Detecting Fishing Activity

Gina Escobar

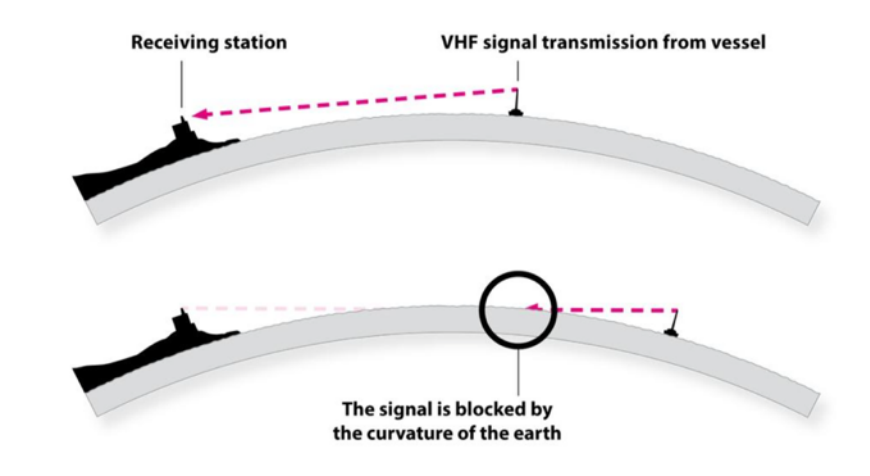
Where are the boats fishing?

Identify and visualize where fishing is taking place at a global scale is important to eliminate **illegal**, **unregulated**, and **unsustainable** fishing practices.

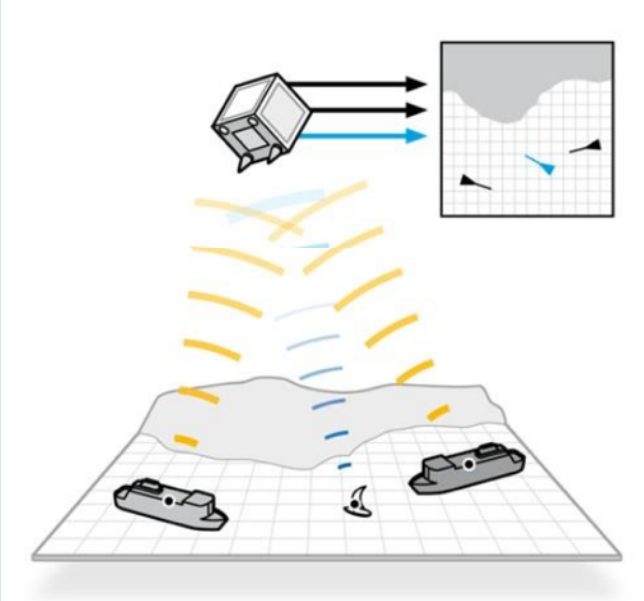
GLOBAL FISHING WATCH
globalfishingwatch.org
OCEANA SKYTRUTH Google

Automatic Identification System (AIS)

Emitted by all boats in order to prevent collisions



Picked up by satellites



2M rows of labeled data

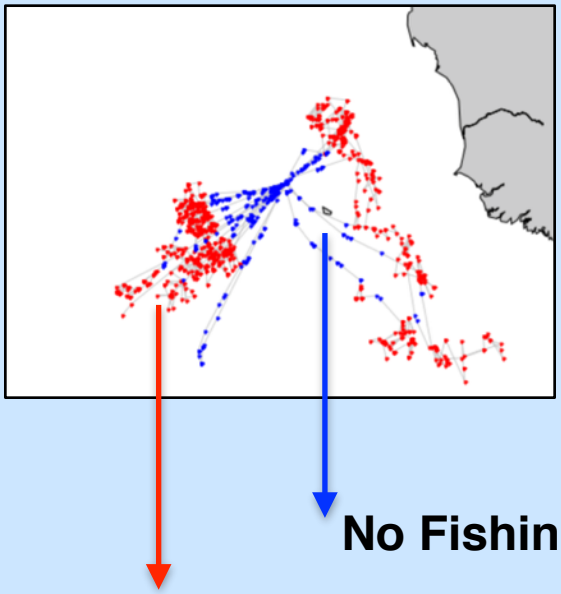
- Latitude
- Longitude
- Course
- Speed

70 engineered features

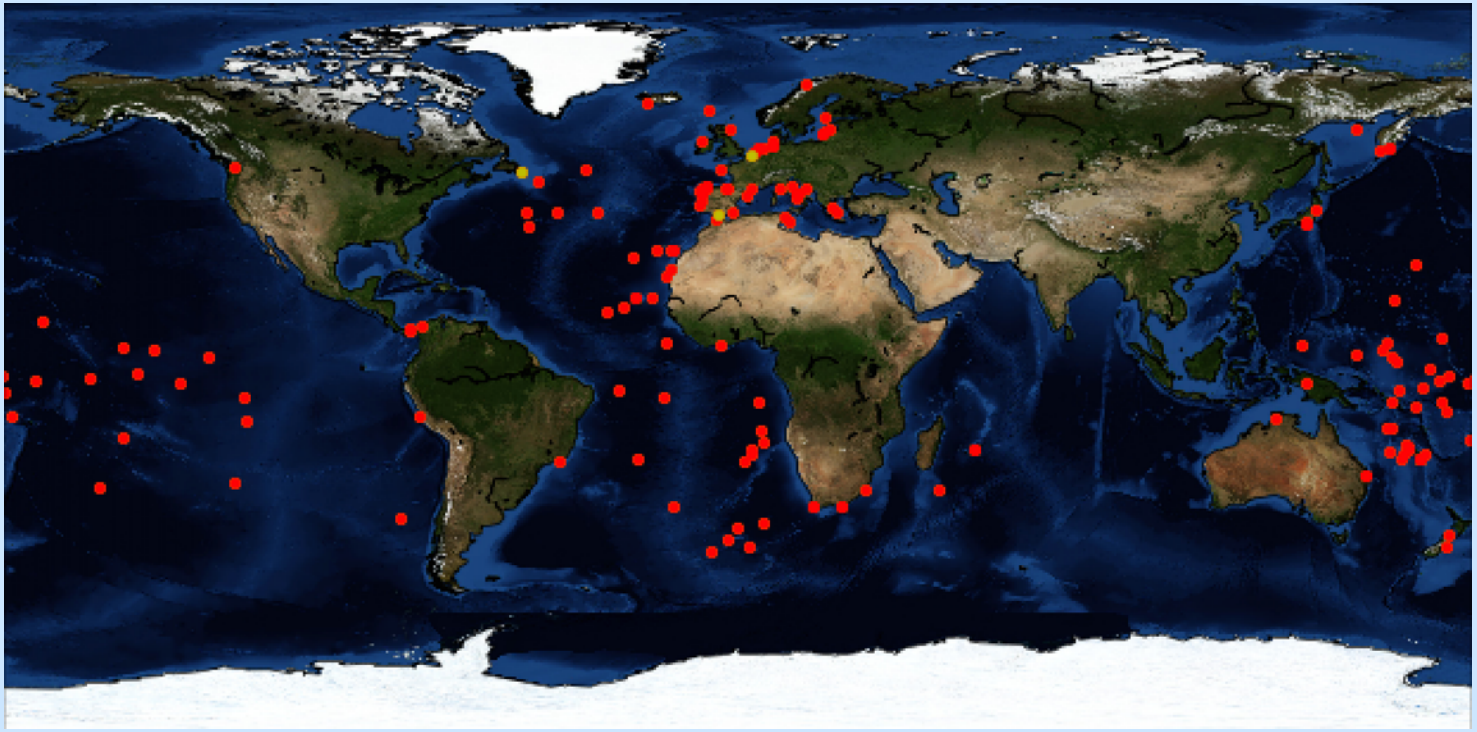
- Daylight
- Mean, standard deviation

Time windows: 0.5h - 24h

Track example

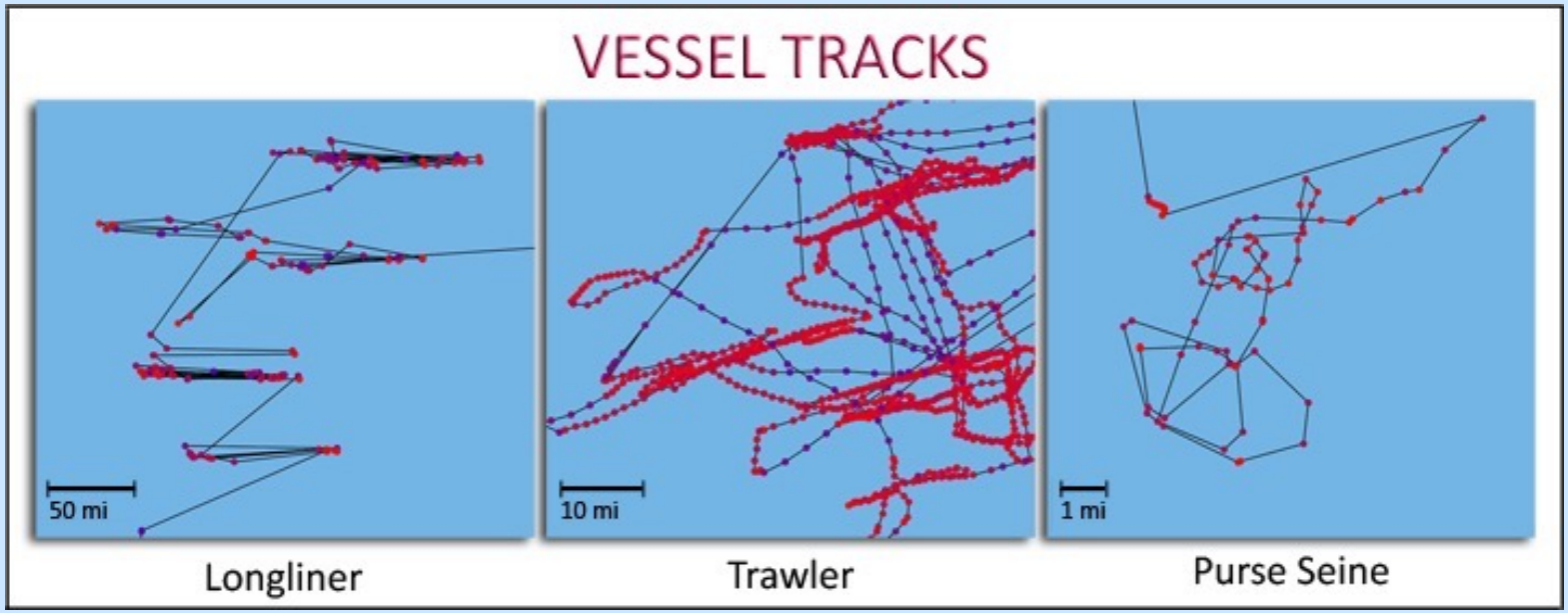


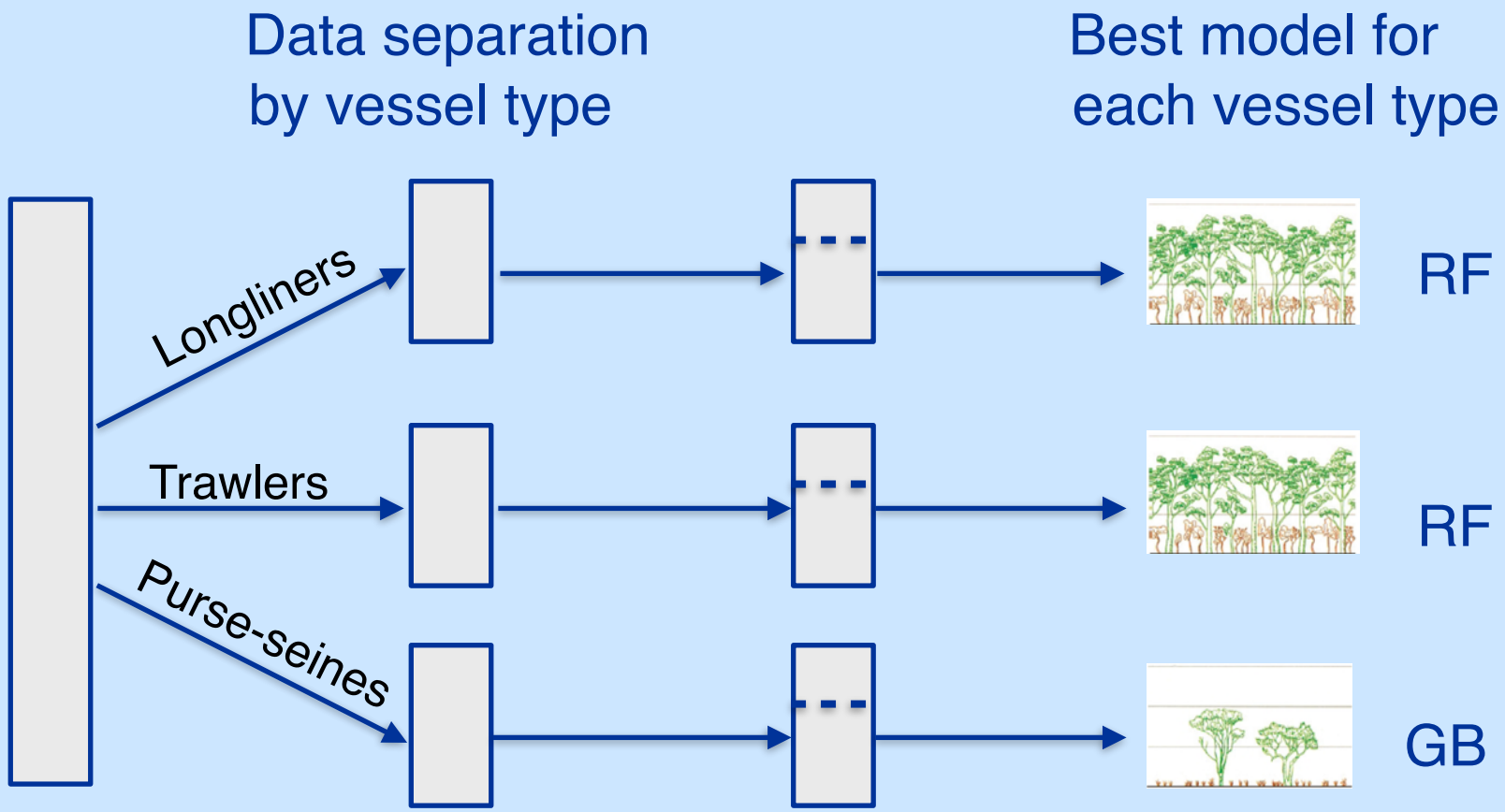
Fishing around the world



- Boats used for this project

Each type of vessel produces a different signature track



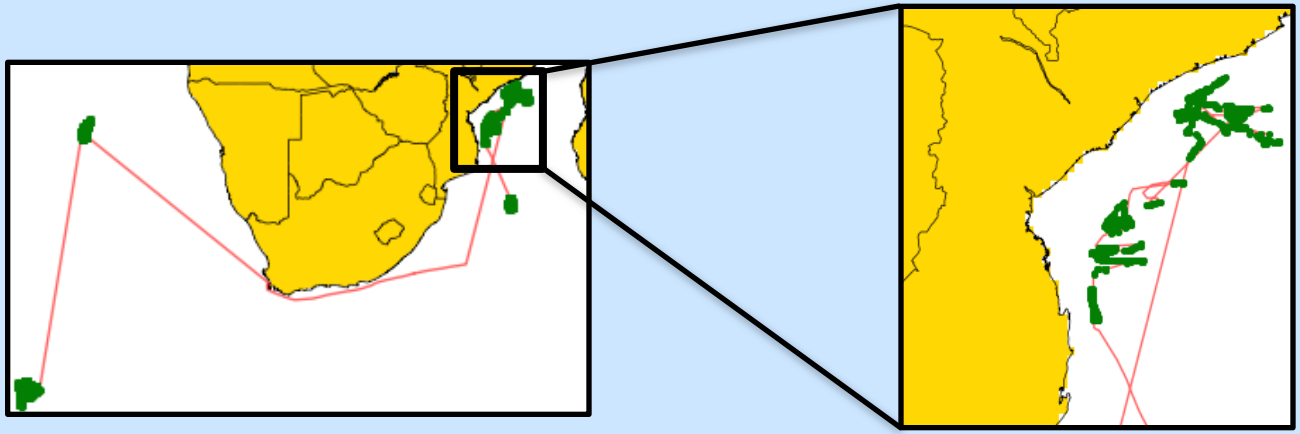


Pipeline

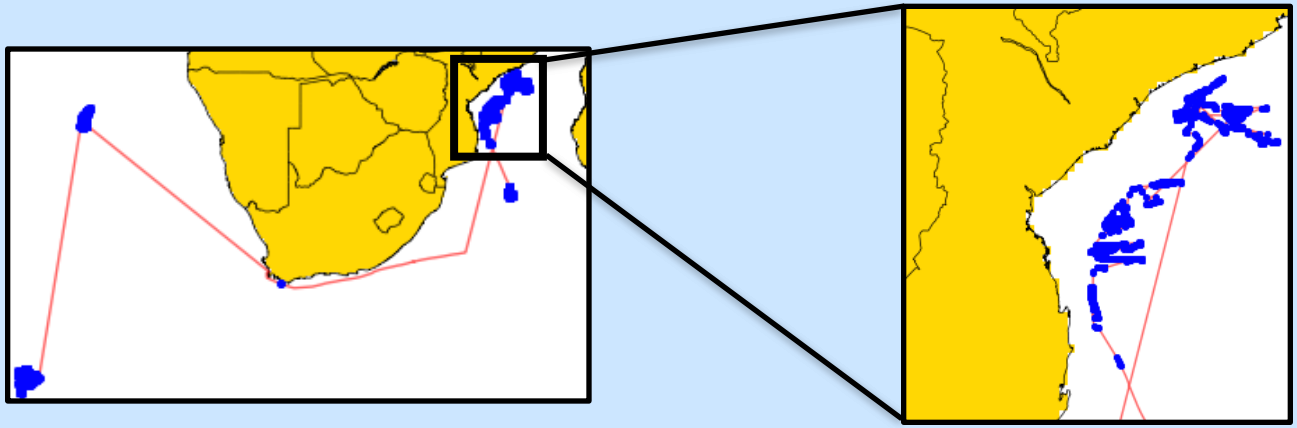
Train - CV - test split
based on vessel ID

LONGLINERS

Actual fishing sites

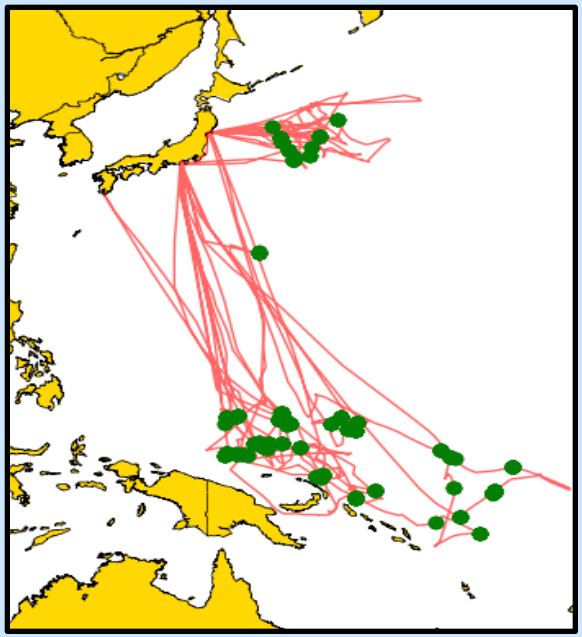


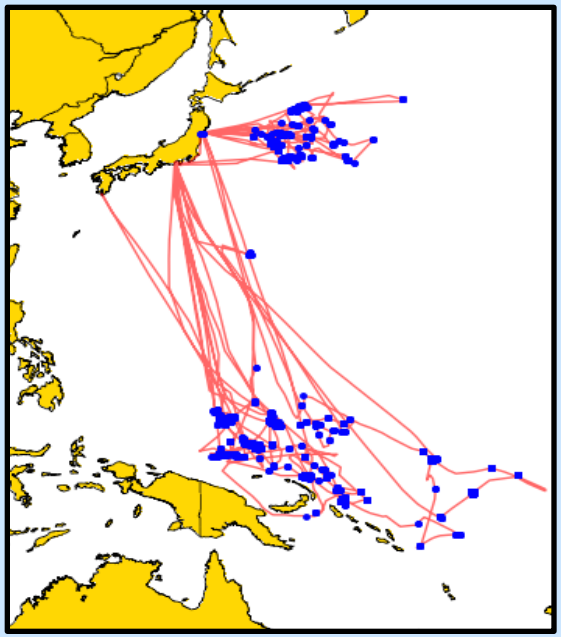
Predicted fishing sites



PURSE SEINES

Actual fishing sites





Predicted fishing sites

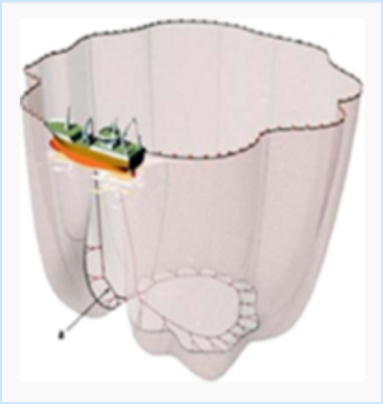
Performance results

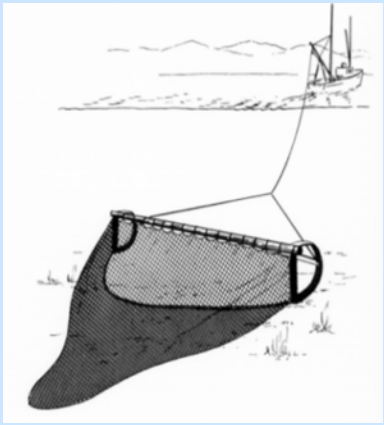
	Accuracy	F1-score
Longliners (RF + 24h windows)	**0.99**	**0.95**
Trawlers (RF + 24h windows)	**0.98**	**0.87**
Purse Seines (GB + 6h windows)	**0.88**	**0.45***

RF: Random Forest Classifier
GB: Gradient Boosting Classifier

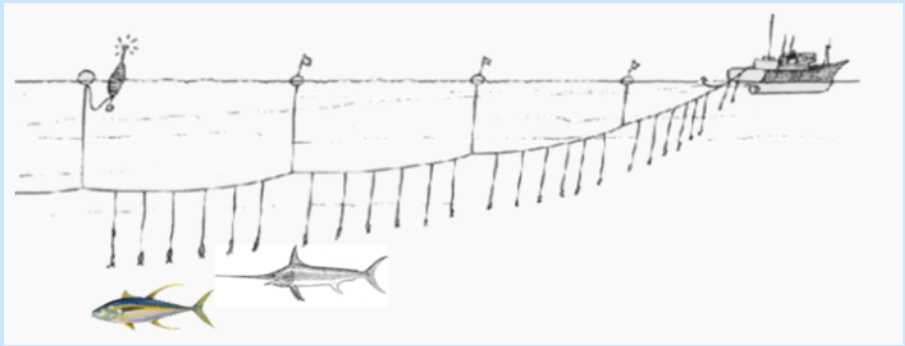
*** An improvement over value reported by Global Fishing Watch of 0.38**

A word on Purse seines…





Trawlers



Longliners

Future work

- Improvement on purse-seiner model.
- Incursions into Marine Protected Areas (MPAs)

Marine Protected Areas

Acknowledgements:

- David Kroodsma
- Tim Hochberg
- Nathan Miller

Thank you!

GinaE/Detecting-fishing-activity

GinaEscobar

Backup slides

Performance of all the models