



Popular science summary of the PhD thesis

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Title of the PhD thesis	Advancing Fisheries Science: Enhancing Data Collection and Analysis through Electronic Monitoring
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Science summary

Since the 1960s, global seafood consumption has doubled, creating immense pressure on marine ecosystems. Overfishing, habitat destruction, and climate change are exacerbating these challenges. Accurate catch data on species composition and size distributions is urgently needed to assess the impacts of fisheries and guide managers in balancing ecological and socio-economic sustainability.

Despite advancements in data collection technologies, significant gaps in catch data remain due to unreported or misreported catches. Inaccurate data leads to flawed stock assessments, increasing the likelihood of setting quotas or regulations that do not reflect the true state of fish populations.

While initiatives like observer programs and landing obligations aim to address these gaps, both face limitations such as high costs, logistical challenges, and enforcement issues, leaving much fishing activity undocumented. In contrast, Electronic Monitoring (EM) systems equipped with onboard cameras and sensors offer promising scalable solutions for widescale collection of complete catch data. When combined with deep learning methods, these systems can automate catch documentation by identifying species, counting individuals, and estimating lengths.

This thesis introduces methods to support automated catch documentation:

- **Length estimation of partly occluded catch items:**
We refine and test a methodology using morphometric relationships to estimate total length of individuals in dense catches where the catch item is partly occluded due fish overlap.
- **Data collection framework for video instance segmentation:**
We develop a data collection framework and publish a dataset for video instance segmentation in occluded catch scenarios from a conveyor onboard a demersal trawler.
- **Semi-automated catch documentation:**
We develop a data collection framework and publish a dataset for video instance segmentation in occluded catch scenarios from a conveyor onboard a demersal trawler.
- **Application of length data in fishing gear selectivity studies:**
We explore the potential of using length data collected from EM videos in relation to fishing gear selectivity studies.