Fishing Activity Detection

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Galvanize - DSI Cap Stone project

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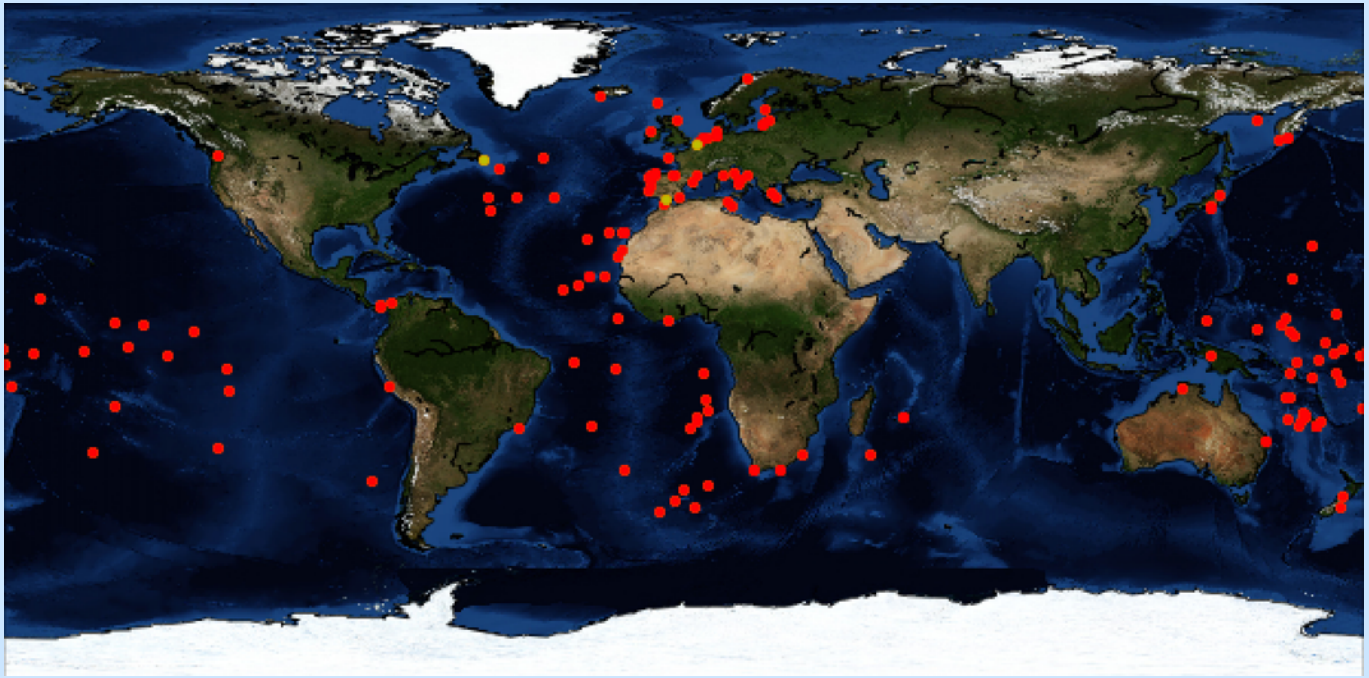
Motivation
Where they are fishing

Identify and visualize where fishing is taking place at a global scale with the goal of eliminating illegal, unregulated, and unsustainable fishing practices.

Train-cross-test validation by boat

In collaboration with: Global Fishing Watch

Location of the vessels used in this project



2M rows of labeled tracks

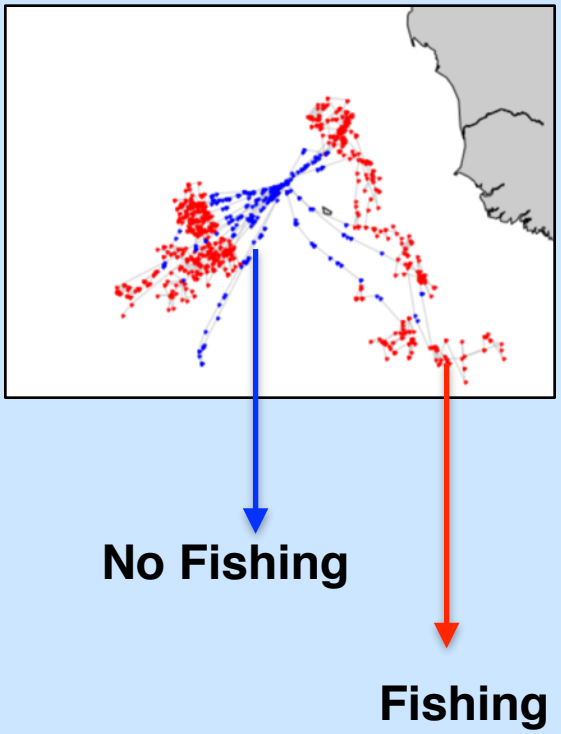
- Latitude
- Longitude
- Course
- Speed

80 engineered features

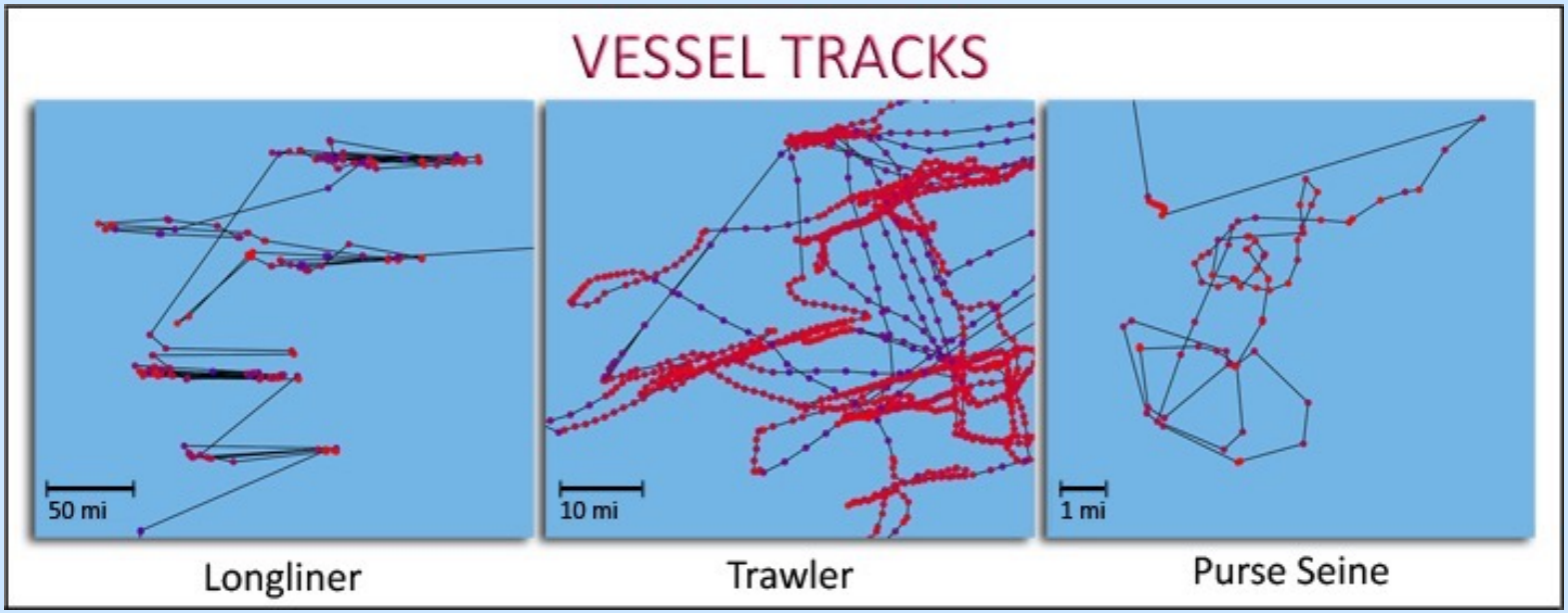
Time windows: 0.5h - 24h

- Standard devs
- Sine and cosine of course

Track example

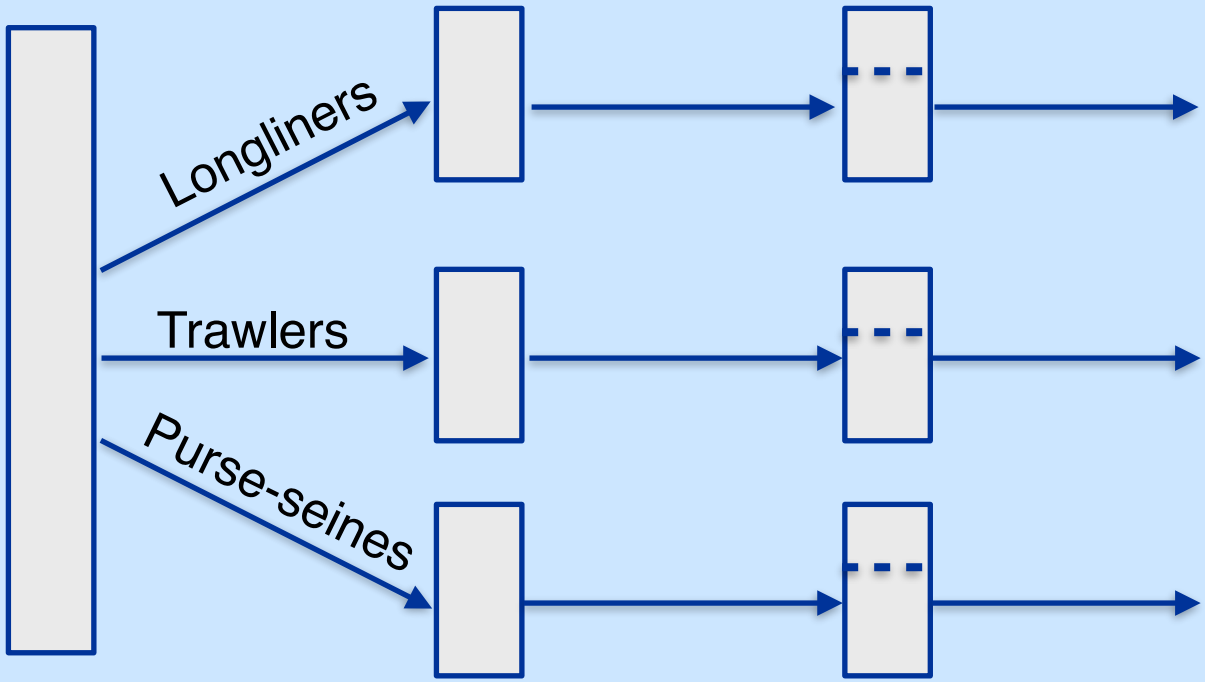


Each type of vessel produces a different signature track



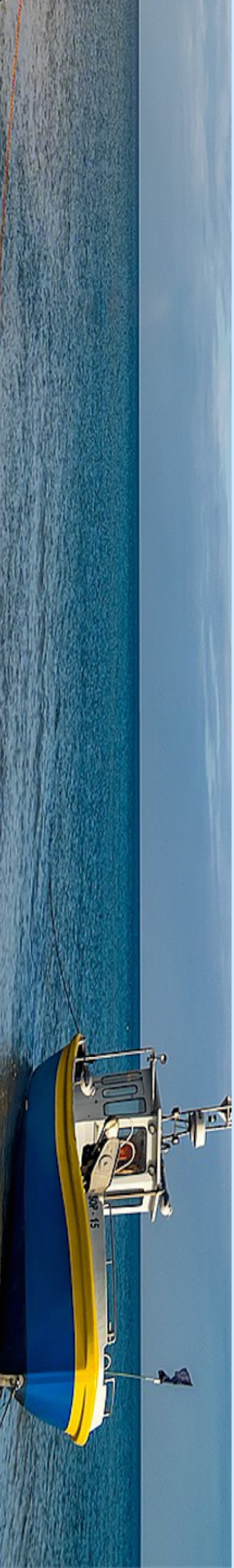
Data separation
by vessel type

Best model for
each vessel type



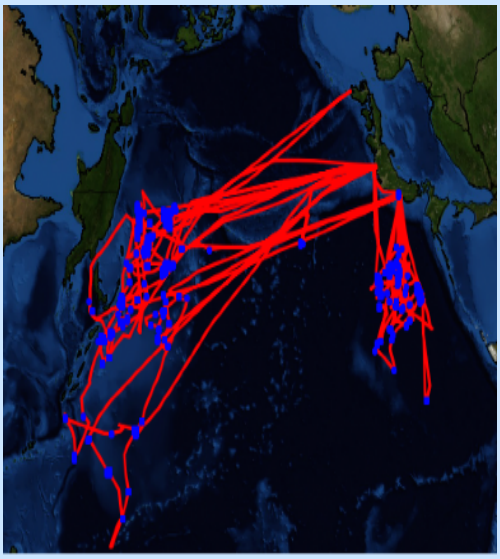
Train - CV - test split
based on vessel ID

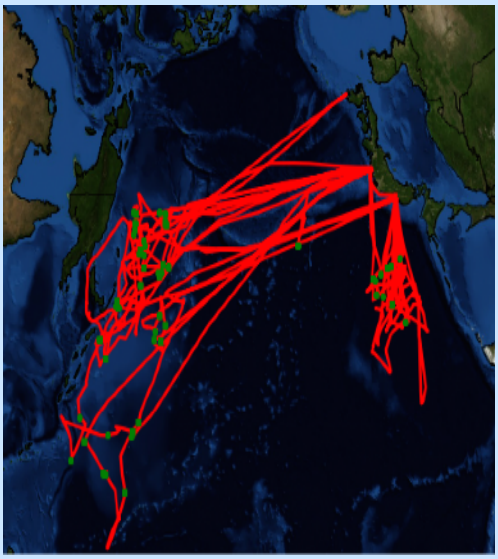
Pipeline



Predictions

Labels



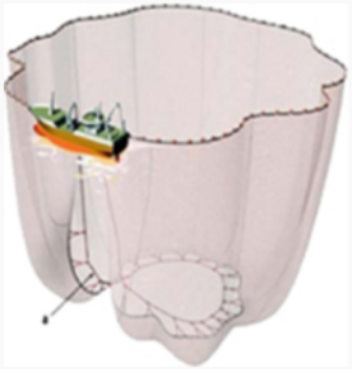


Model validation results

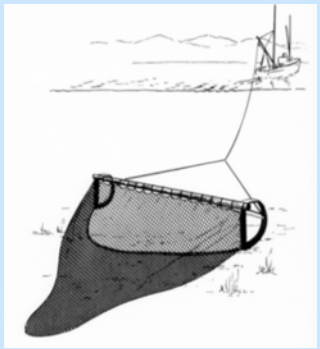
	Accuracy	F1-score
Longliners (RF + 24h windows)	**0.99**	**0.95**
Trawlers (RF + 24h windows)	**0.98**	**0.87**
Purse Seines (GB + 6h windows)	**0.88**	**0.45**

RF (Random Forest Classifier)
GB (Gradient Boosting Classifier)

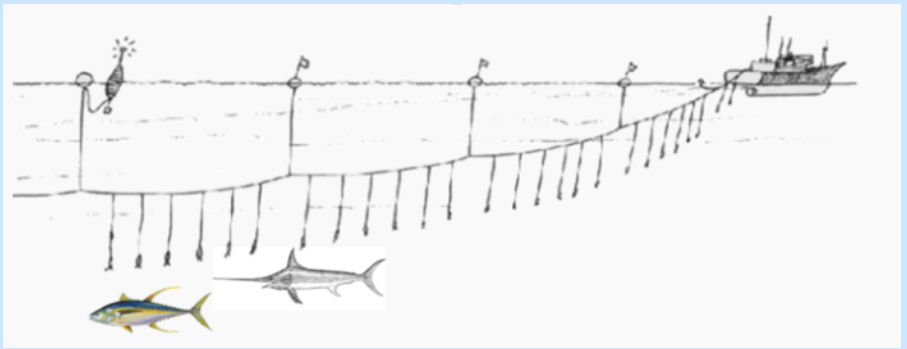
A word on Purse-seines…



Trawlers



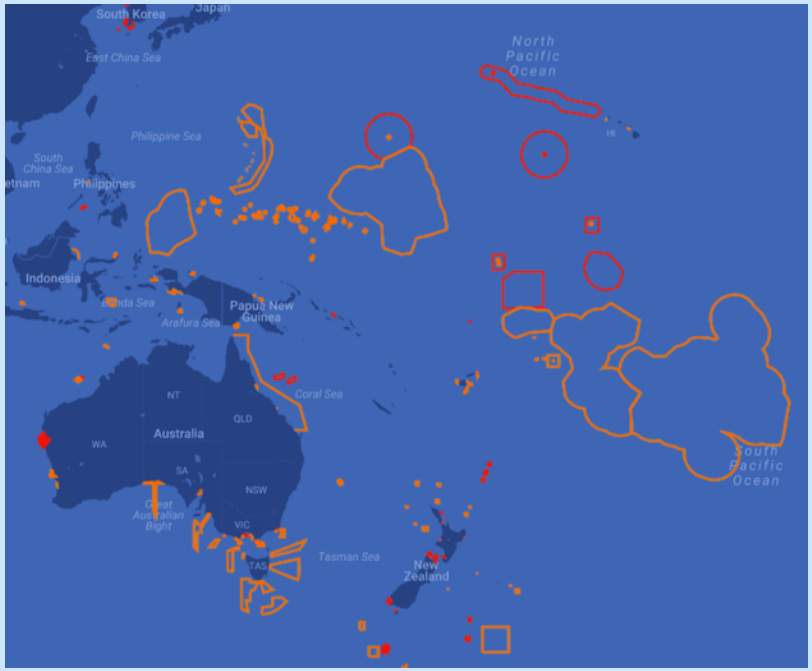
Longliners



Future work

- Improvement on purse-seiner model.
- Incursions into Marine Protected Areas (MPAs)
- Not all zig-zagging behavior is fishing.

Marine Protected Areas



Acknowledgements:

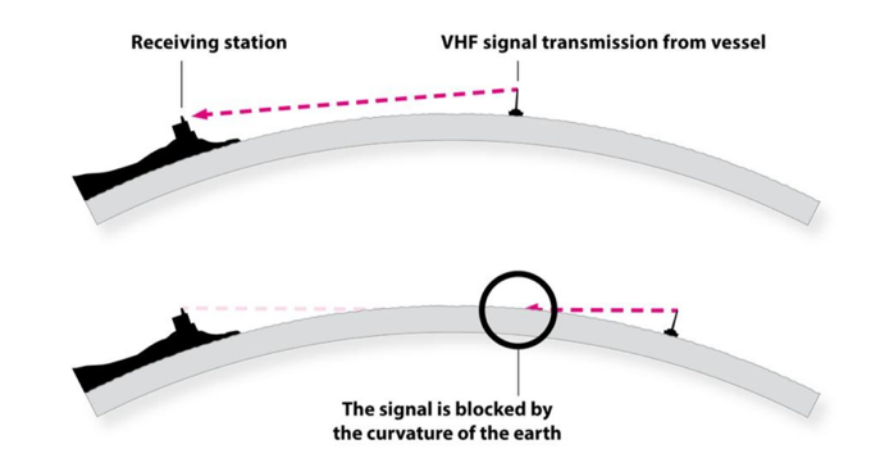
- David Kroodsma
- Time Hochberg
- Nathan Miller

Thank you!

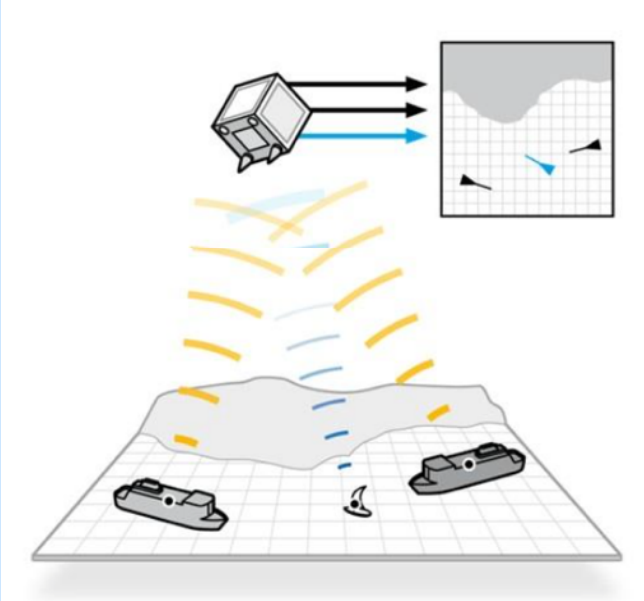
Backup slides

Automatic Identification System (AIS)

Emitted by all boats in order to prevent collisions



Picked up by satellites



All models performance