Harnessing the power of computer vision to provide early warning of jellyfish in fish farms

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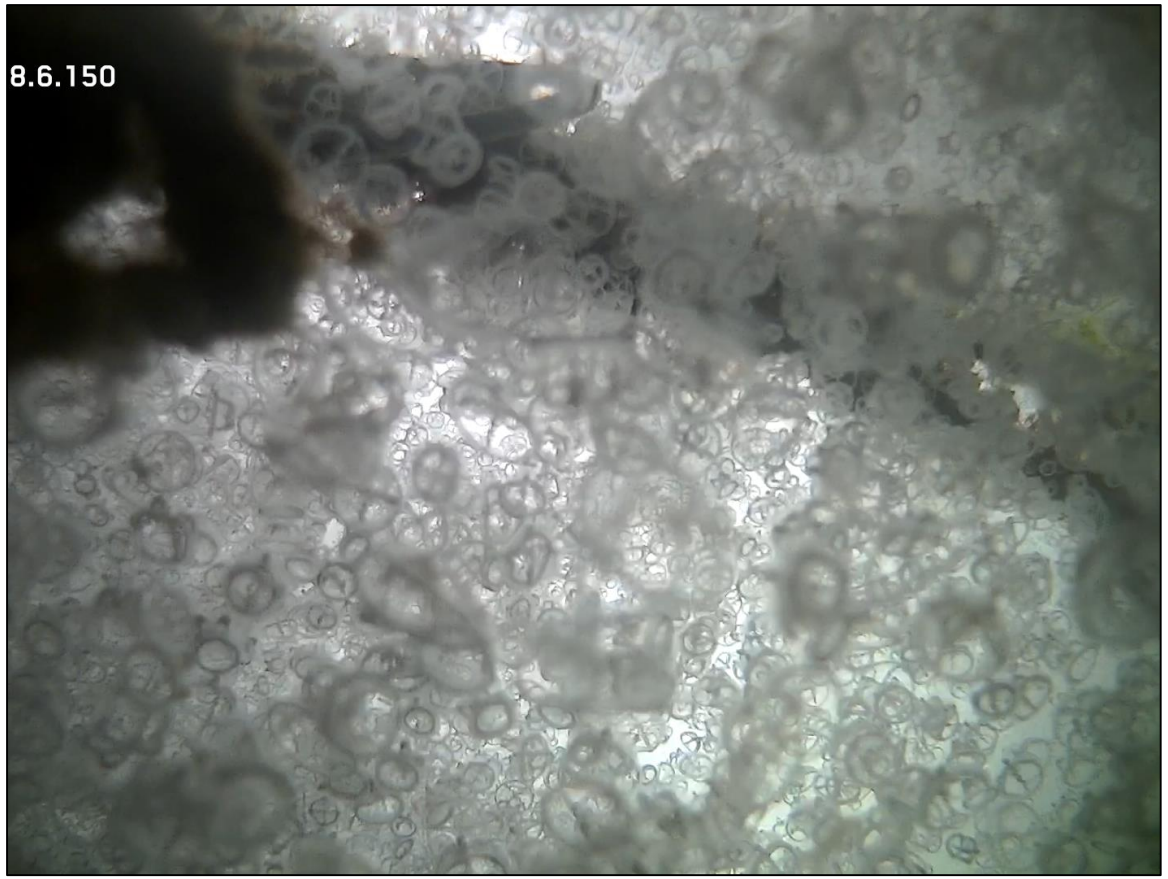
Jellyfish cause major problems for finfish aquaculture

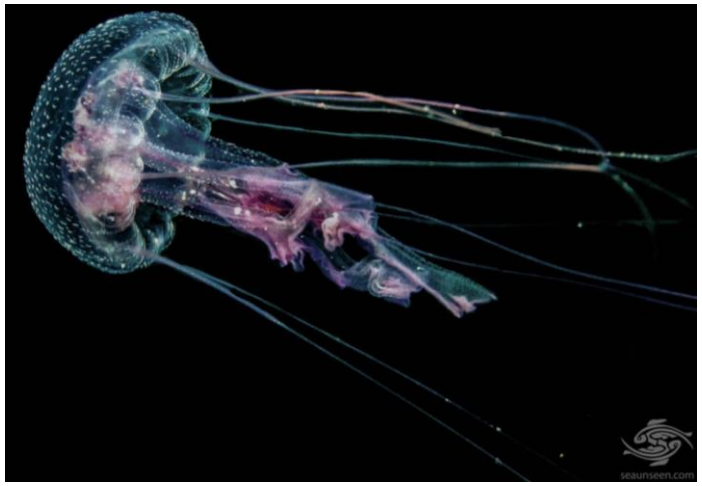


Blooms of jellyfish can kill and injure fish within minutes

Mitigation approach depends on the type of jellyfish

Different types of jellyfish have different impacts

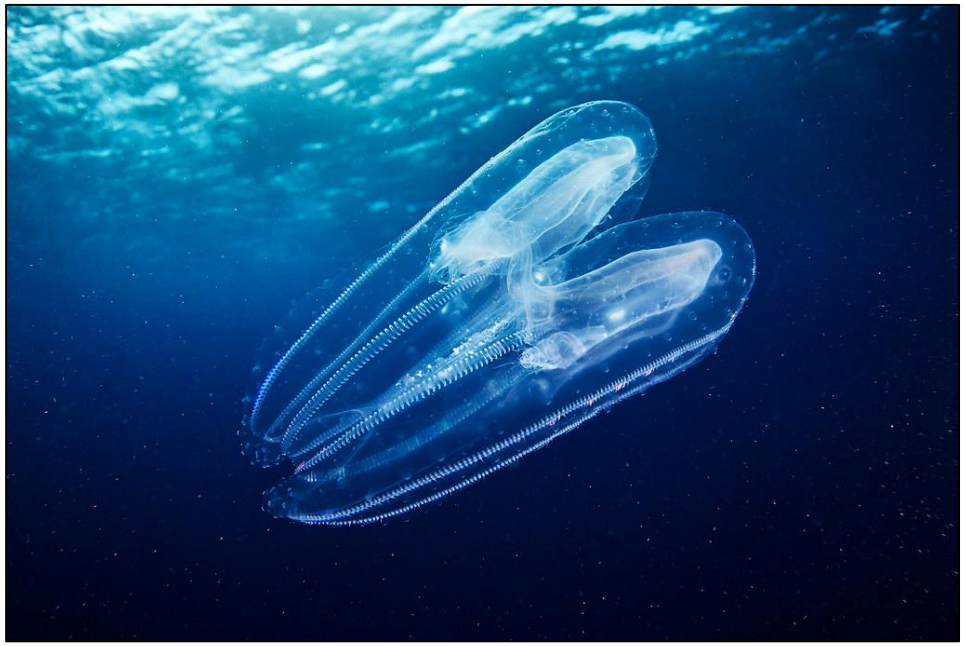
Cnidarian medusae and siphonophores



- Gill pathologies
- Skin lesions
- Mortality

Different types of jellyfish have different impacts

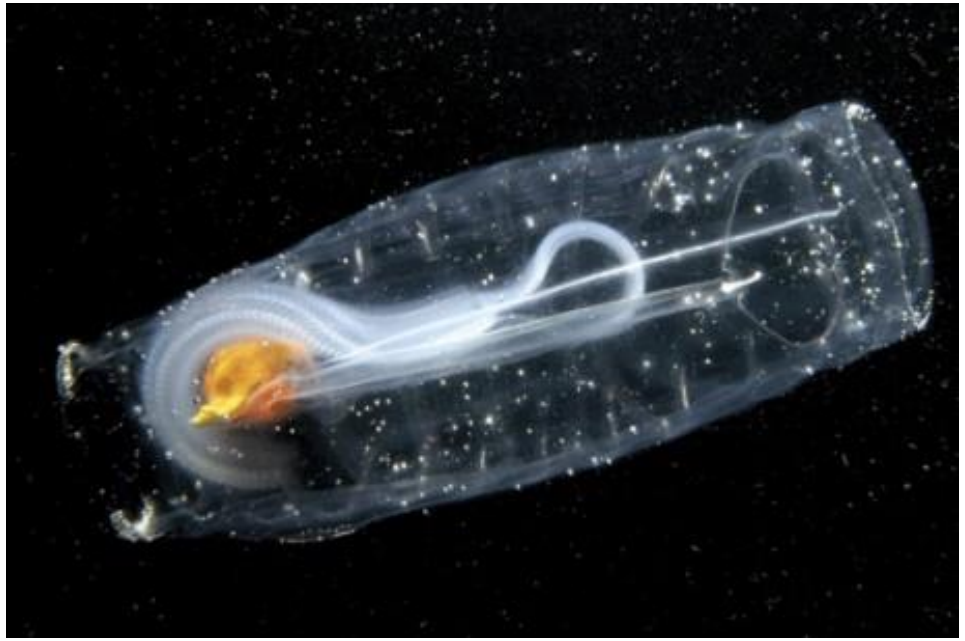
Comb jellyfish (ctenophores)



- Occlude nets
- Deoxygenation

Different types of jellyfish have different impacts

Salps (pelagic thaliaceans)



- Mistaken for feeding pellets
- Deoxygenation

Managers need to respond quickly to jellyfish ingress

Alter feeding rates

Oxygenation

Jellyfish are currently detected manually

https://www.tassal.com.au/sustainability/

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Jellyfish are currently detected manually

Remote monitoring of jellyfish is also needed as aquaculture moves into higher Energy and offshore environments

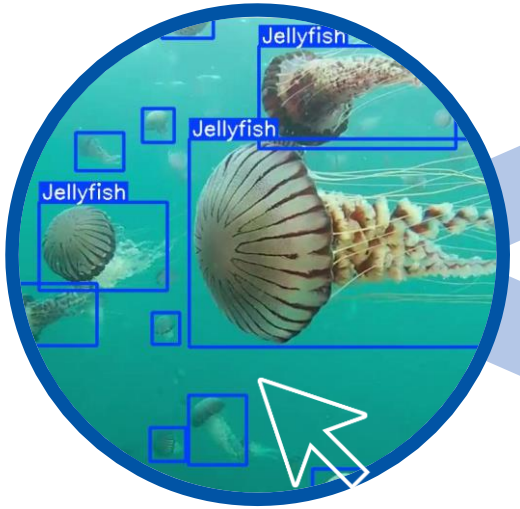
Aim

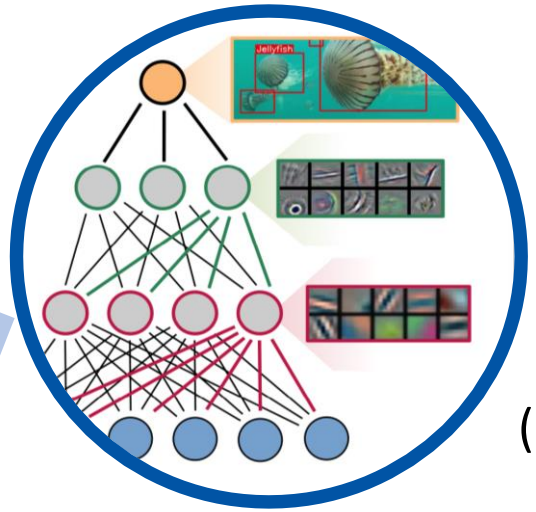
To develop a machine learning model to detect and identify jellyfish in video footage streamed from feed cameras inside pens

Process of creating the model

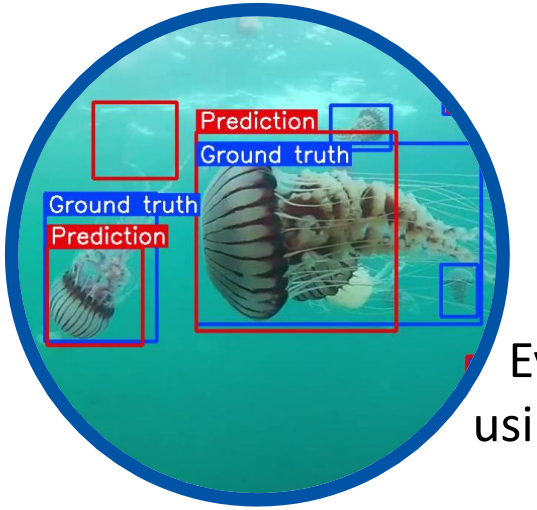
Acquire a video library of jellyfish in fish pens

Annotate jellyfish in video frames





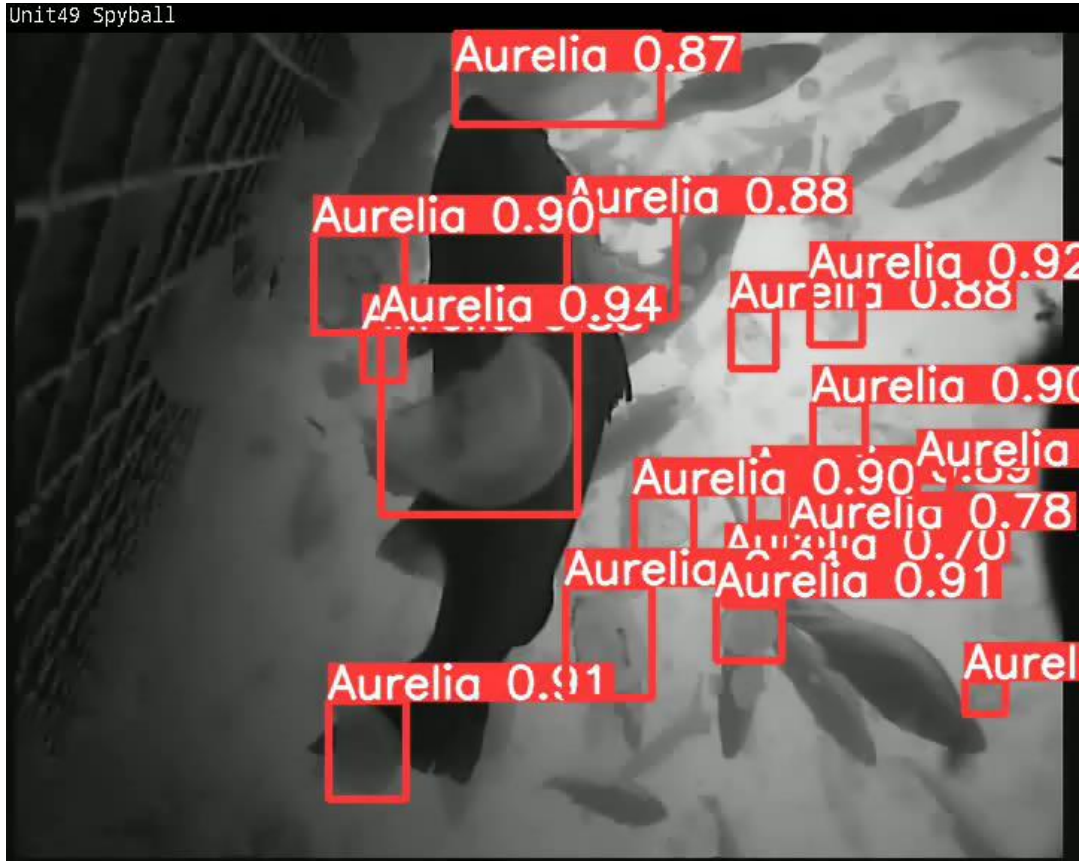
Train the object detection model (Faster RCNN & YOLO)



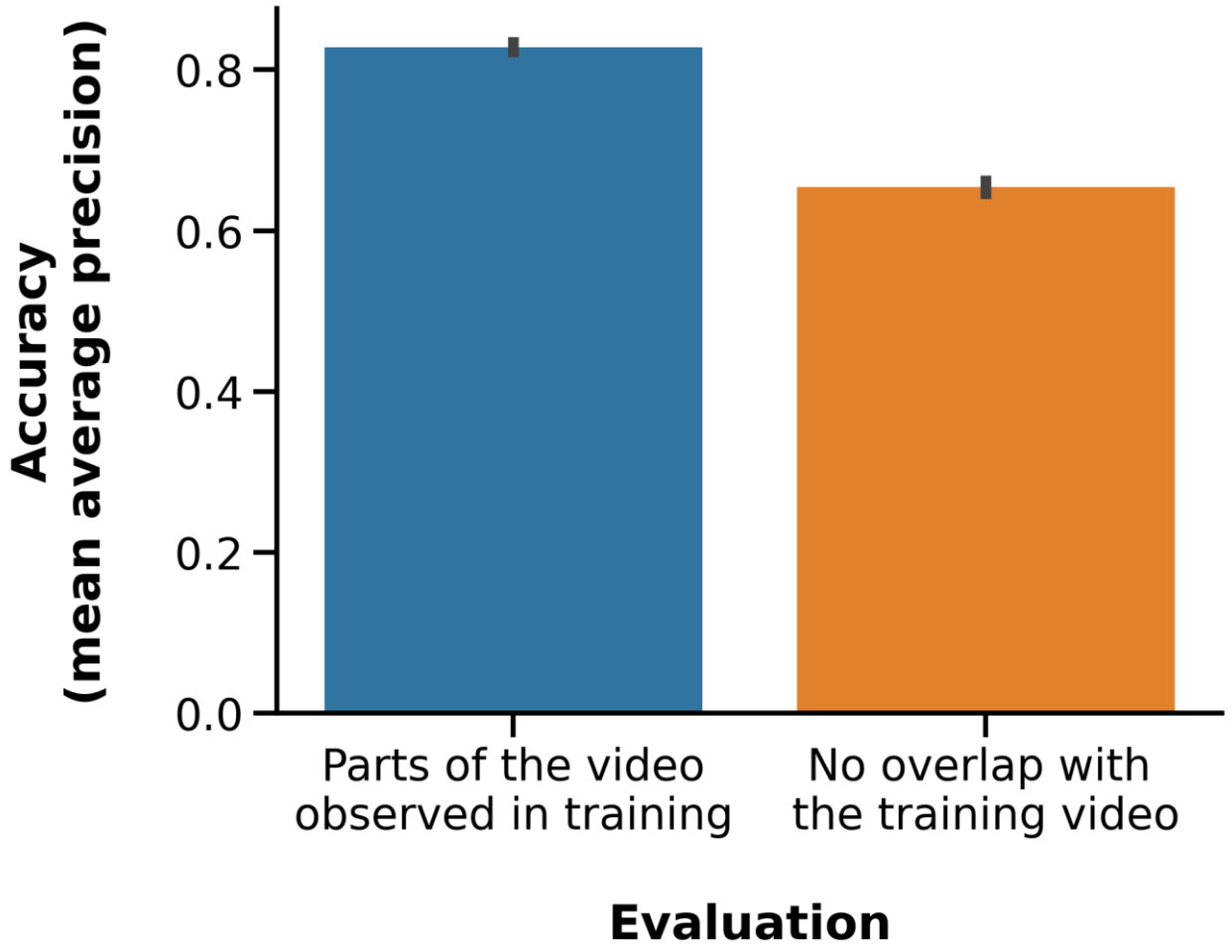
Evaluate the model using new videos

Detection of the moon jellyfish, *Aurelia* sp.

Trained model



Evaluation of the *Aurelia* model

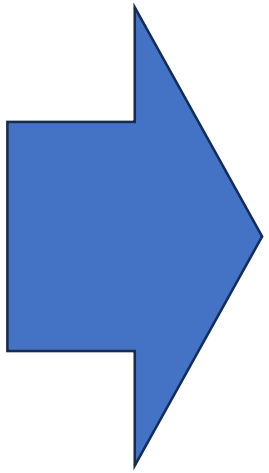


Accuracy can be improved by:

- Training on more videos
- Computationally

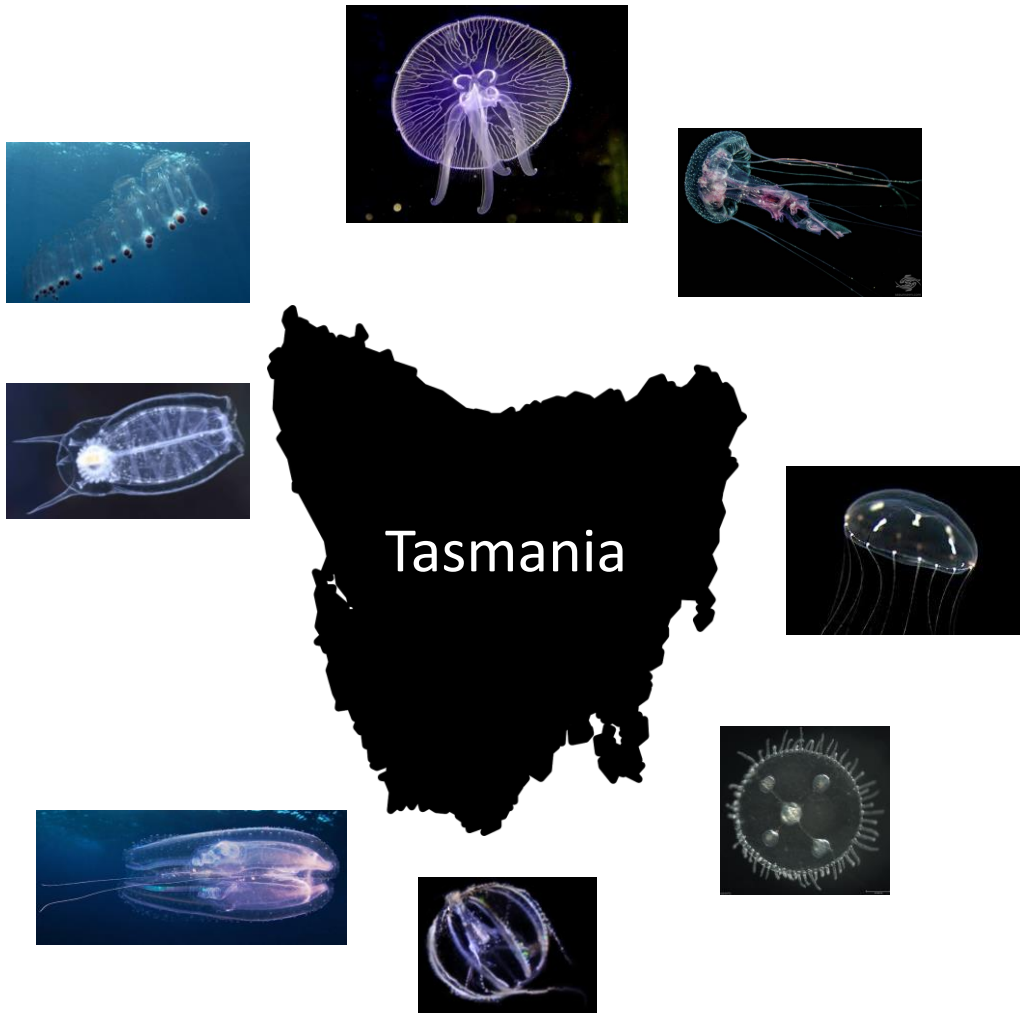
To be useful for industry the model must be able to:

- Identify different species of jellyfish
- Identify jellyfish in different environmental settings/conditions
- Work using different camera systems



More videos!

Expanding beyond Tasmania…



Some overlap in problematic species between Tasmania and other salmon producing areas

To develop a globally relevant system, video libraries of jellyfish from other regions are needed

If you're interested in participating, please contact us…..

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