

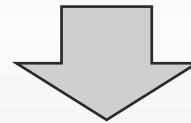
No Limitations



INTEGRATION STRATEGY



DENK Vision AI Hub



Product Integration

- DENK API
- Docker
- Online-Service

```
int ReadAllModels(  
    const char* path,  
    char*      proto_chars,  
    int*       proto_size,  
    int        device);
```

Partner network

- Integrators / Automation companies
- Software companies



Own Software

- No code!
- Seamless experience



PROJEKT @ KTM MATTIGHOFEN

BoostUp!
Bridge
2022



Facility
Visit



Selection
of Use
Cases



Training of
Datasets

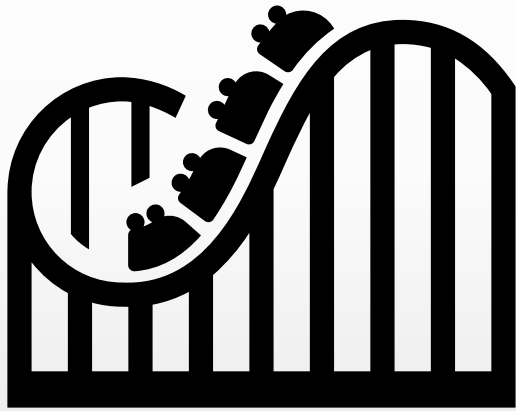


Integration
Challenges

Next Steps

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Challenges



■ Expectations



■ Time



■ Stability



SENIOR TECH SCOUT

**ANTON
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