

## Sustainable Fishing : An Introduction

Sustainable Fishing is an ideal scenario where the harvesting of fish stocks is at a sustainable rate that ensures that the fish population does not decline over time as a result of fishing methods and fishing can be done indefinitely. It also involves minimised impacts on marine wildlife and local communities dependent on marine life. Unfortunately, we still face many challenges before this goal can be achieved and this poster will illustrate the key problems and introduce innovative solutions to them.

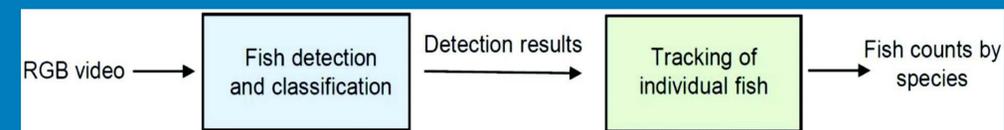
## The Challenges

Currently, the commercialised fishing industries worldwide are actively engaging in overfishing, where vessels catch fish faster than populations can replenish. Furthermore, bycatch, representing the non-target marine animals killed as byproducts of commercialised fishing, is responsible for 40 percent of the world's annual marine catch. These practices are often illegal but unreliably unregulated.

Overfishing is the opposite of marine sustainability, neglecting the health of vital fish stocks in favor of short-term profits. Bycatch harms protected species deemed endangered or otherwise off-limits by causing unnecessary mortalities, such as dolphins stuck in nets. Both cause unbalanced food webs and the active erosion of the marine ecosystem, which can lead to the collapse of coastal economies.

## Smart... Fishing?

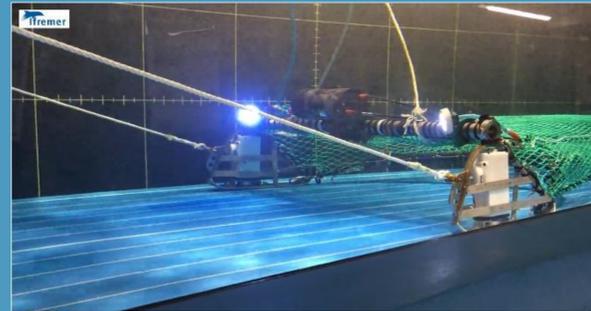
Artificial Intelligence (A.I.) is being implemented into our daily lives at an impressive rate, ranging from digital assistants to medical systems that offer precise optical diagnoses. While it may seem odd, A.I. can also come to improve upon the fishing industry by enhancing monitoring and can greatly reduce bycatch and overfishing.



Flow chart of an A.I. system analysing video feed of a fishing vessel (Khokher, et al., 2021).

## Potential Applications

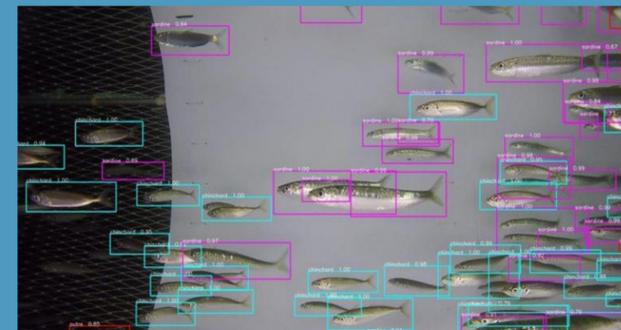
### Project 1: Smart Trawls (Game of Trawls)



The 'Game of Trawls' device (Ifremer, 2021).

It is a trawl net that uses trained A.I. and sensors to identify and detect the species of fish entering the trawl net in real time and optimises positions of the trawl instead of dragging along seabed. Fishermen can allow fish of interest to enter the trawling net and release unwanted ones through an A.I. operated hatch.

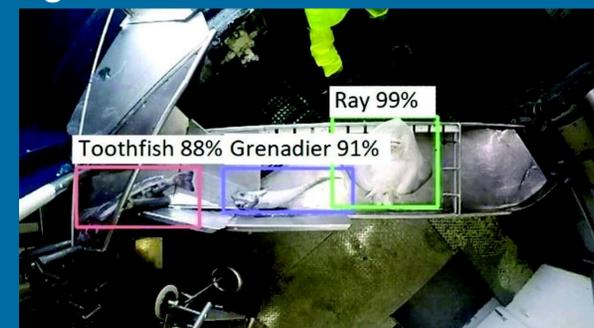
This is a project headed by *Ifremer* aiming to integrate modern technological advances from the fields of A.I. and sensory networks to fishing gear. With the goal of lessening the impact of trawling on marine ecosystems, this trawl net can be used by any fishing vessel, commercial or local.



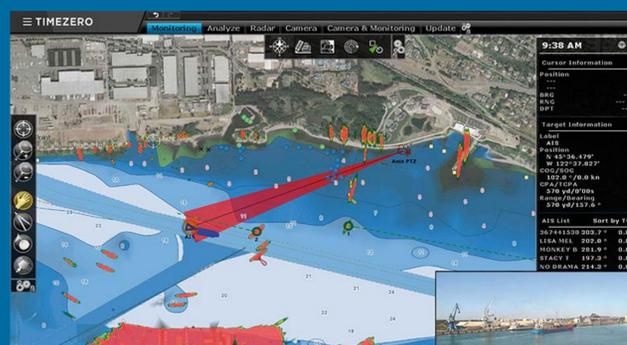
A.I. detecting and identifying fish that enter trawl (Ifremer, 2021).

### Project 2: Coastal and catch monitoring

Instead of being manually processed by observers, video feed from on-vessel cameras that record fishing operations can be automatically analysed by a trained A.I. This offers quick and reliable evidence to persecute offenders that overfish or target protected species.



A.I. analysing caught fish (Khokher, et al., 2021).



Furuno video monitoring integrated into satellite view (FURUNO, n.d.).

A.I. can use information from current maritime surveillance such as the Coastal Radar System (CRS), and Long Range Camera (LRC) to identify and track fishing vessels of interest, and even predict fishing routes of ships that turn off their trackers. Governments can use this information to persecute illegal fishing and enforce marine regulations more readily.

## Shared Advantages

- Allows fishermen to make informed decisions
- Greatly reduces bycatch
- No manual observation needed
- Collects data simultaneously
- Better protects marine life
- Helps support coastal economies

## Shared Disadvantages

- May be misused
- Discarding can still occur illegally
- Affected by weather
- Requires a lot more data to recognise more species and increase accuracy

## References

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