

Swissphotonics & Swiss Food Research TECH DAY 2016

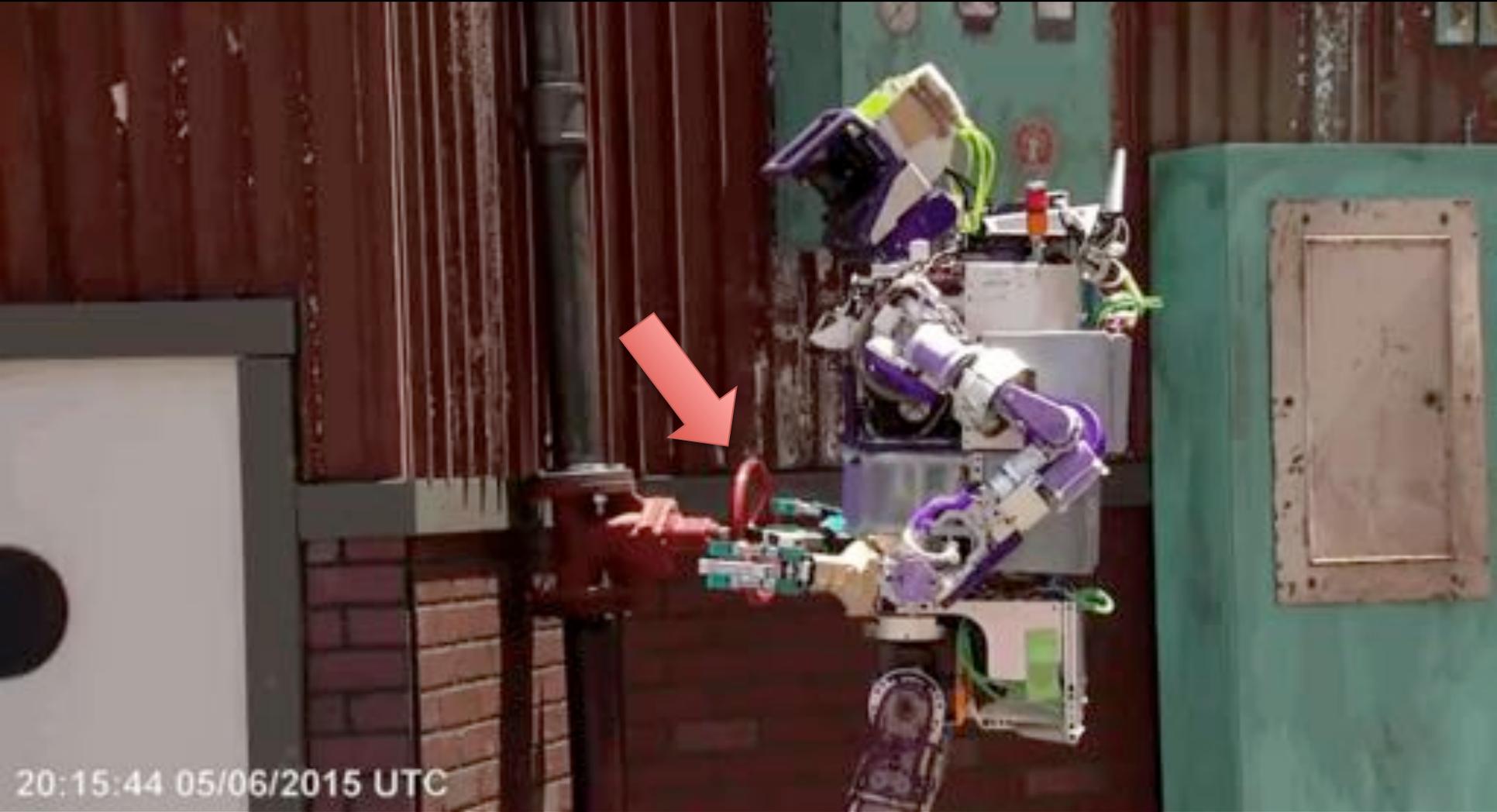


Reto Wyss, PhD
CTO ViDi Systems SA

a member of







20:15:44 05/06/2015 UTC





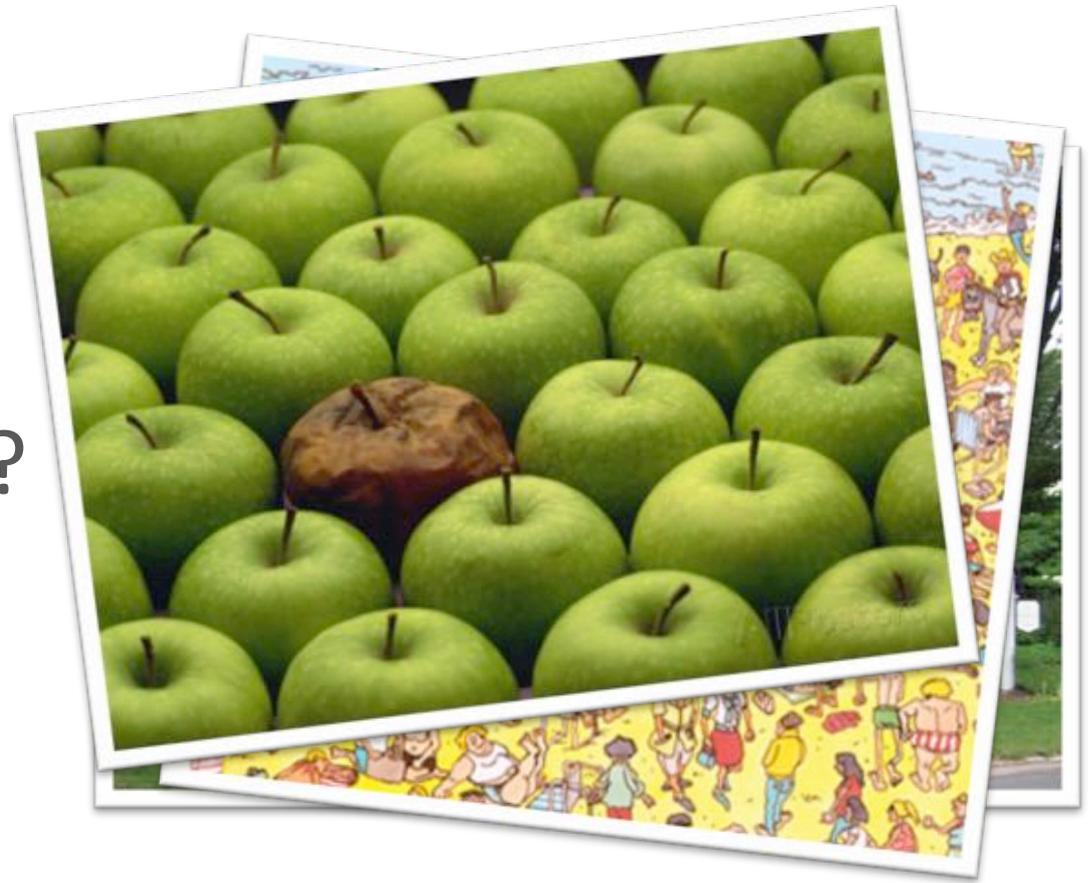


Our goal

*Enable computers, machines and robots to **understand images** such that they can meaningfully interact with the real world.*



What is this?
Where is Waldo?
What's wrong?



VIDI



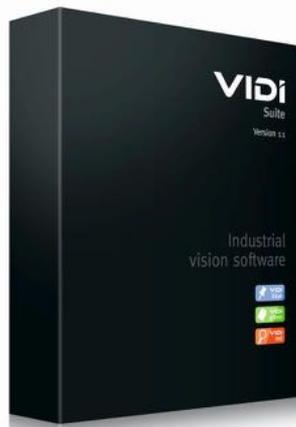


ViDi Suite

Affordable computing power



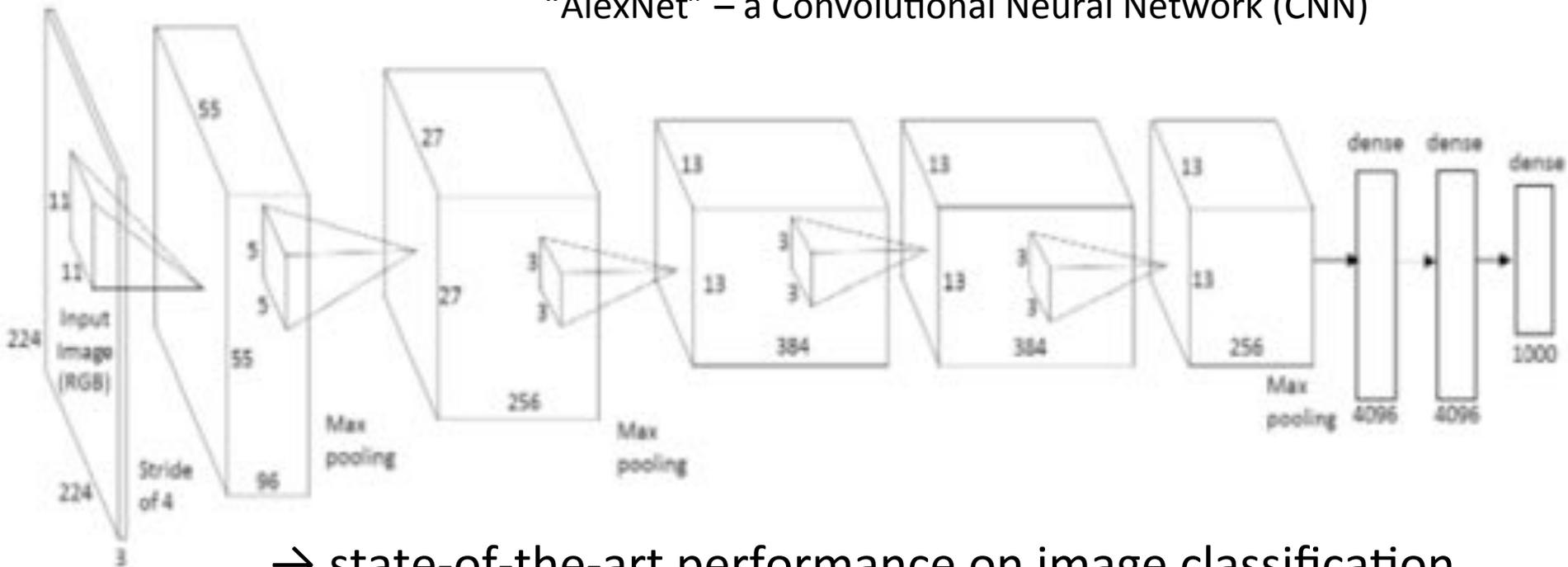
Deep Learning Technology



Abundance of data



“AlexNet” – a Convolutional Neural Network (CNN)



→ state-of-the-art performance on image classification

for **thousands** of classes

trained with **millions** of images

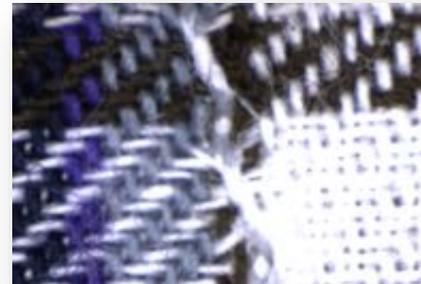
VIDI

Challenges in Industrial Applications

1



2



3

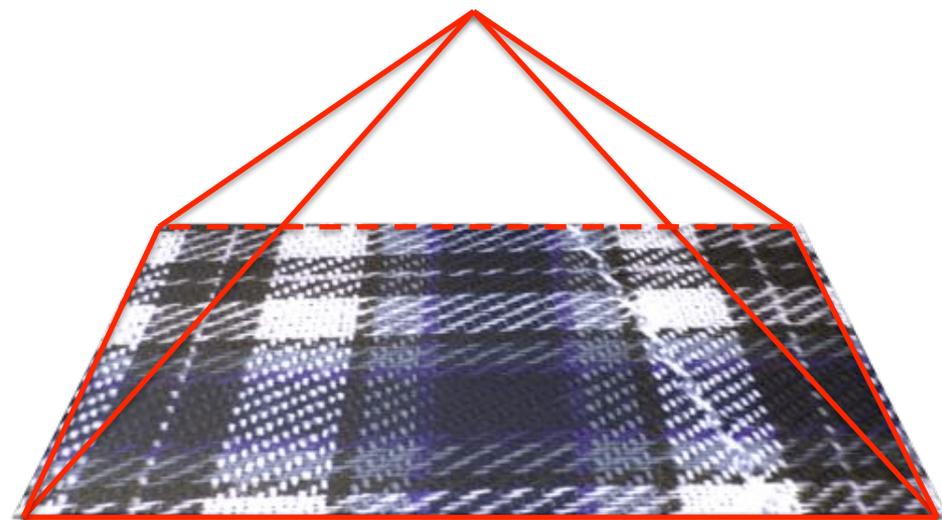




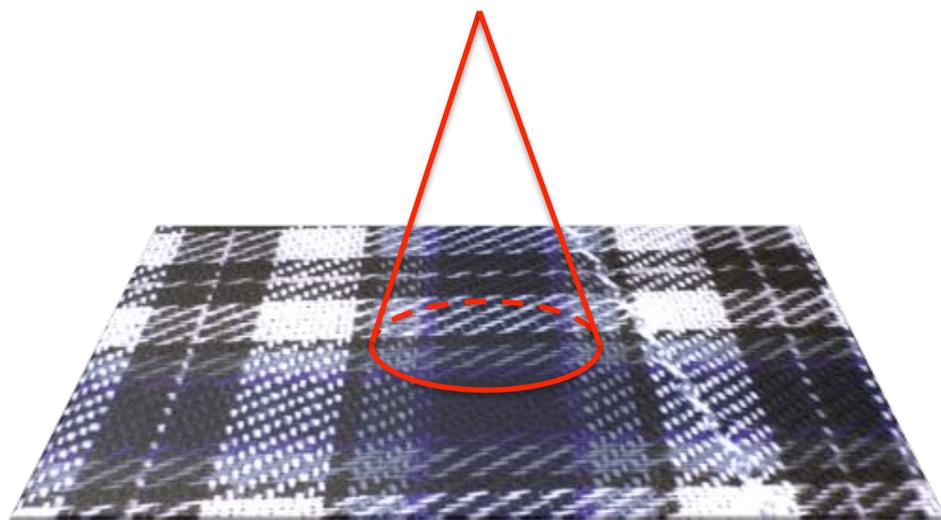
Brute Force

vs

Focus & Attention



CNN



VIDI

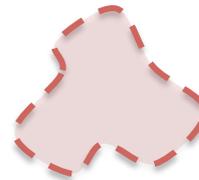


Anatomy of a unique approach

Core



Focus



Tools

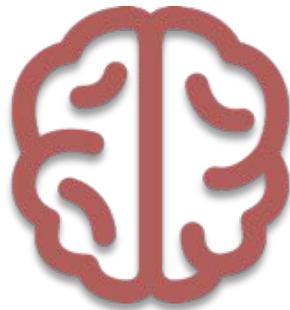




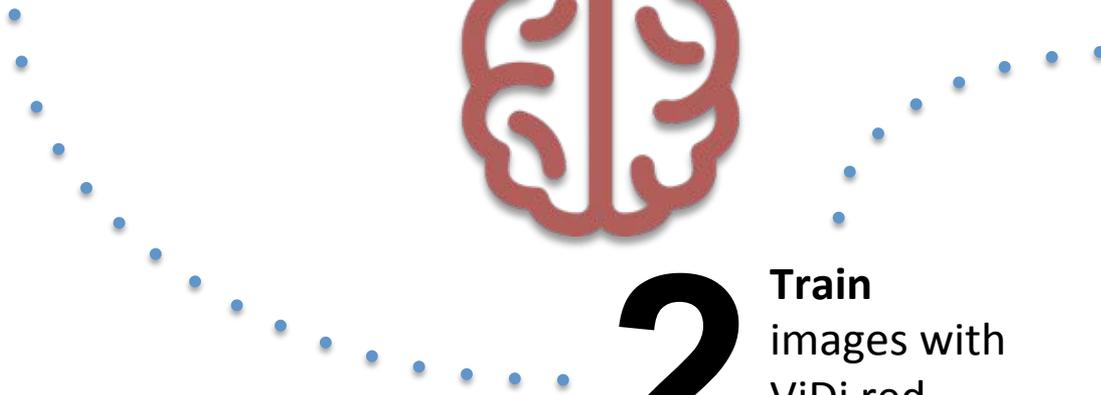
1 Collect
images of
good
samples



3 Validate
model on
images with
defects



2 Train
images with
ViDi red
unsupervised



default input analyze

Database Overview

17 Images 17 views 17 labeled 8 trained

processing time 202.7ms

show ROC

4.31 deviation 5.84

Actions for 17 views

display

4.47

4.51



Tortilla Chips

detection of broken, burnt and folded





1 Collect images of good & bad samples

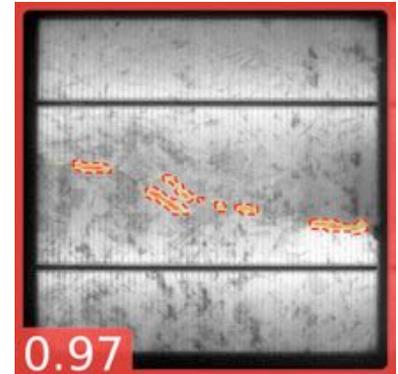
3 Train model with ViDi red supervised



2 Mark defects on bad images

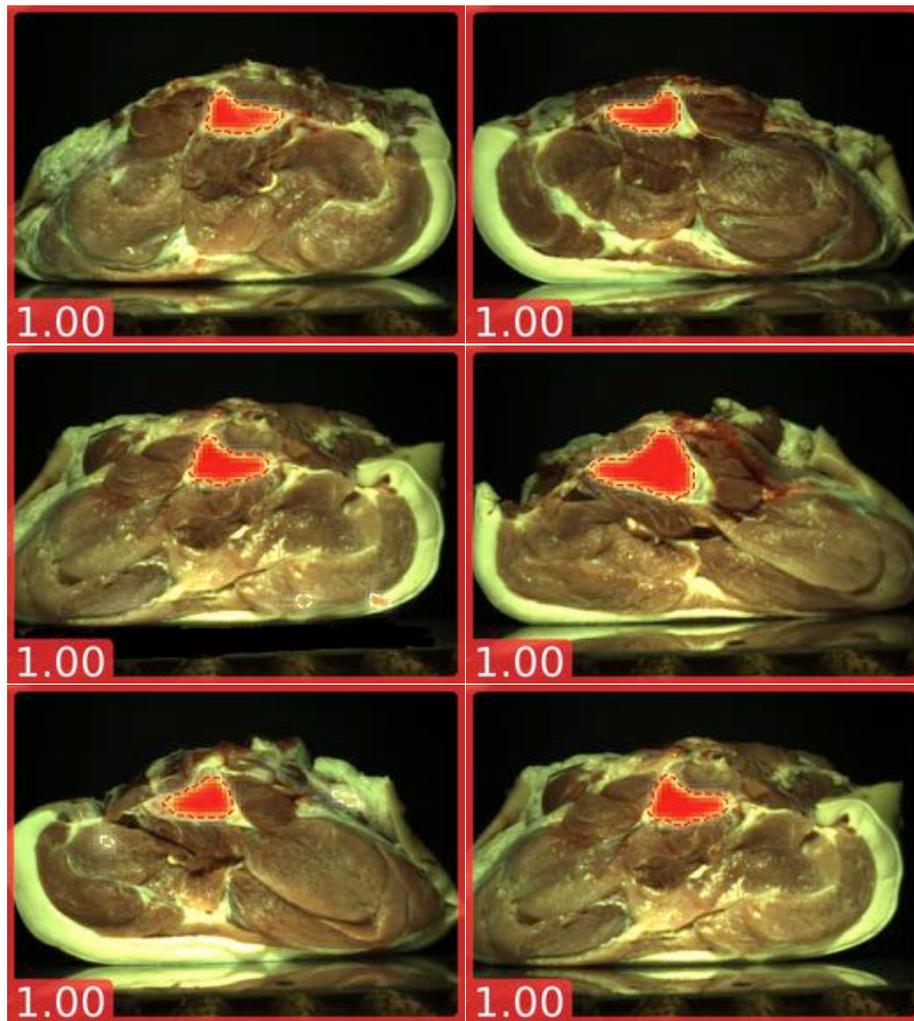
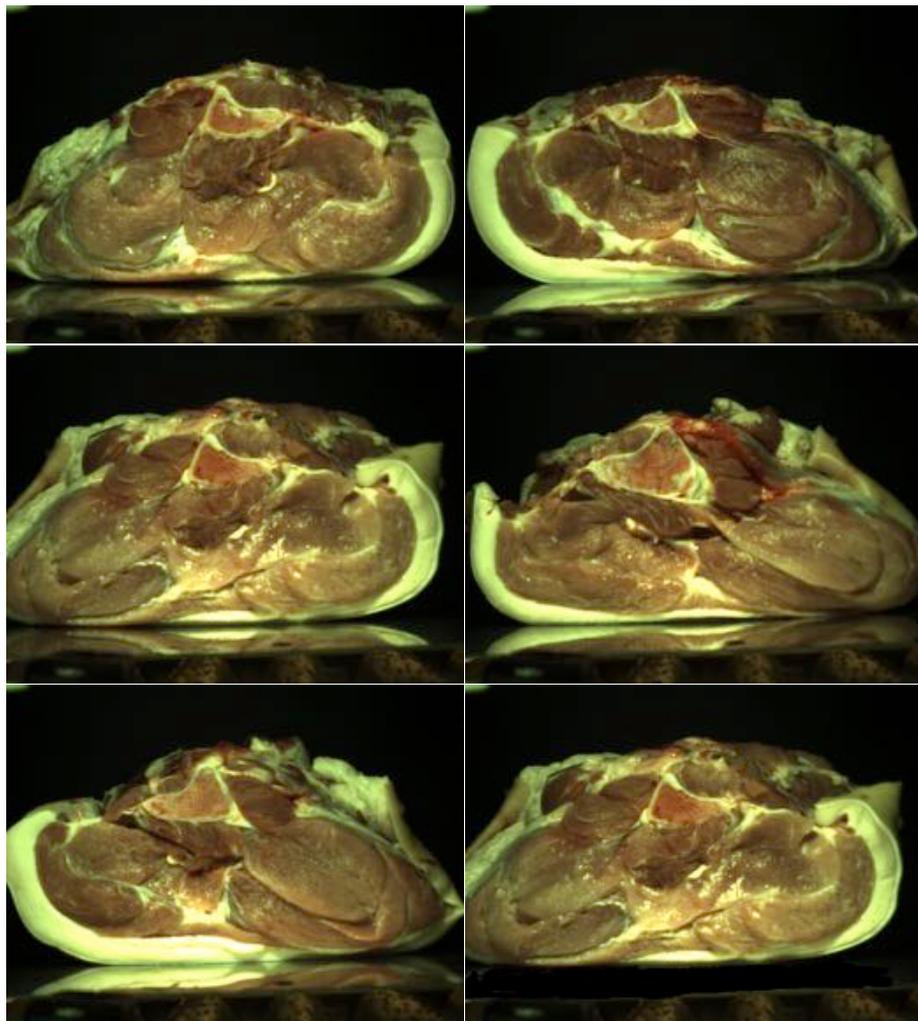


4 Validate model on untrained images





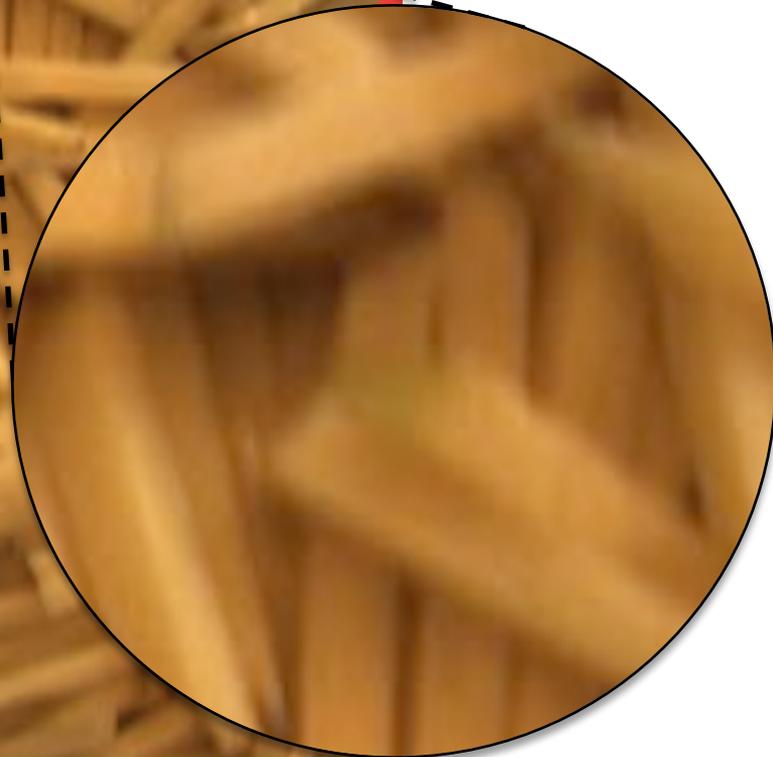
Bone Segmentation





French Fries

detecting green tips

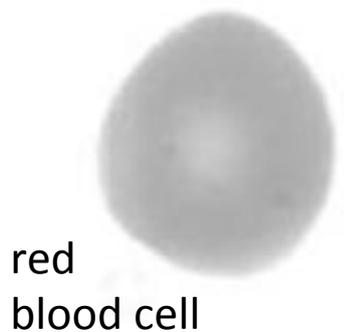


0.98

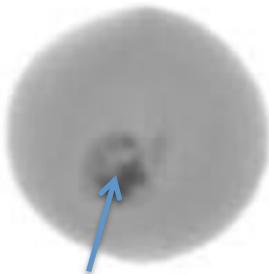


Medical Diagnosis

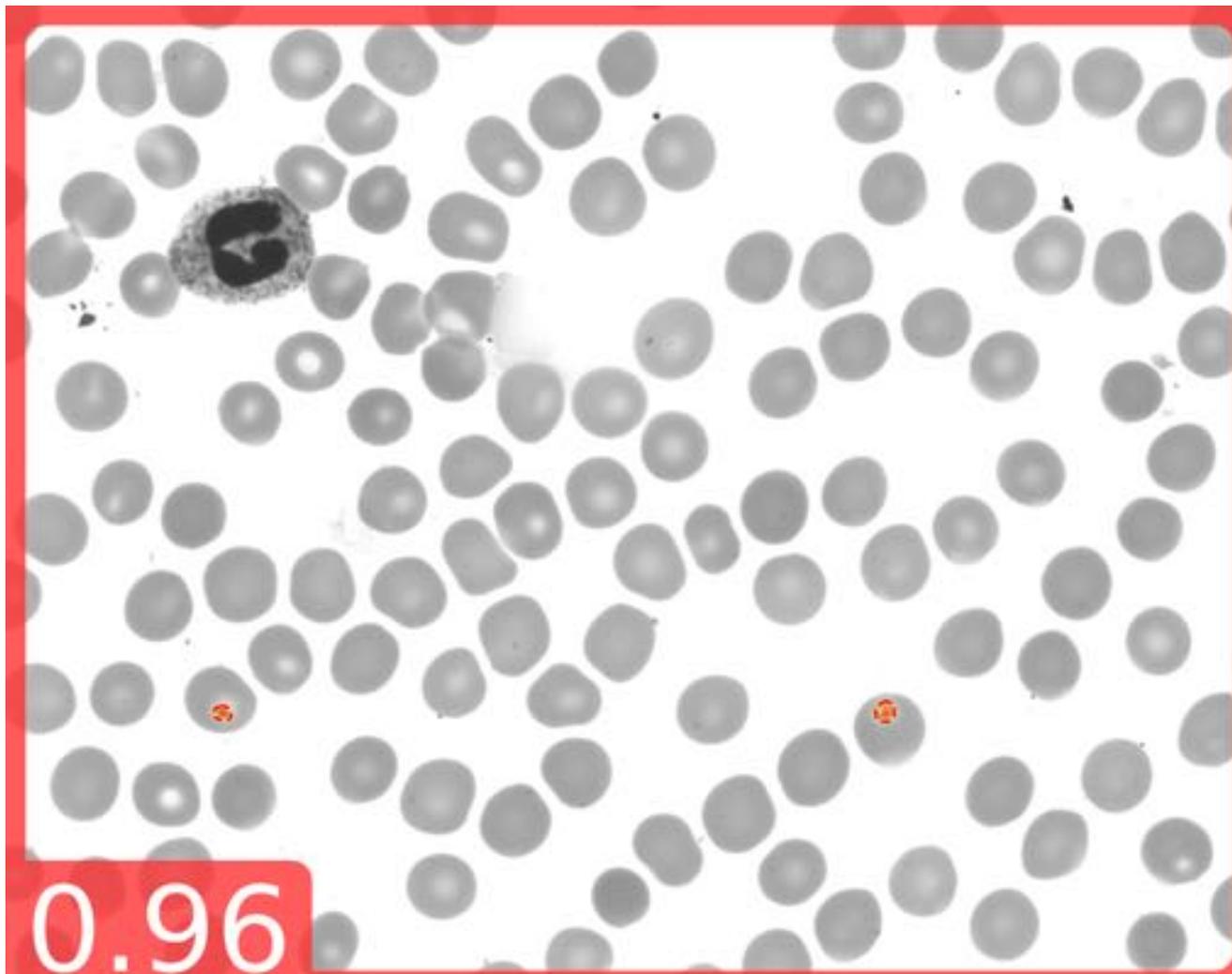
Malaria parasite detection in blood smears



red
blood cell



Malaria parasite



0.96

images courtesy by
Dr. J. Lundin, FIMM, Finland



1 Collect images of objects



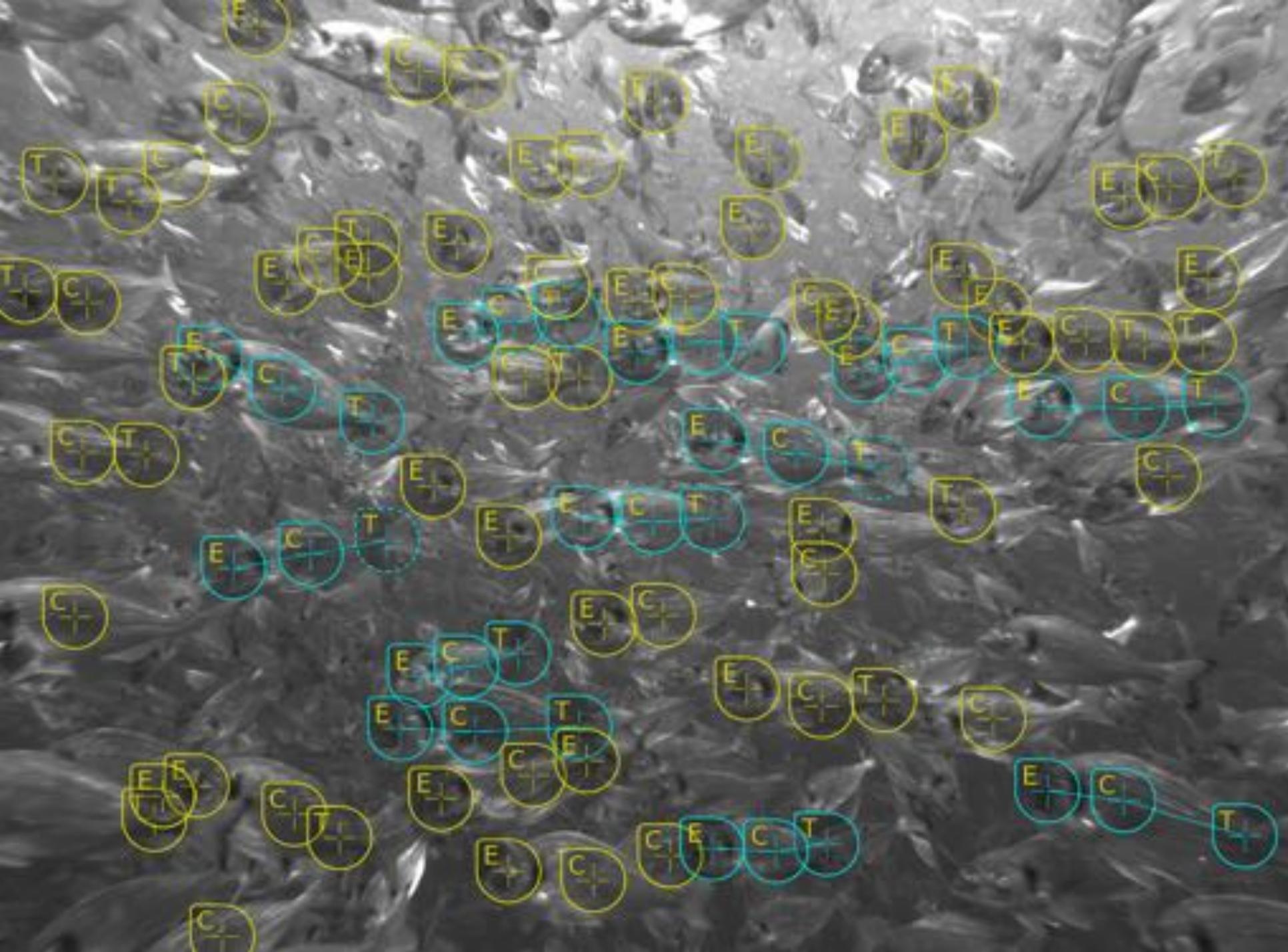
3 Train model with ViDi blue

2 Identify features on images

4 Validate detection on untrained images



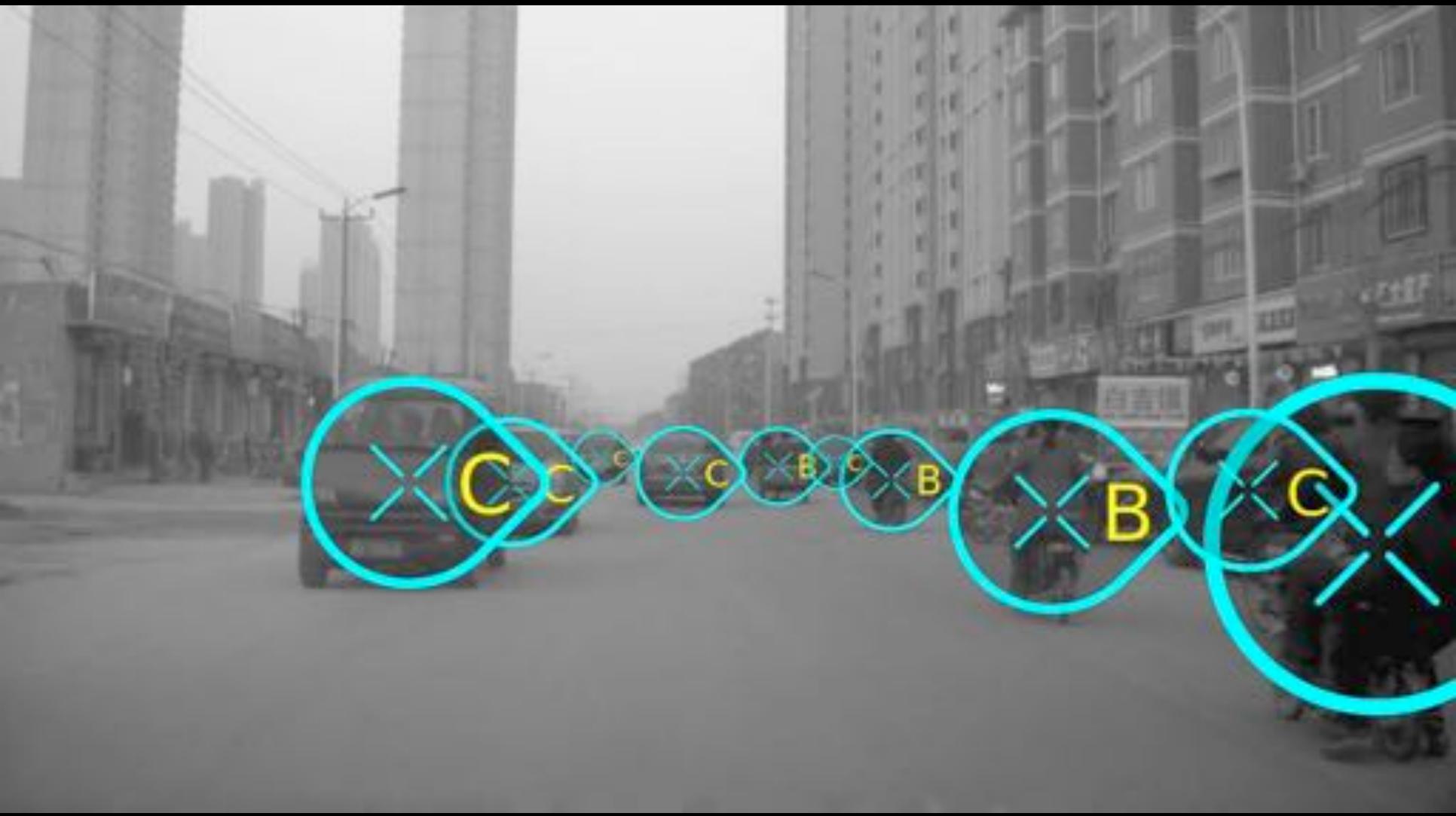
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Driver Assistance

tracking and identifying road users





1 Collect images of products



2 Tag images with their label



3 Train model with ViDi green

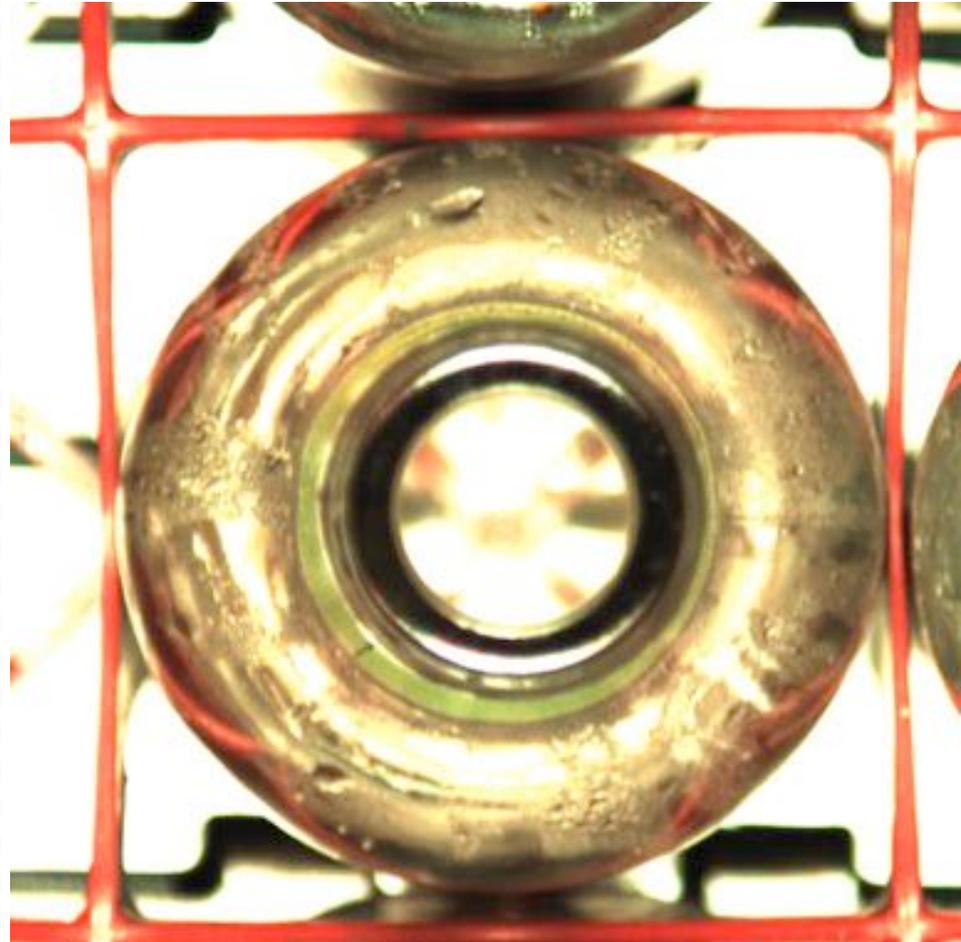
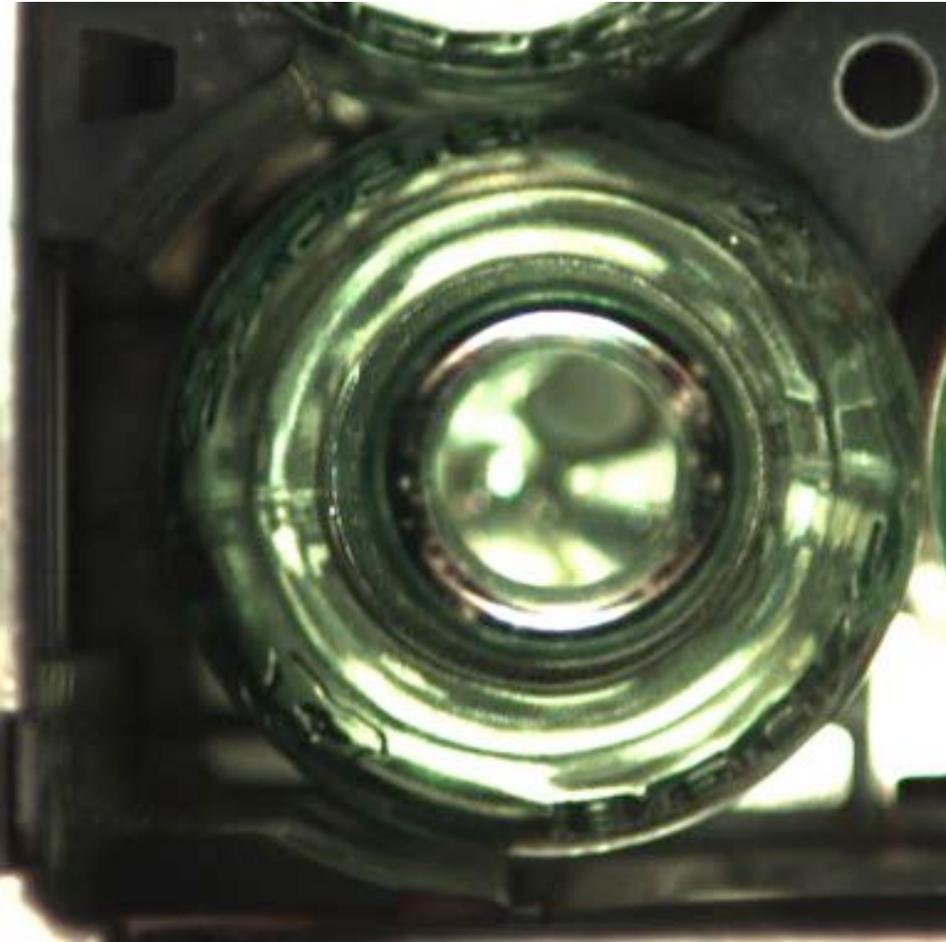


4 Validate model on untrained images



VIDI

Bottle Sorting



vs



98.4%

correct classification



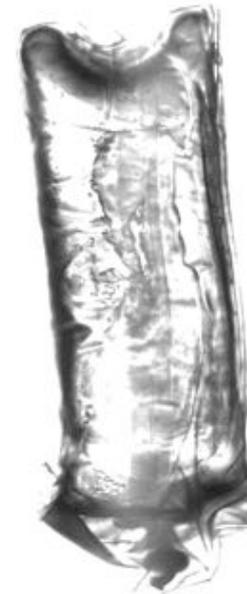
Chicken Packaging



11 classes



Pharma Packaging orientation of IV bags



Up or Down?

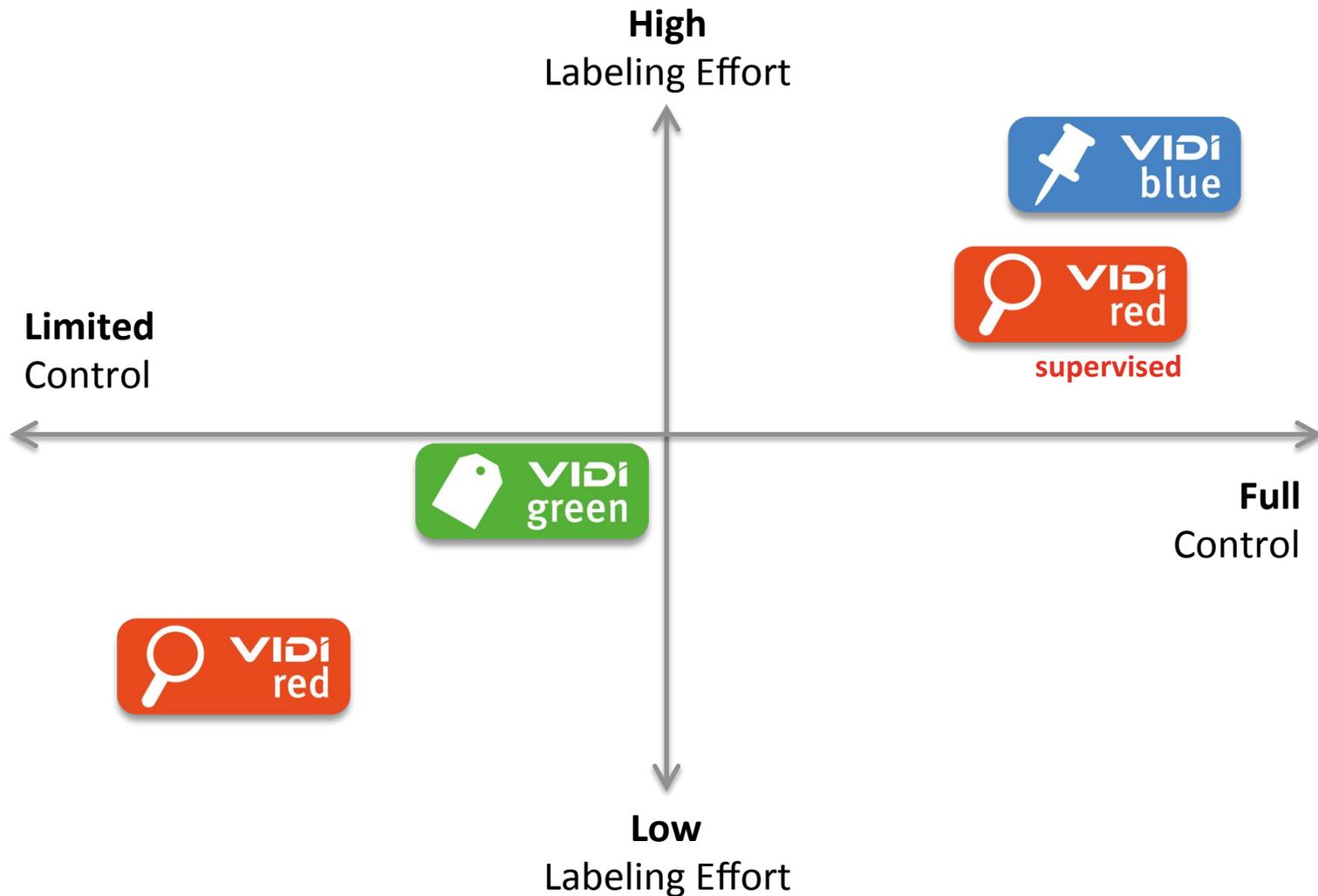


99.98% correct





You Get What You Give

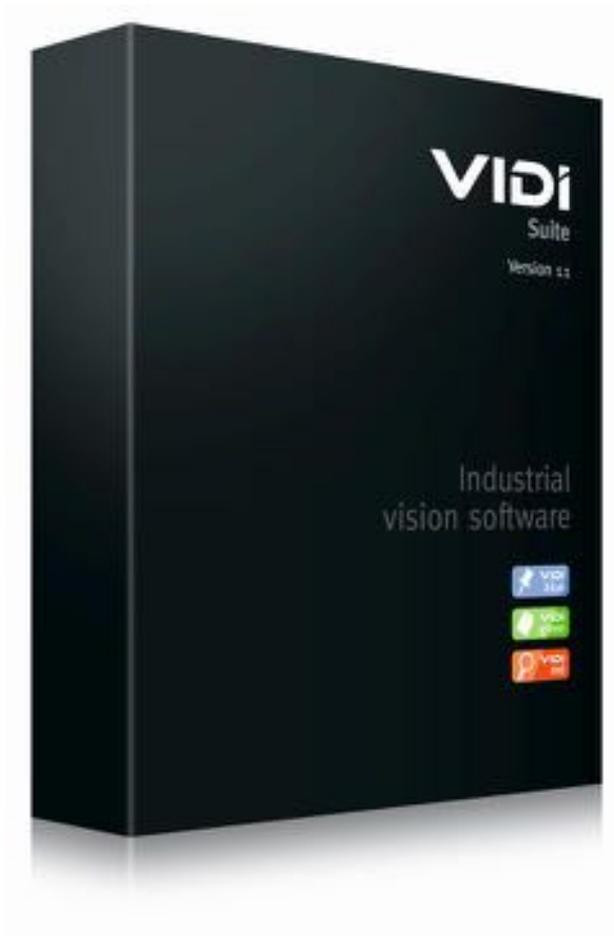




Deep Learning based Image Analysis

*Automated aesthetic inspection, classification
and detection*

- **Human-like:** Outperform the best quality inspectors
- **Self-learning:** No software development required
- **Powerful:** Tackle the impossible to program inspection challenges





VIDI

Hunting defects

Human-like
Self-learning
Powerful

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