

INDISAL - Enabling technology for identification of individual salmon in commercial fish-cages

*The underlying idea is to develop an individual **biometric "finger-print" identification of each salmon** in industrial sea based salmon farming, enabling the gathering of status information for observed individual salmon over time, through the use of underwater equipment and camera-systems along with advanced computer vision algorithms. The gathered information will support improved farming control, animal welfare and productivity.*

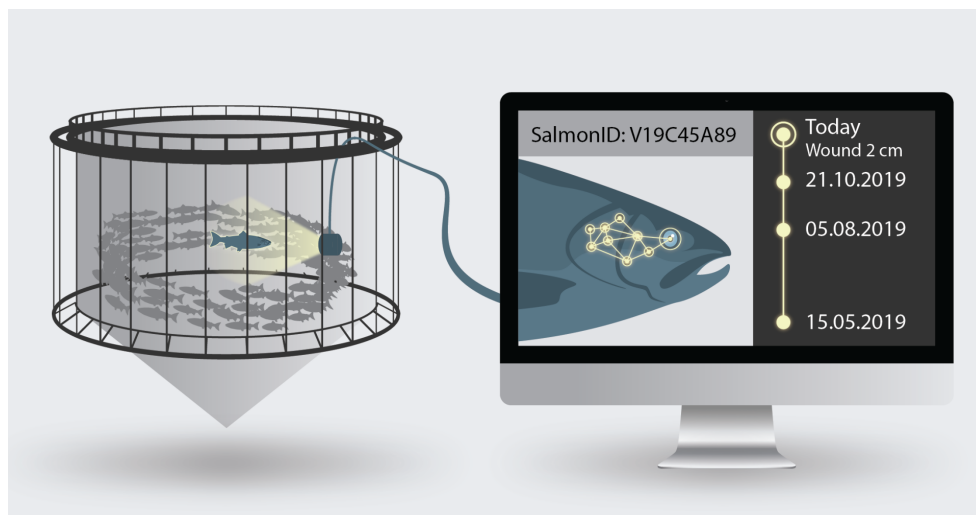


Figure 1: Illustration of the INDISAL-project: Status data of a salmon extracted from video along with biometric identification results in a time-line-history for an individual Salmon (A.M. Lien/SINTEF Ocean).

Individual based fish recognition is the key to reach the **maximum level of salmon-fish-cage surveillance** and the **maximum level of information about the status of the fish**, both on a micro scale (individual fish) and on the larger fish-farm scale (fish population). Hence, the potential of the innovation in this project is very high, and brings the observation of farmed fish to a new unprecedented level.

PARTNERS

- SEALAB AS
- Mowi ASA
- Marina Aqua AS
- Safepath AS
- Inovamares AS
- NTNU
- SINTEF Ocean

In the INDISAL-project, the partners will develop and improve innovative underwater light and camera solutions in order to receive high quality underwater video recordings. These, in turn, will allow to exploit computer vision and machine learning techniques to automatically identify individual fish and measure key fish-status-variables related to:

A) **appearance** (e.g. size and shape, physical damages like wounds and lice counting) and

B) **behaviour** (e.g. swimming speed, stress, feeding activity and welfare indicators),

that can be assigned as meta data to the observed individual fish. The project is based on the insight that sal-

mons, which are transferred from the hatchery to a fish-cage, have already developed a **uniquely identifiable and robust spot-pattern** and individual salmon will be identified using the melanophore spot-pattern in the head region (and/or the body region), like a **biometric finger-print**.

The innovation enables the salmon farming industry to have an overview of the current state of each individual salmon (i.e. growth-rate, quality, health status), while the collected time-line data of individual salmon can be used to analyze in detail which operational events had an impact on both individual fish and the whole fish-population.

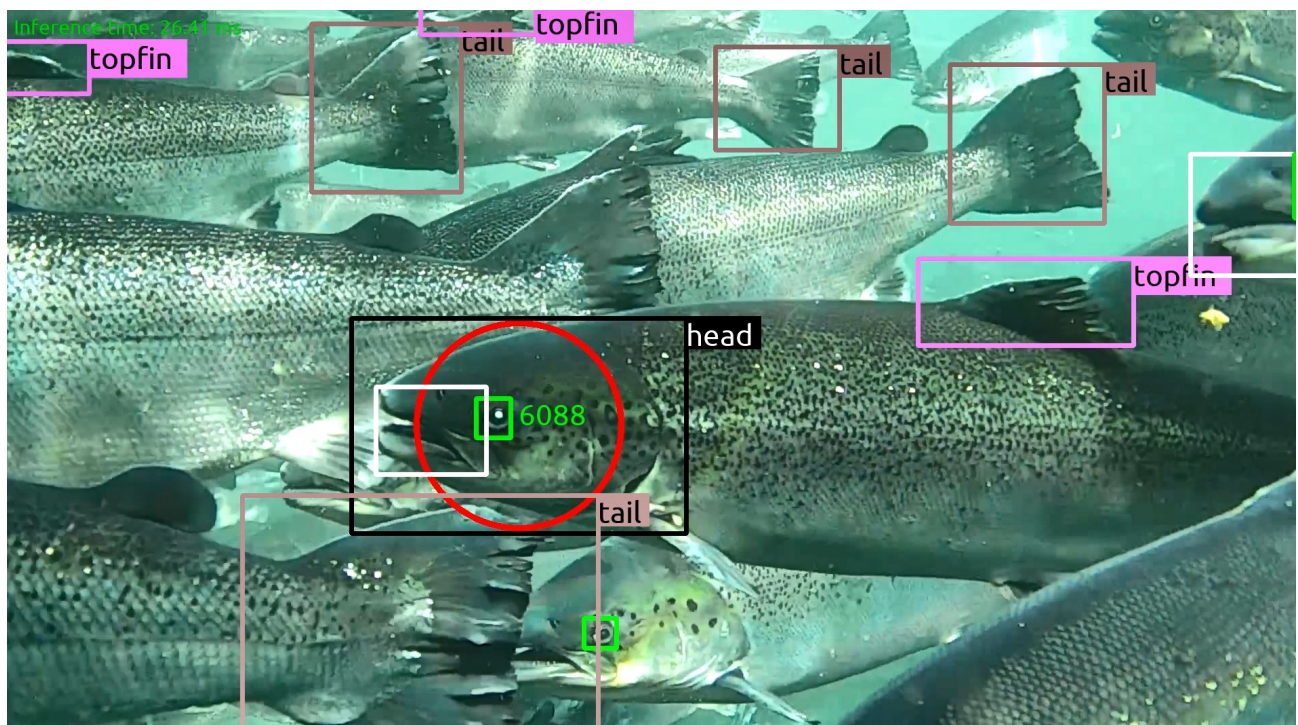


Figure 2: High quality imaging allows the recognition of the head-region along other parts of the salmon and are used to further analyze and characterize the observed salmon.