Automated Salmonid Counting in Sonar Data

Peter Kulits[1], Angelina Pan[1], Grant Van Horn[2],
Sara Beery[1], Erik Young[3], Pietro Perona[1]

[1]California Institute of Technology
[2]Cornell University
[3]Trout Unlimited

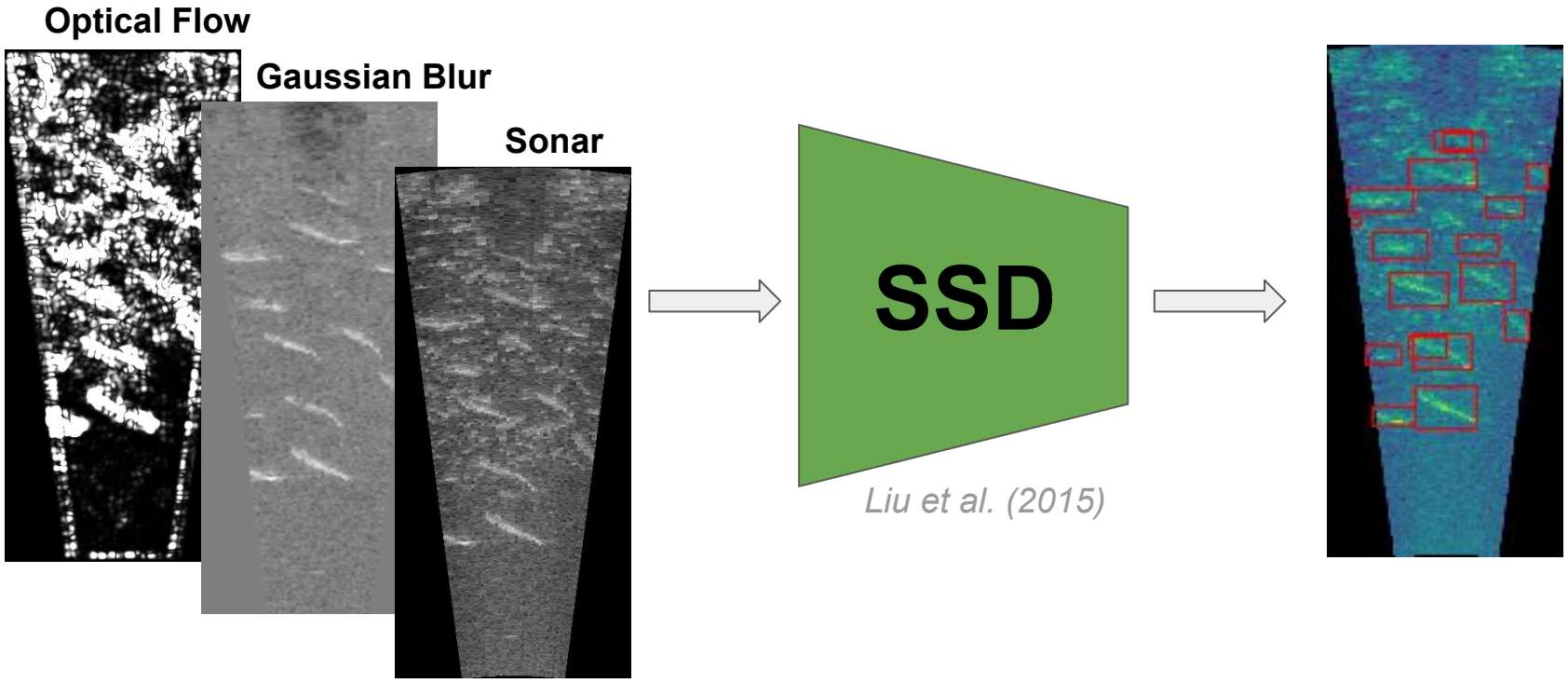
Fish Counts: Barometer of Environmental Health

- Salmonids are keystone species.
- Factors such as climate change threaten many Salmonid populations.
- Fish counts are used to evaluate population health and guide recovery strategies in threatened populations.

Project Goal

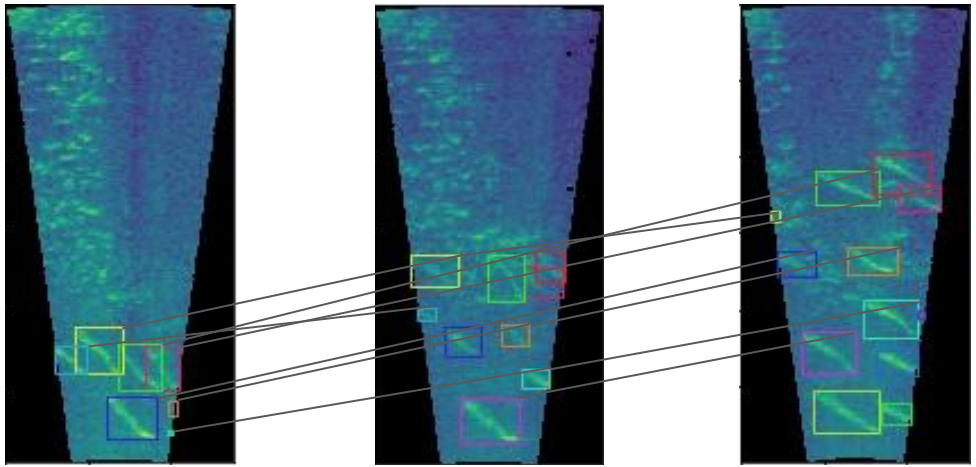
- Current methods of fish counting suffer from excessive cost and lack of timely results.
- **We propose leveraging modern deep-learning techniques to create an automated pipeline for counting fish, which will reduce the time and expense constraints of manual review and possibly increase accuracy.**

Object Detection



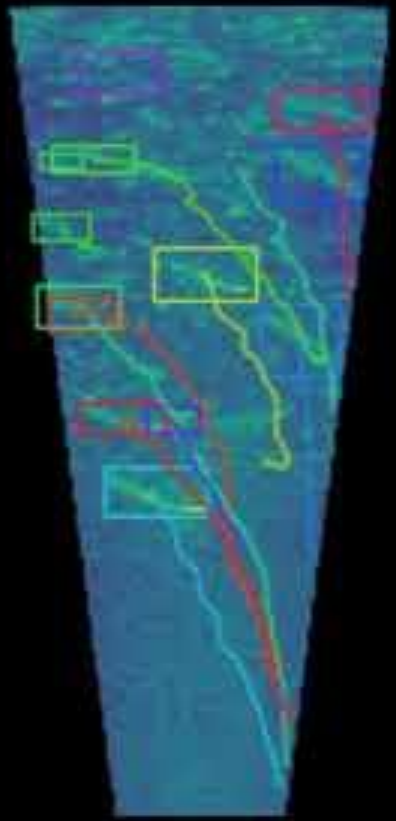
Tracking

- Simple Online and Realtime Tracking (SORT) algorithm
- Measure fish length across track by median box width
- Filter out tracks with few boxes and small fish



Bewley et al. (2016)

Determine Direction of Travel



Acknowledgements

Amazon Web Services

Dean Finnerty,
Trout Unlimited

Keith Denton and Mike McHenry,
Lower Elwha Klallam Tribe

George Pess and Oleksandr Stefankiv,
National Marine Fisheries Service

James Miller, Suzanne Maxwell,
Brandon Key, Carl Pfisterer, Gregory Buck,
April Faulkner, and Jordan Head,
Alaska Department of Fish and Game

Michael Sparkman and David Kajtaniak,
California Department of Fish and Wildlife