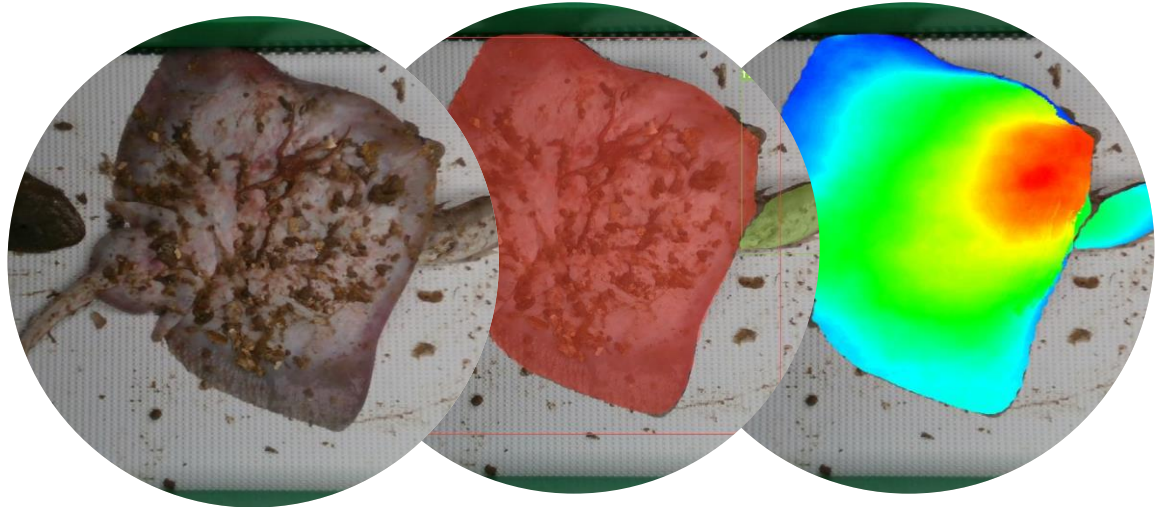


Fully Documented Fishies

“Creating an automated catch registration system for fisheries”

Jurgen Batsleer & Edwin van Helmond



The challenge of catch registration

Landings well documented



Part of catch discarded at sea...?



- Support advice on catch opportunities (ICES)
- Support scientific advice (STECF)
- Support research Landing Obligation (Discard registration)

Observers at sea

Accurate identification

Labour intensive:

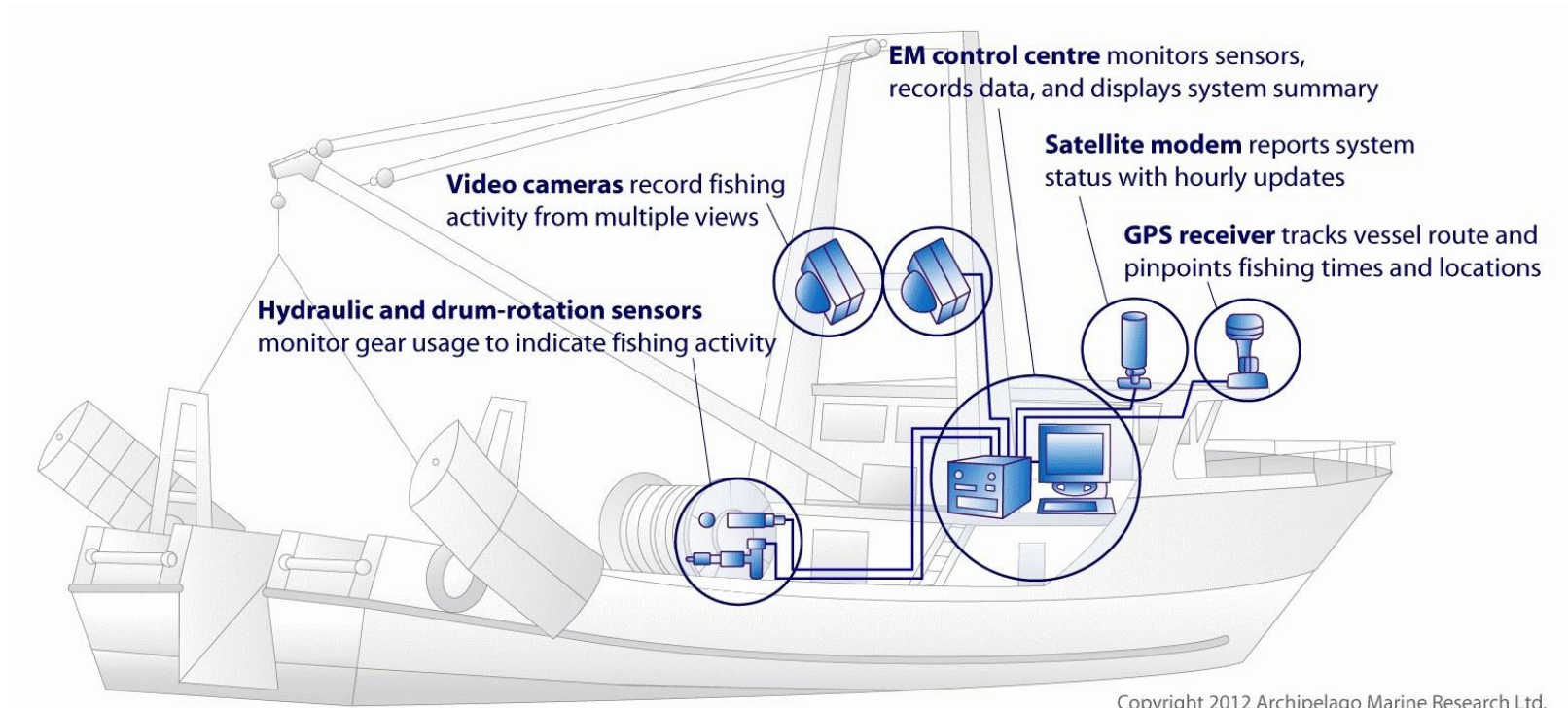
Small sample size

< 5% of total catch

< 1% of the fleet



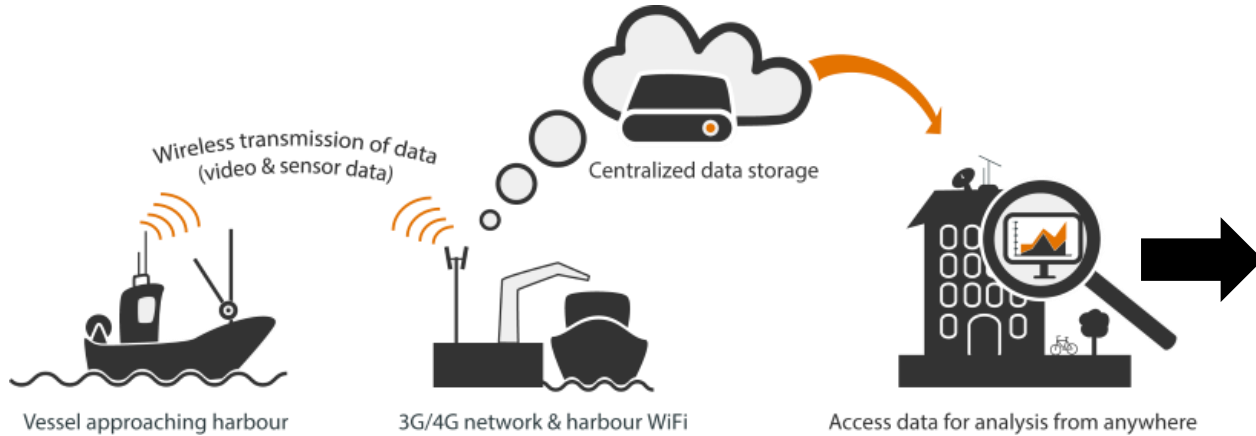
The solution: Electronic monitoring on-board



Set up of electronic monitoring



Anchor Lab



“Classic” electronic monitoring

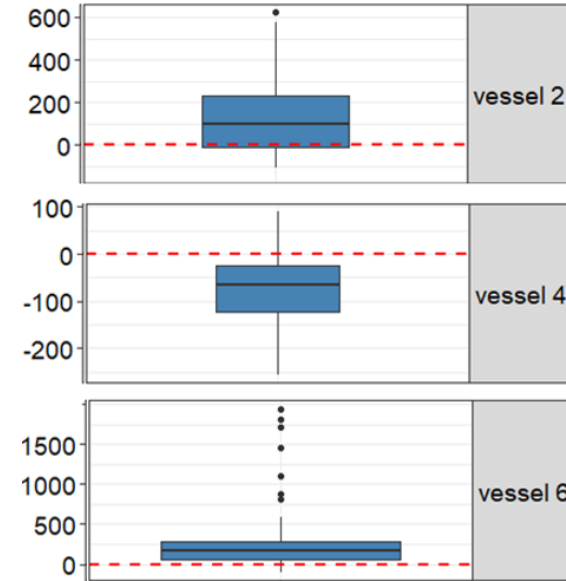
“Snapshots”



2 minute 'snapshots'



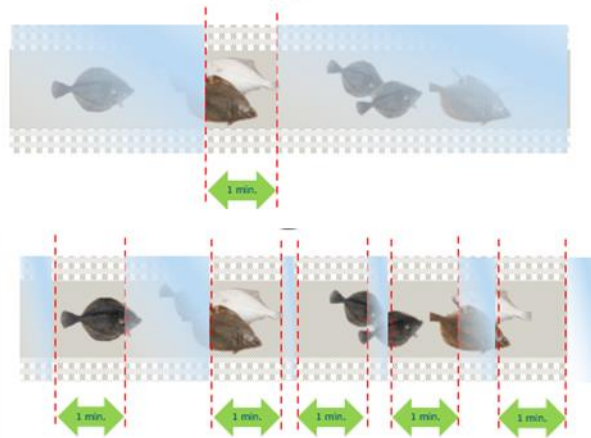
1 minute 'snapshots'



Extrapolate with catch weight

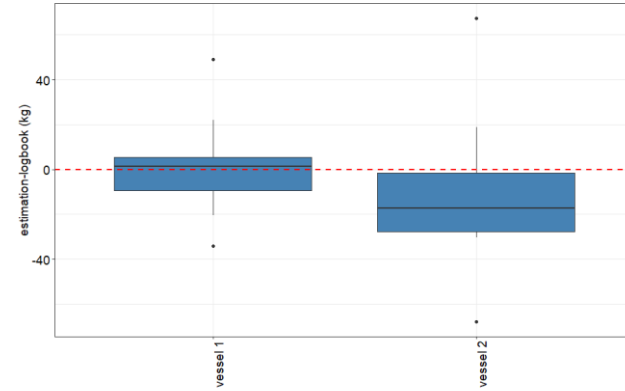
“Classic” electronic monitoring

“Video-segment”

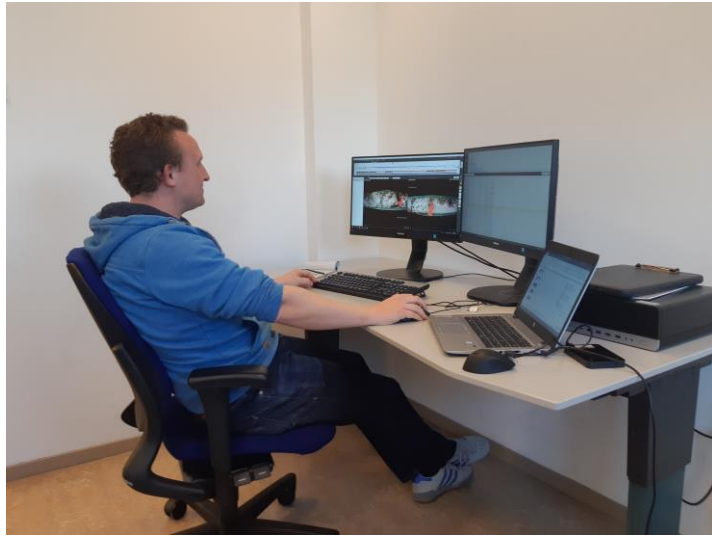


Extrapolate with time

Boxplot over hauls: plaice

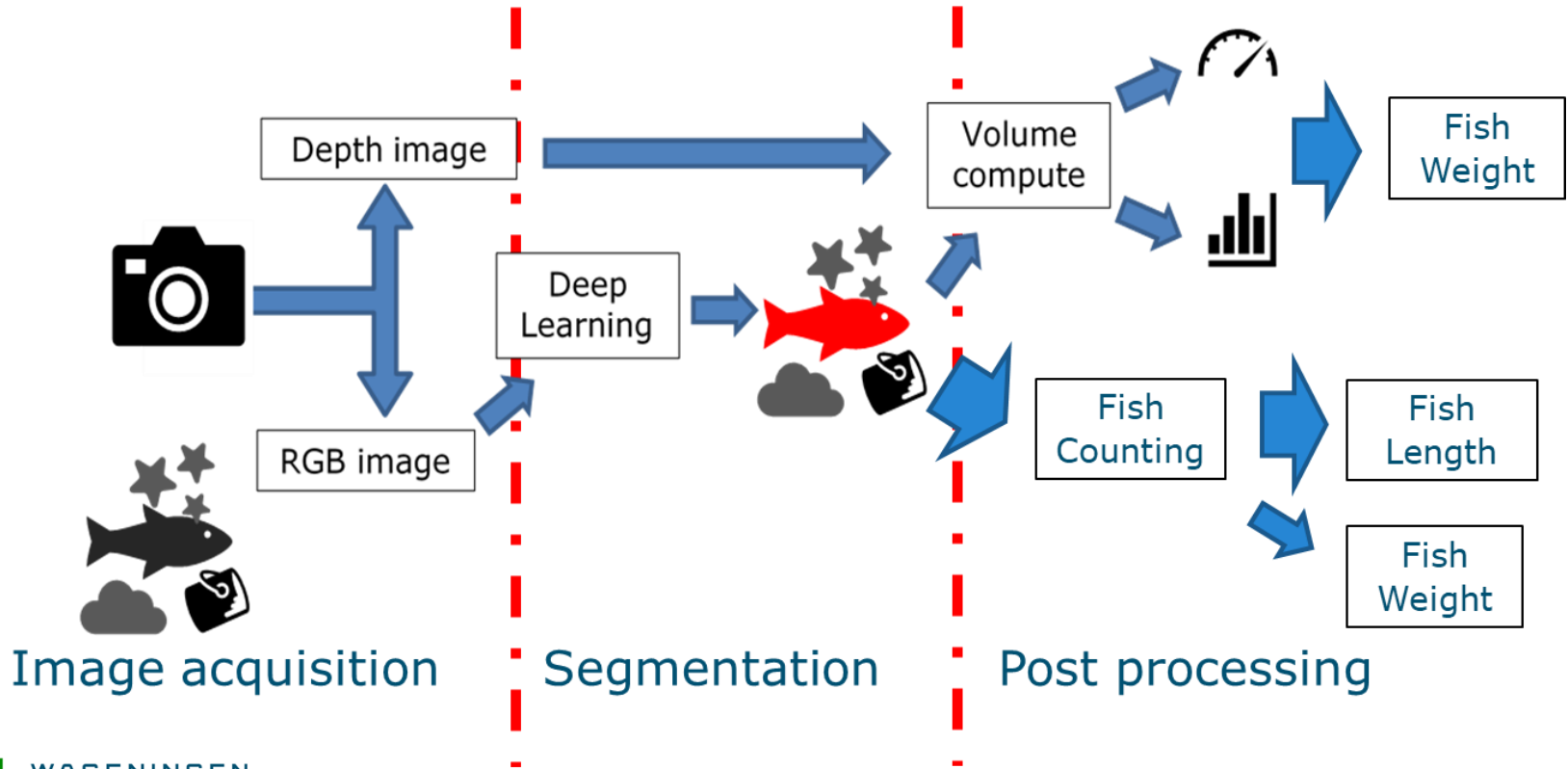


Electronic monitoring – not quite there yet...

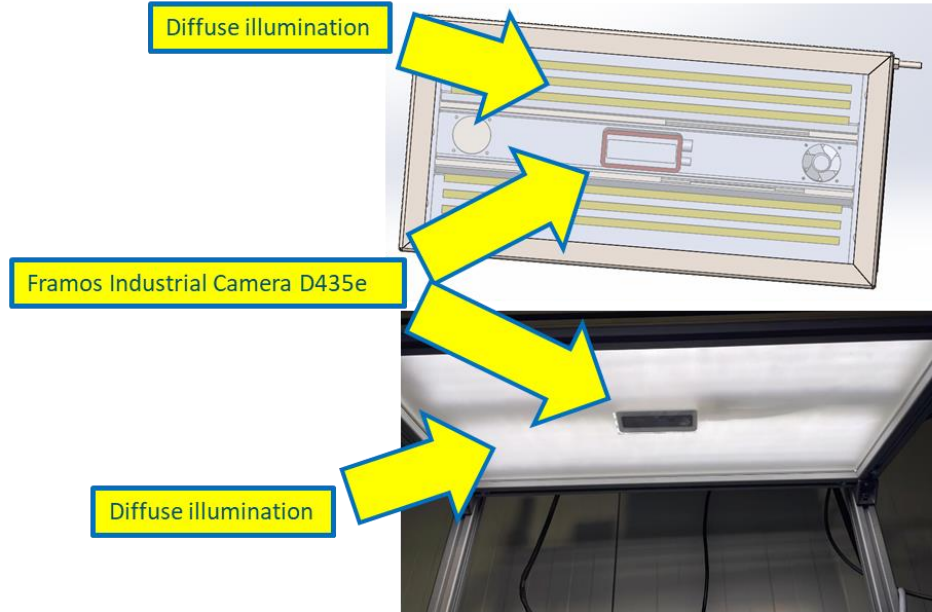
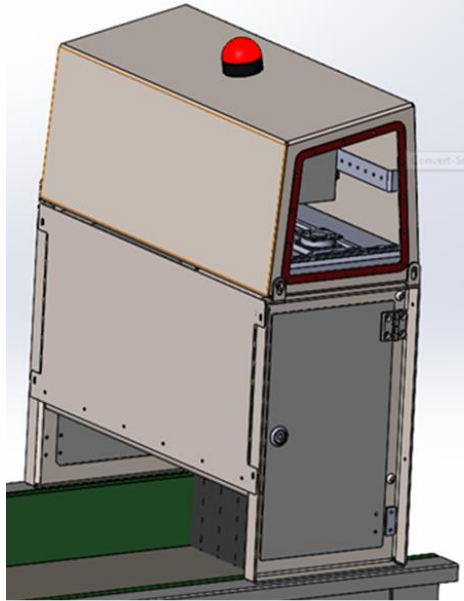


1. Video review is labour intensive
2. Deal with large amount of (video)data
3. No biological data such as length and weight.
4. Level of intrusion / privacy

Automated catch registration

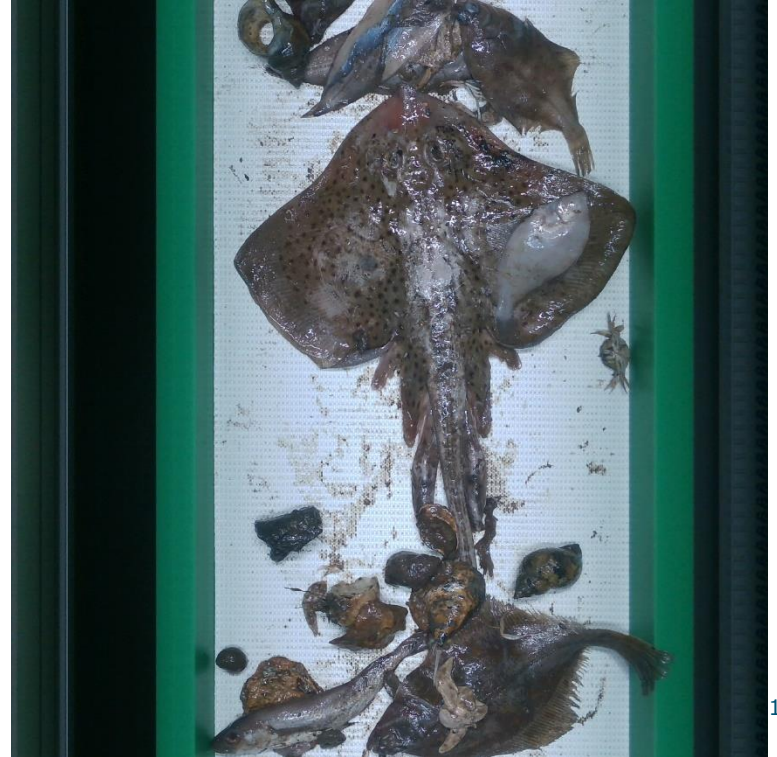
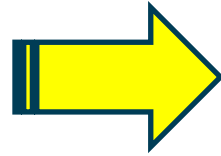
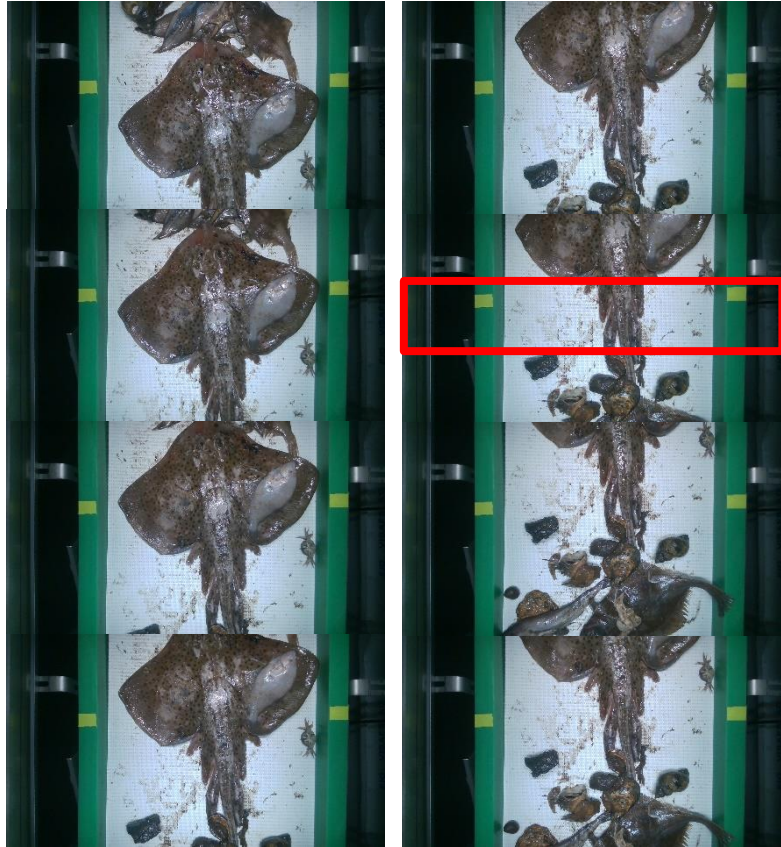


Automated catch registration – prototype 2.0



30 cm

Image overlapping: Line Scan



First setup: Lab and fish auction



Ongoing innovation: Object tracking



First published results

Original Article

Automatic discard registration in cluttered environments using deep learning and object tracking: class imbalance, occlusion, and a comparison to human review

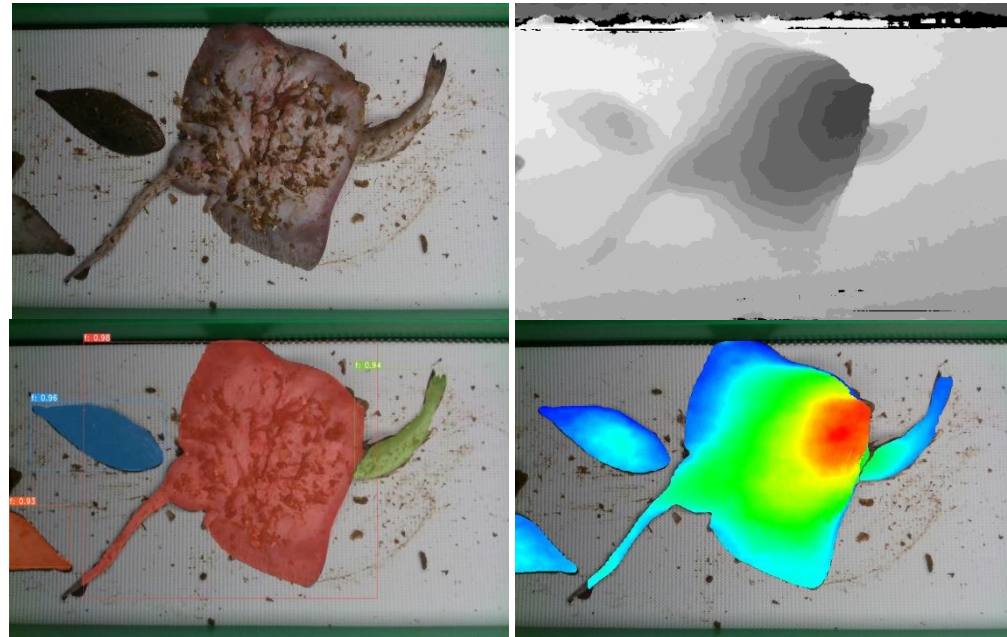
Rick van Essen ¹, Angelo Mencarelli², Aloysius van Helmond³, Linh Nguyen ¹, Jurgen Batsleer³, Jan-Jaap Poos ^{3,4}, and Gert Kootstra^{1,5}

- Recognizes 80% of fish with a count error of 20%
- Better score dorsal side compared to ventral side
- Occlusion, debris and location of the fish



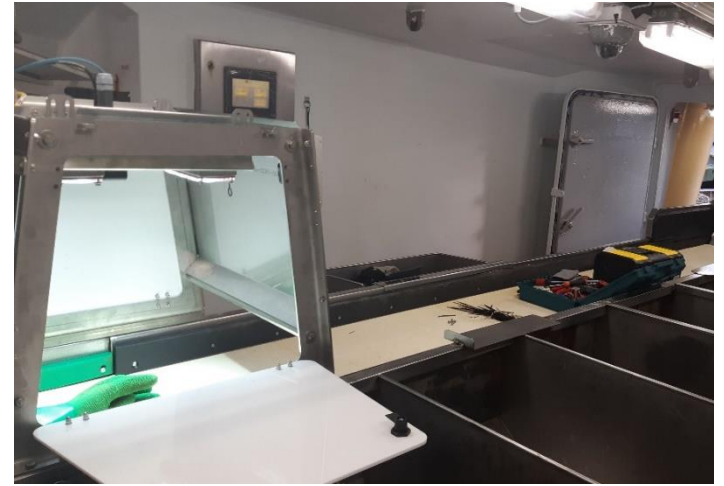
Classification and Weight registration

- Improve data acquisition
- Improve training
- Innovate use of different algorithms
- Integrate 3D

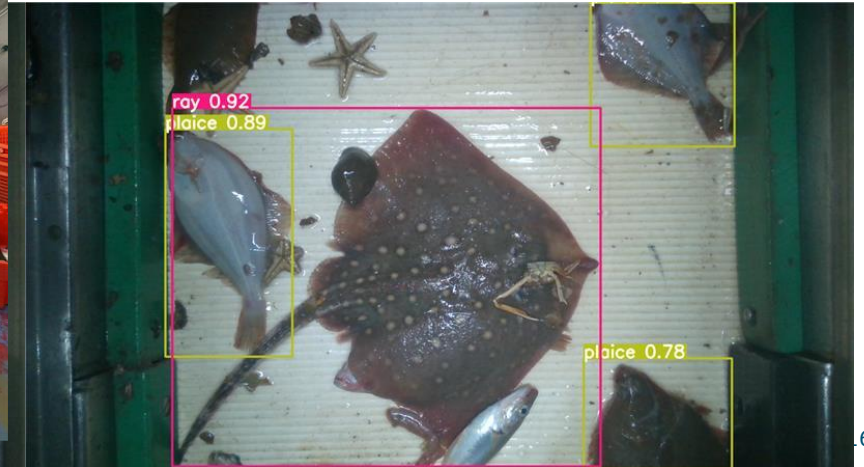
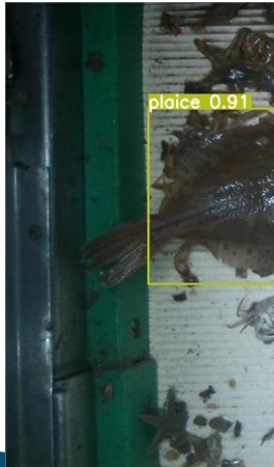


Trials at sea

- Endurance test & encounter challenges at-sea



- On-board preliminary processing



Fully Documented Fisheries – continued

- 3 more years
- Great cooperation (robotics and marine biology)
 - Generating more spin-offs:
 - Active learning
 - Robot fish sorting on board
 - Estimate catch quality / survivability
- International integration (e.g. EveryFish project)

Thank you for your attention!

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