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Ocean Resilience

Build a digital tool for ocean protection data analytics

An experimental exercise to support the **Global Stocktake Datathon**

October 2022

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Problem

Ocean Resilience

Currently, only **8 percent** of the world's oceans are currently under protection

PROMPT OWNER – Speed and Scale
PROMPT TOPIC – Ocean Resilience

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Solution

We created two digital toolkit concepts that enable easy & scalable analytics of ocean data

Objectives

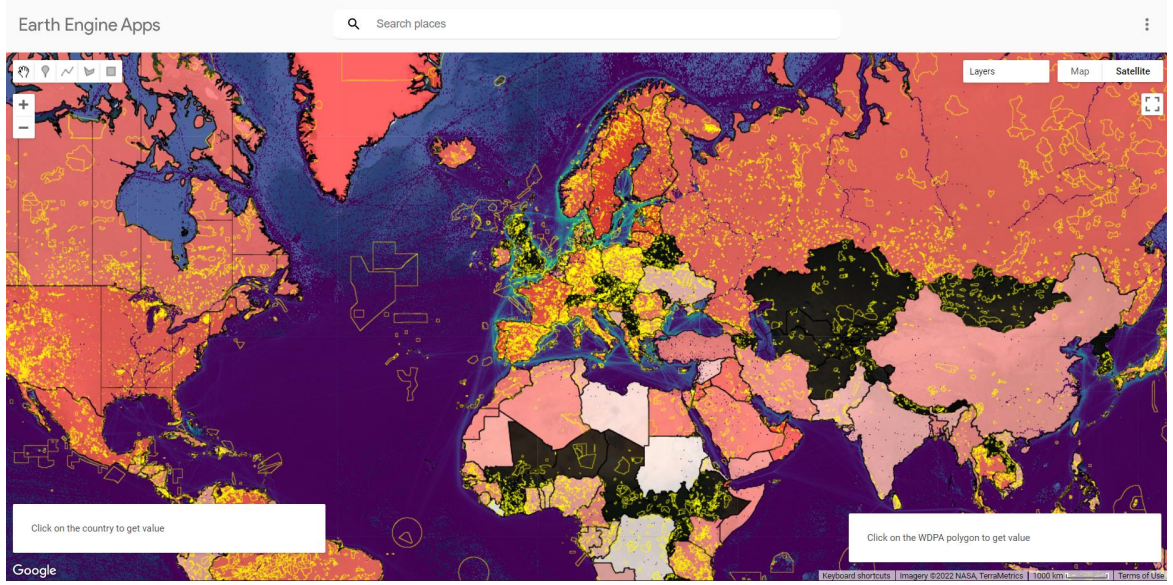
- Ability to add new data sources
- Clear visualization to analyze
- Insights & analytics beyond just “maps”

Technical

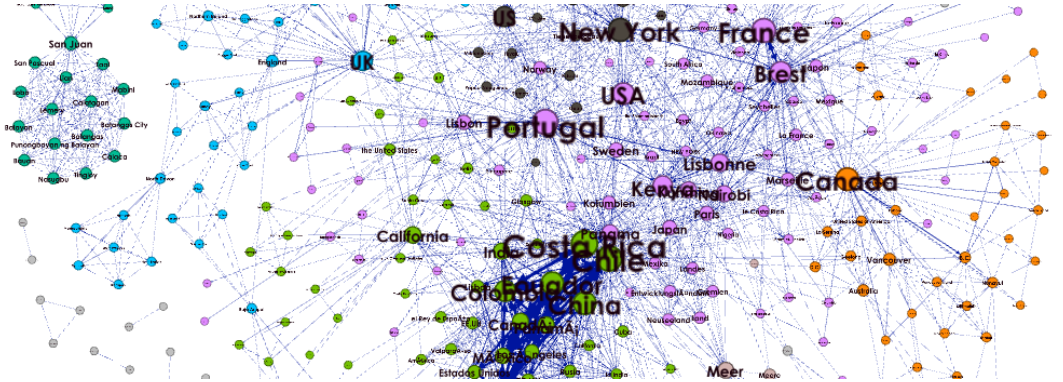
- google earth engine + network web app
- Interactive

Data Sources

- Protected Areas (WDPA)
- Global Shipping Traffic Density (World Bank)
- Ocean Health Index (OHI)
- Deepsea Trawling Countries (Arboretica)
- Global ocean protection news (Arboretica)



https://carlosaupwork.users.earthengine.app/view/james-zhang



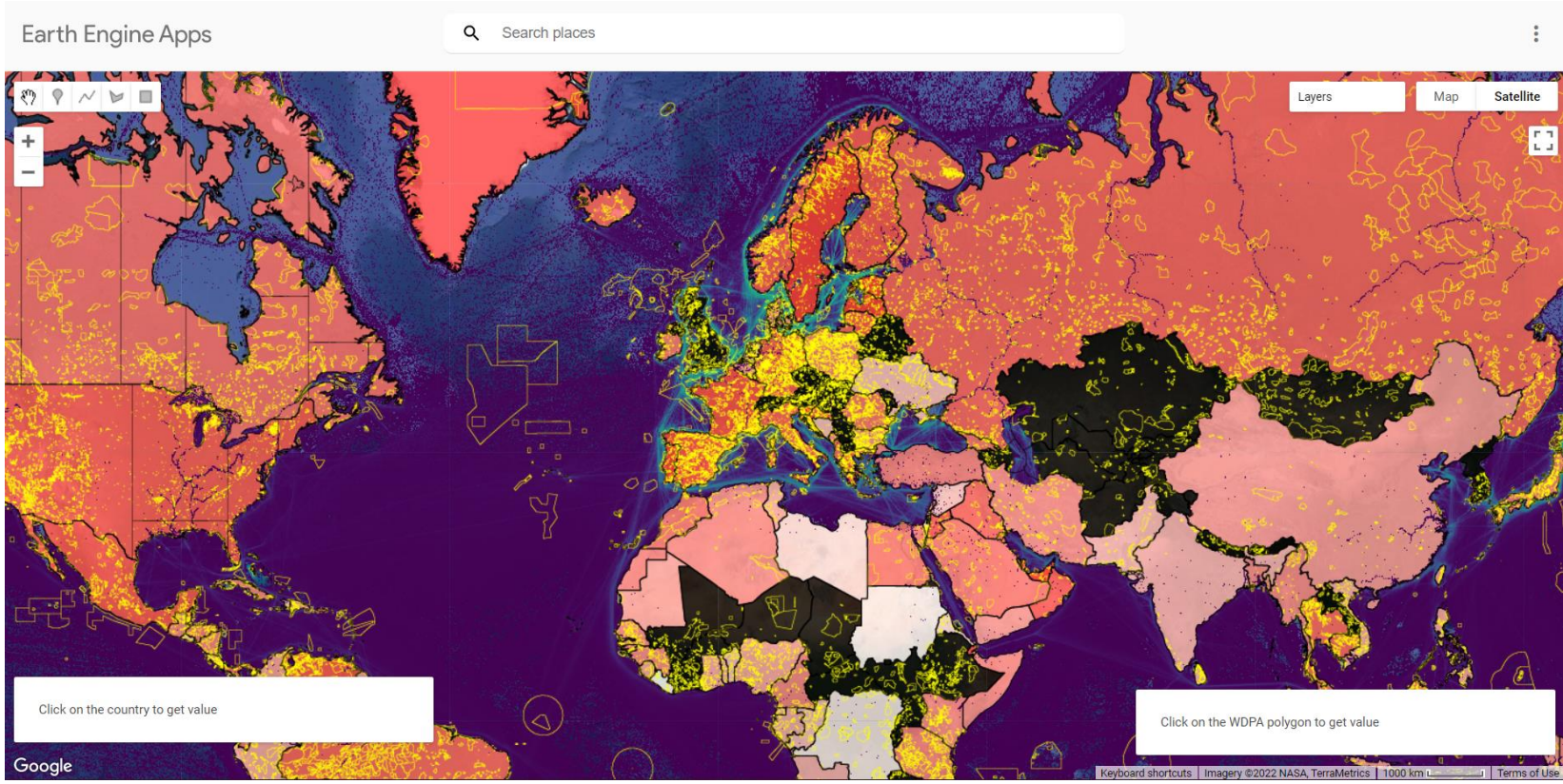
https://ohmanman.github.io/Datathon-Network-Example/network/#

Solution

How to use the tool – map

Step 1

Go to:
https://carlosaupwork.users.earthengine.app/view/james-zhang



Solution

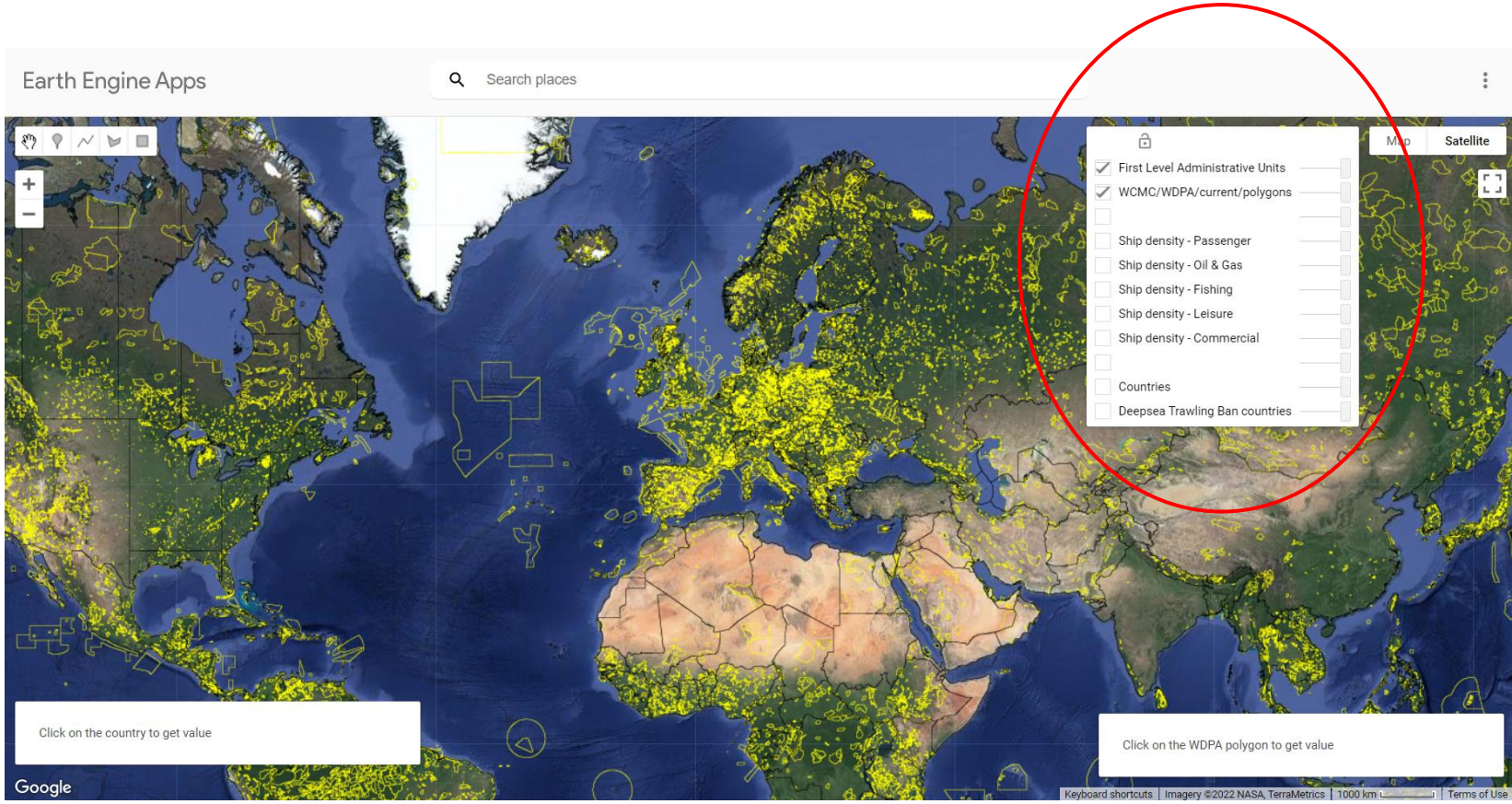
How to use the tool – map

Step 2

Uncheck all layers of data, **except** for the

- "WCMC/WDPA", and
- "First level administrative units"

To have a clear view of the base map.

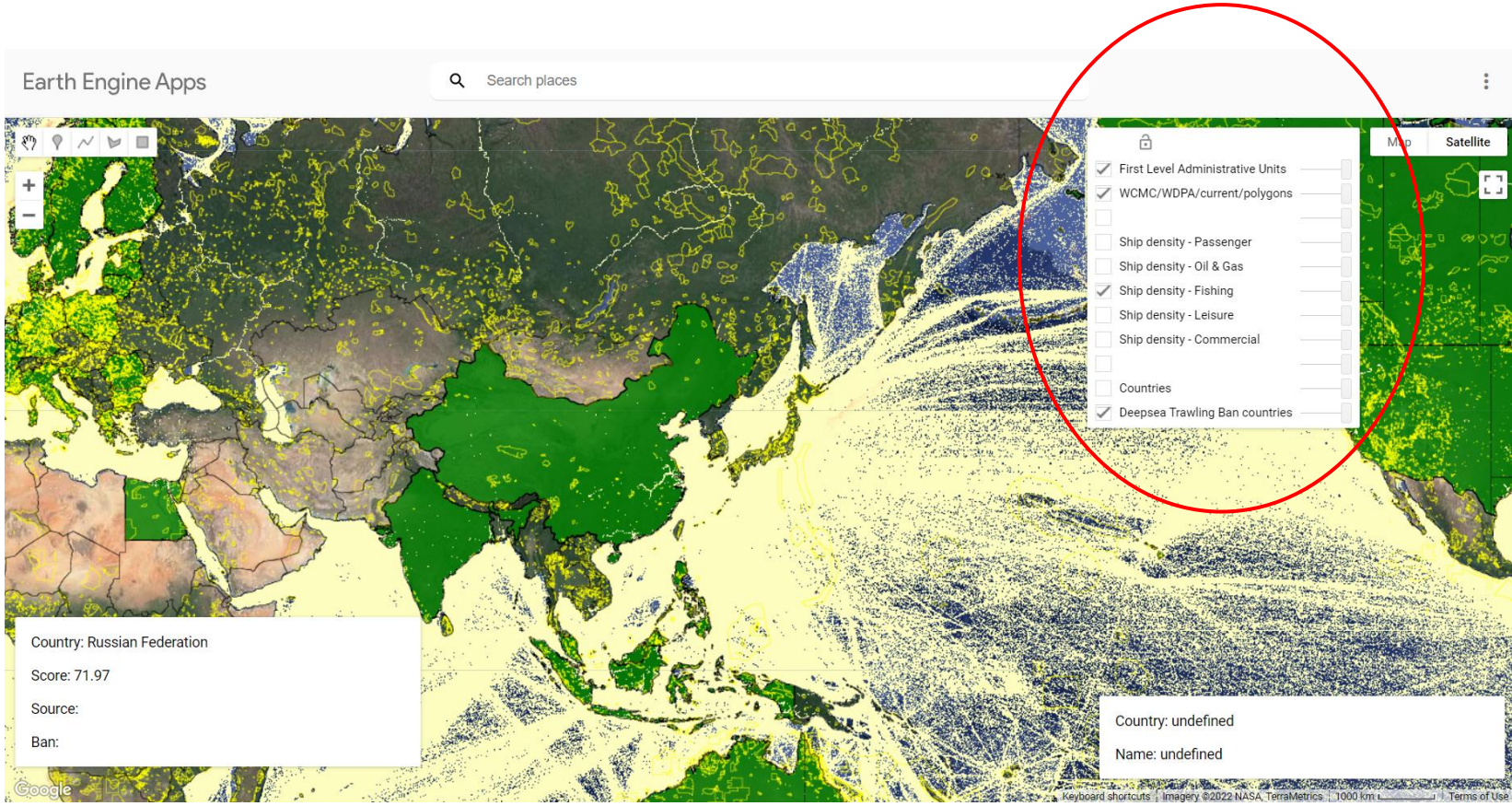


Solution

How to use the tool – map

Step 3

Choose different data layers to play around the tool



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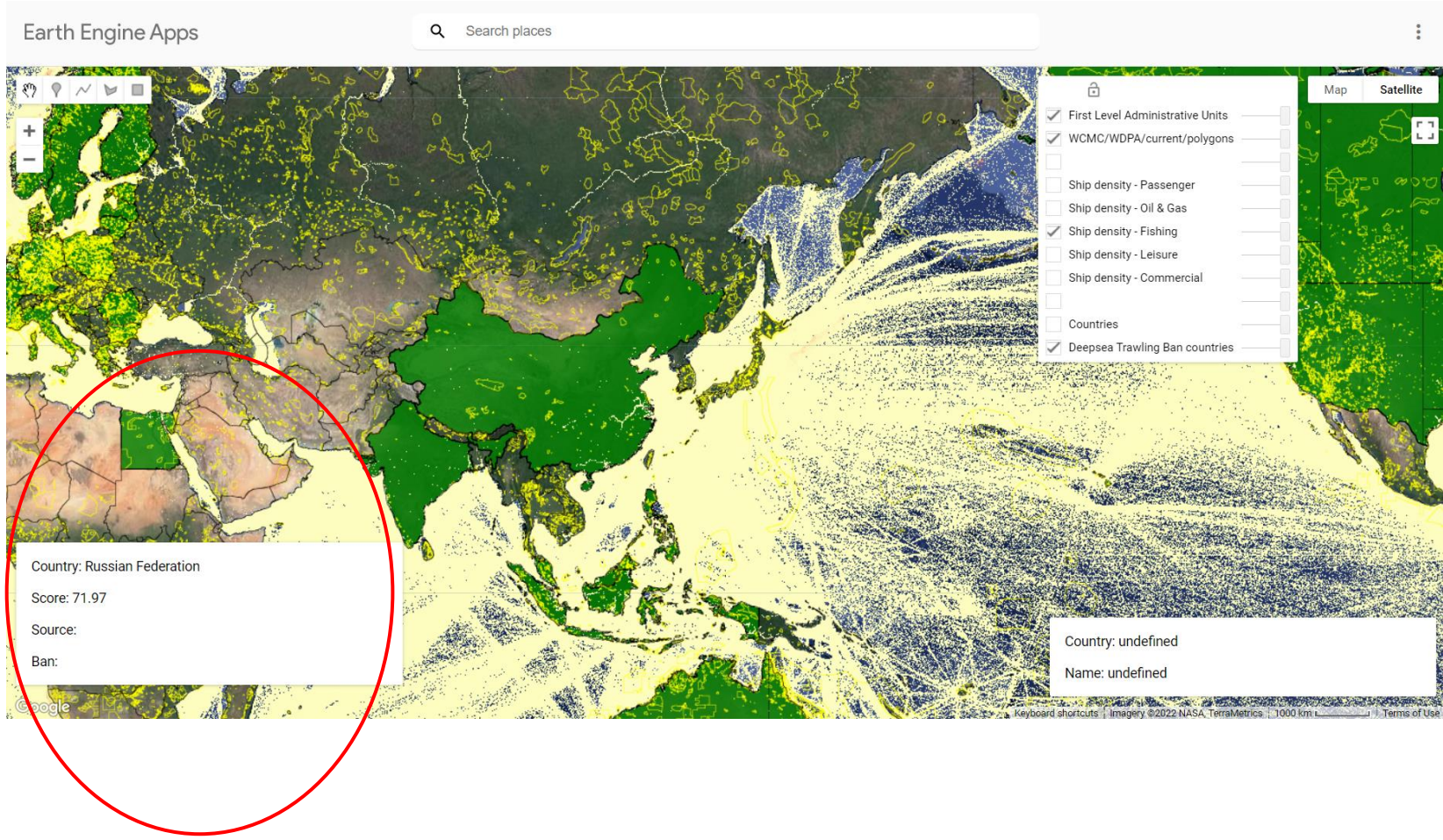
Solution

How to use the tool – map

Step 4

Click on a country on the map to see the country details



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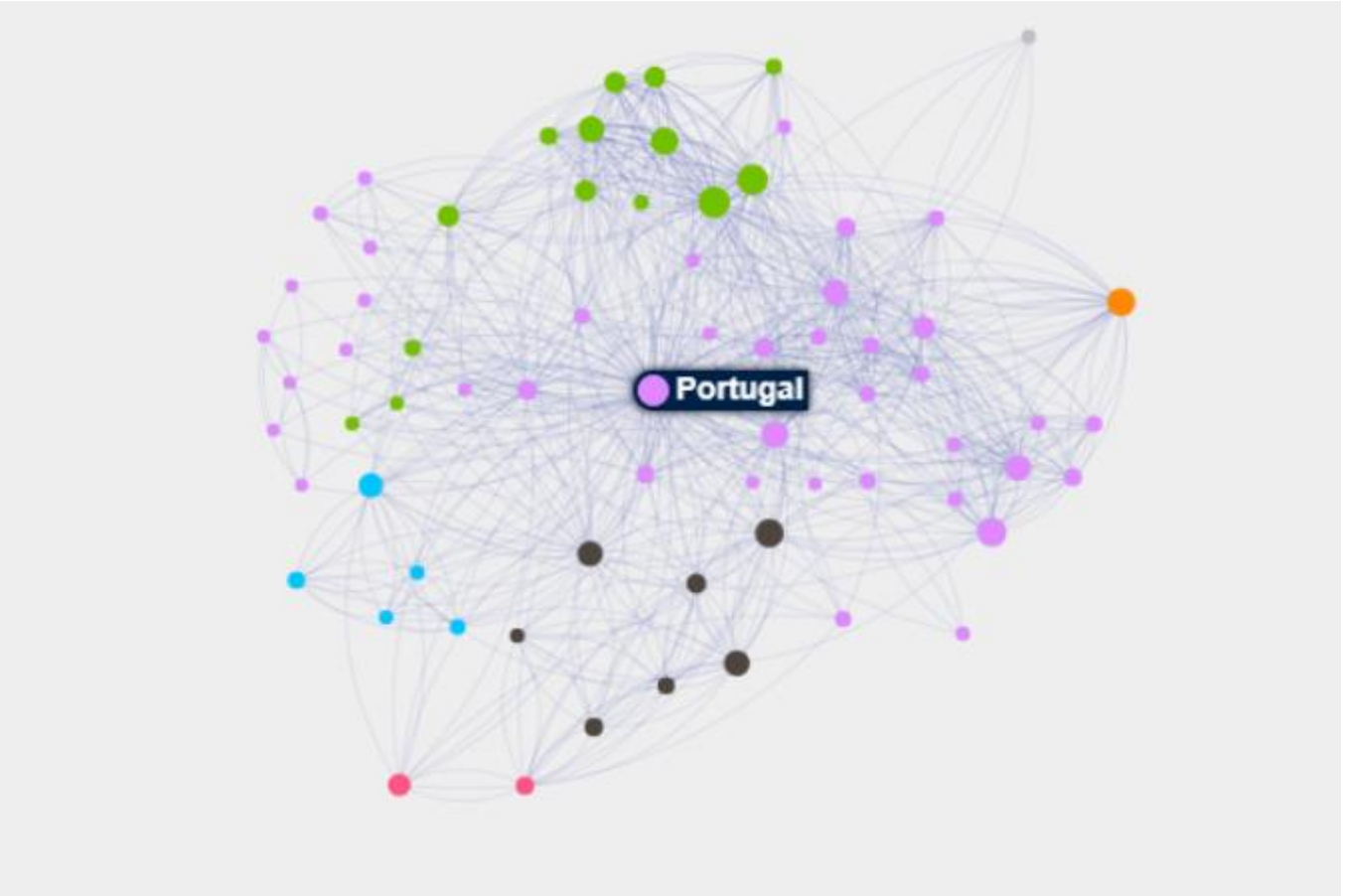
Solution

How to use the tool – network

Step 1

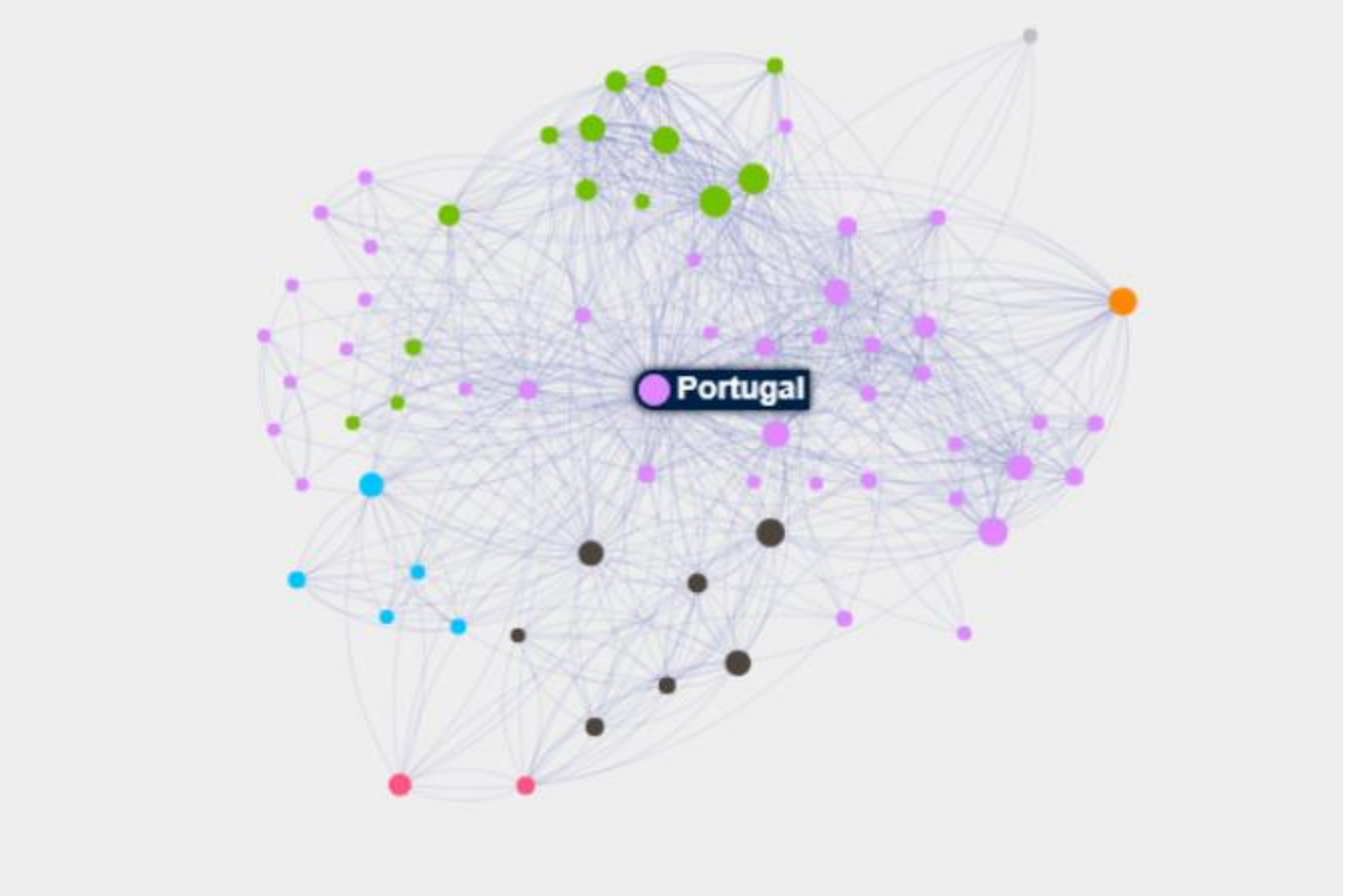
Go to:
https://ohmanman.github.io/Datathon-Network-Example/network/#



How to use the tool – network

Step 2

Hoover your mouse over the nodes (dots) and click to navigate the network



Solution

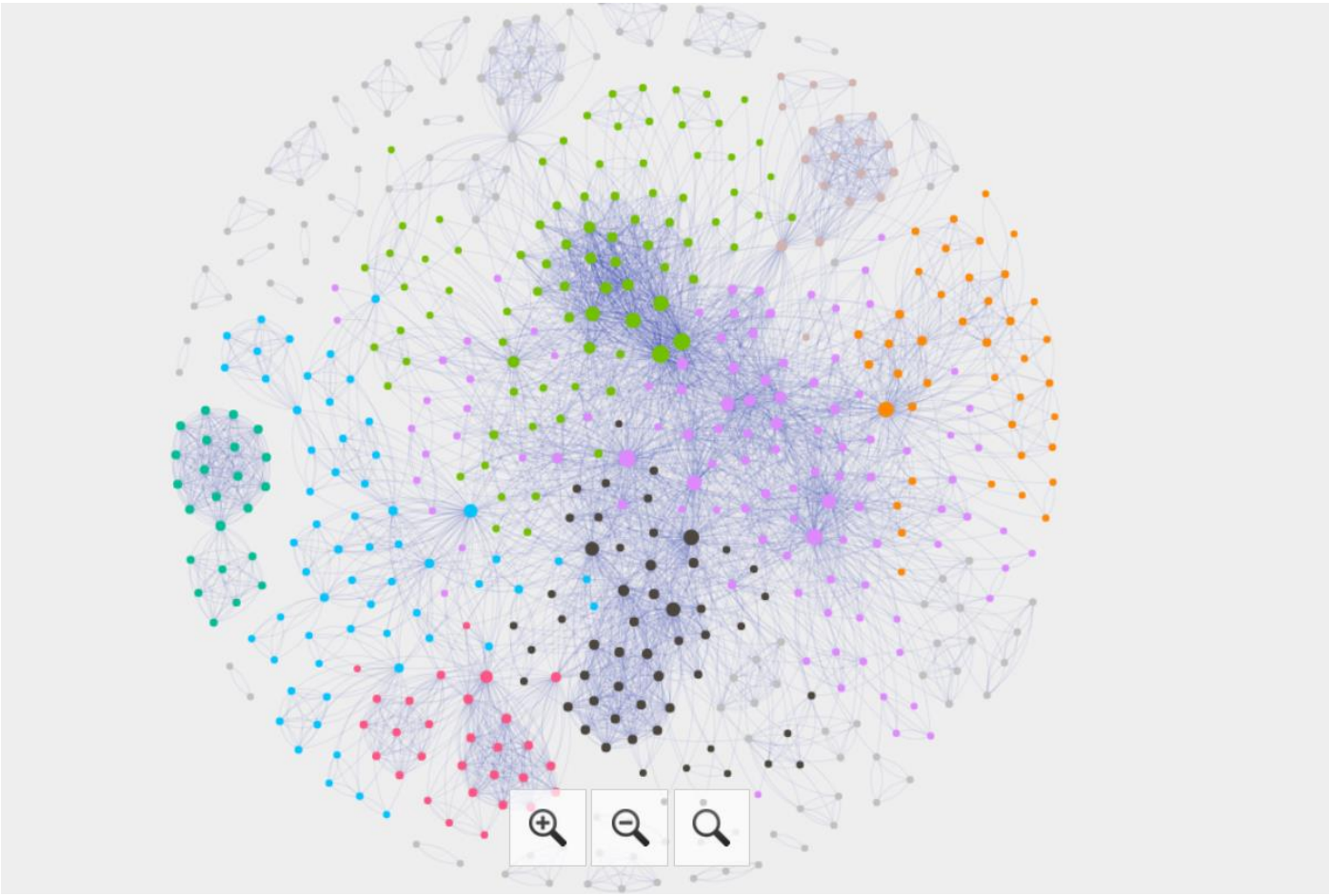
How to use the tool – network

A quick manual

Overview
This network maps out the locations mentioned in news articles about "ocean protection".

Data
We downloaded news articles globally in 5 languages (English, Spanish, German, French, Italian) that talks about "ocean protection" in 2022

Interpretation
- Each node (circle) represent a location mentioned in a news article.
- An edge (line) exists if the 2 location are mentioned together in an article.
- The size of a node represents how frequently it's being mentioned
- The color represents "community", meaning whether the locations belong to a similar group of topics

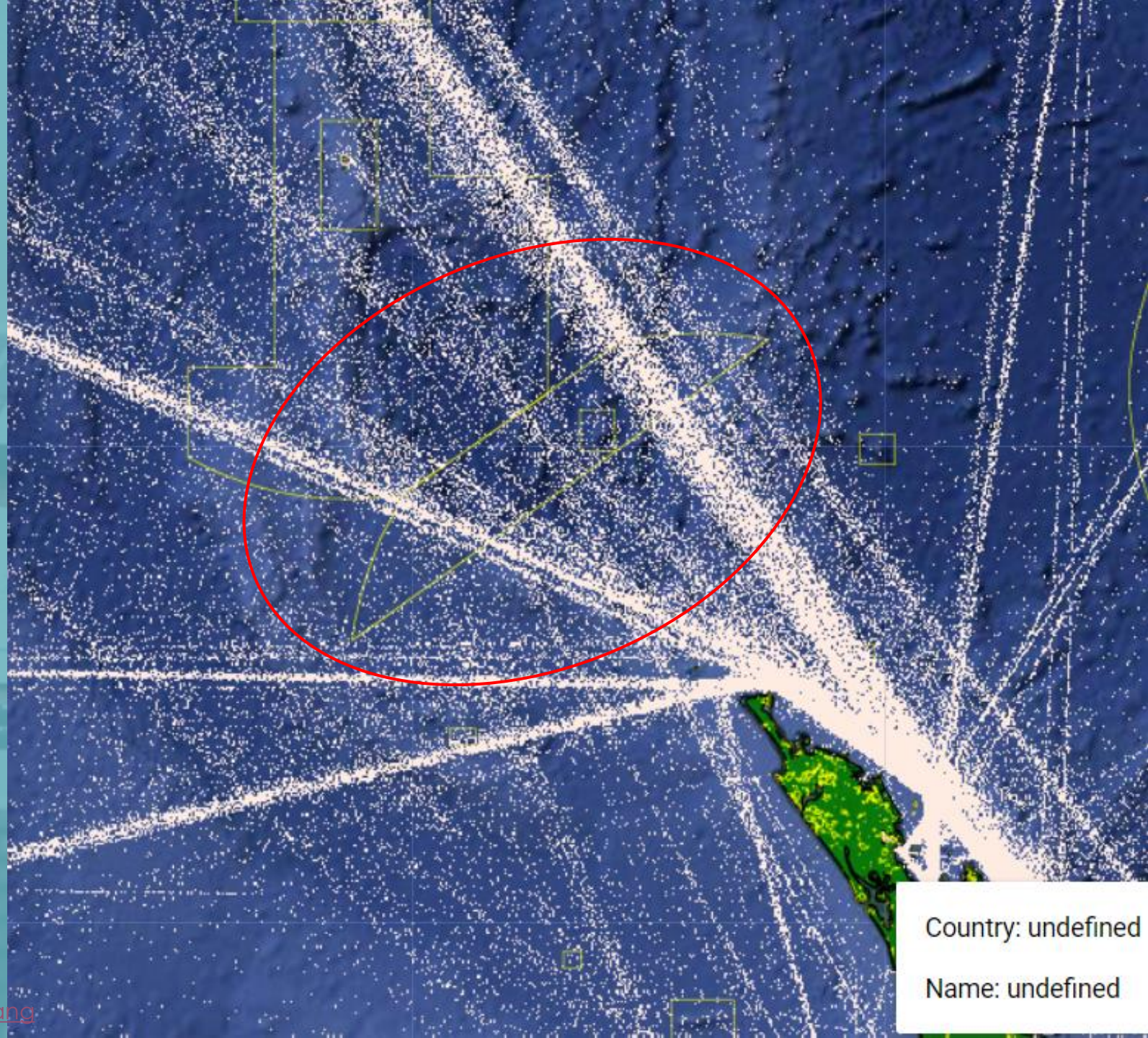


Use Cases 1

Identify high-risk ocean protected areas

Example

Identify ocean protected areas (circled in red within the yellow polygon boundary) that are heavy crossed by oil shipment (white dotted lines)



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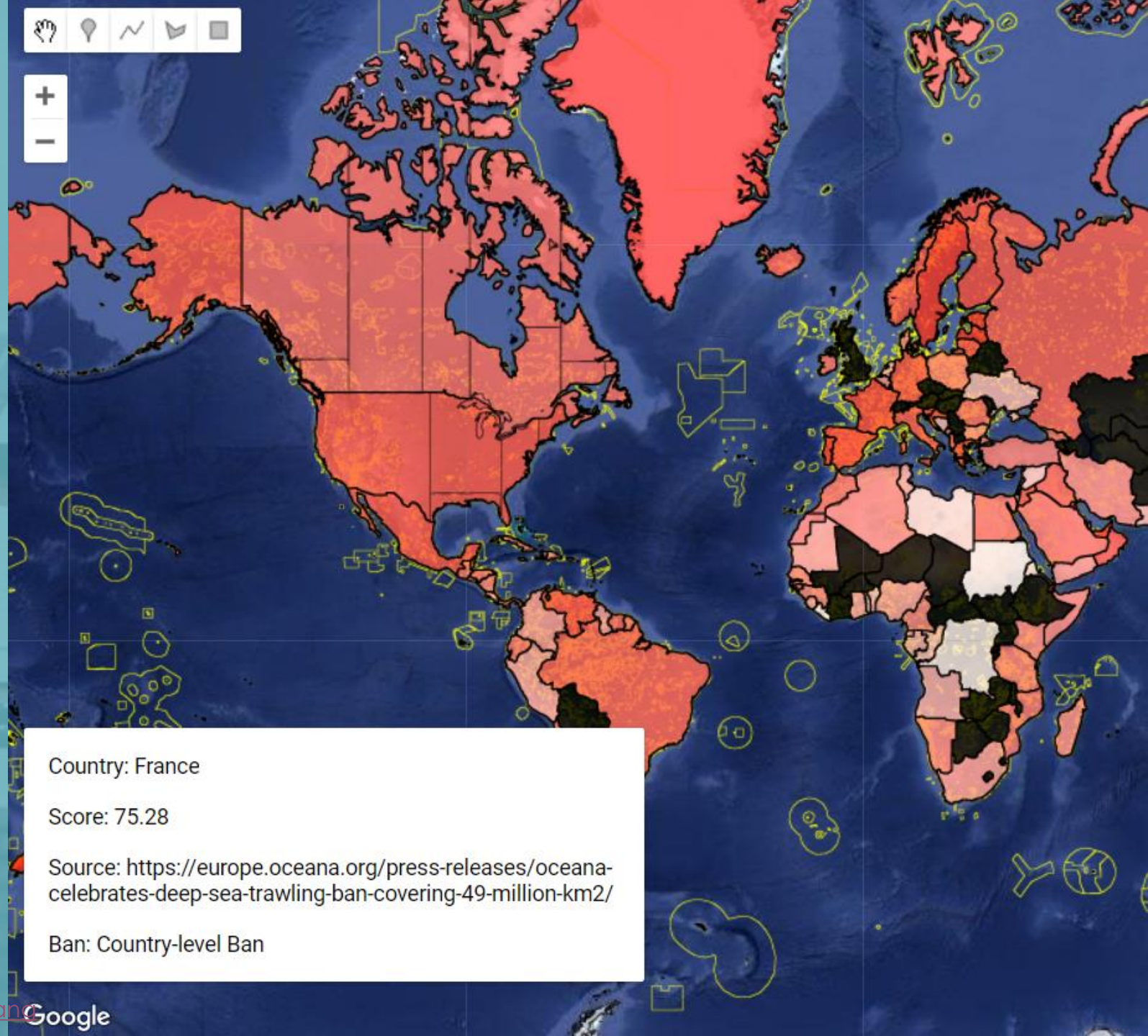
Use Cases 2

Understand country level ocean heath status

Example

Compare how countries perform on ocean health (e.g. French scored 75.28)

- Current data source is Ocean Health Index
- Can add time-series to show tend of ocean health (current not enabled on the tool)
- Can be added/changed with any other indexes in the future



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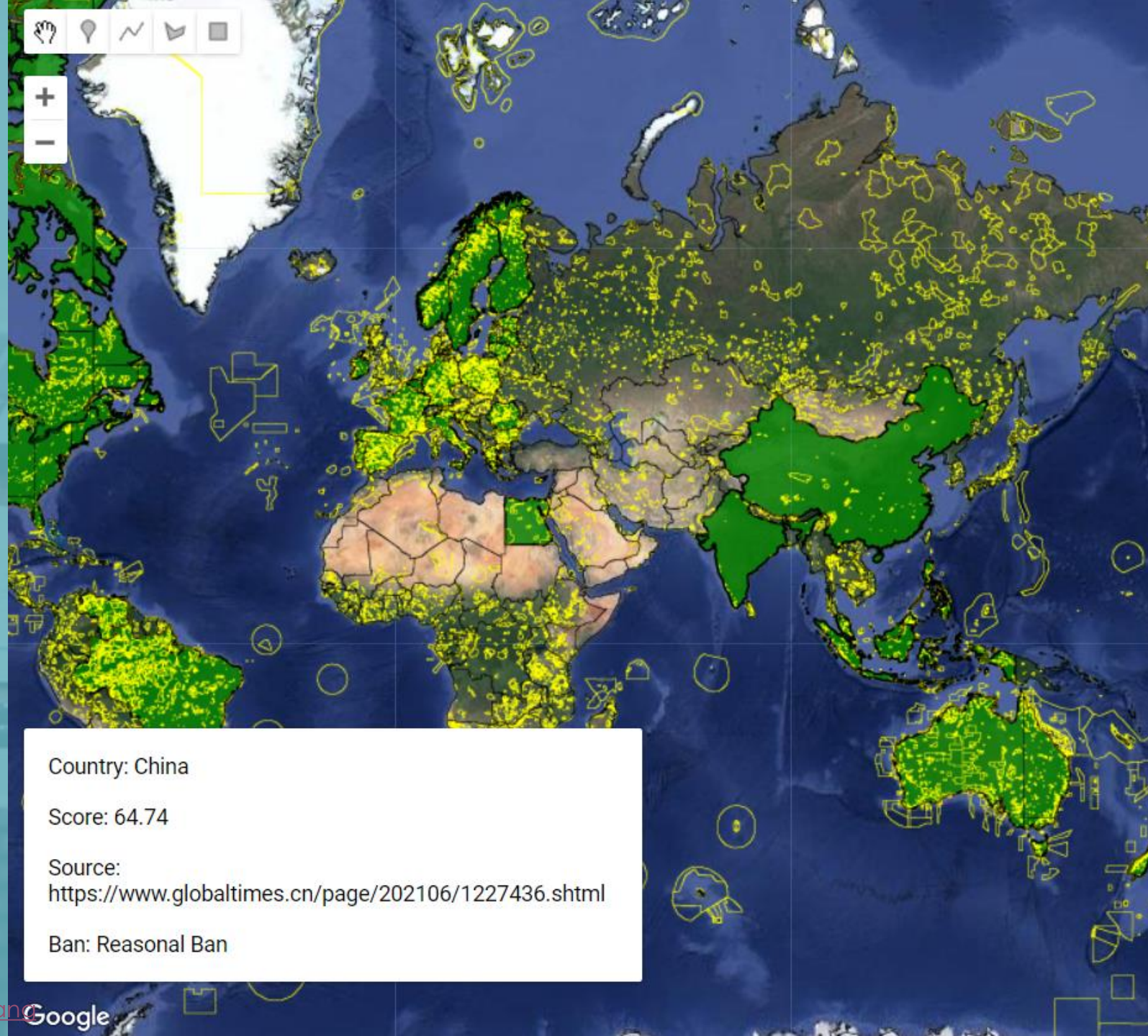
Use Cases 3

Which country banned deep sea trawling?

Example

Green countries have some type of restriction on deep sea trawling

- Data is collected by Arboretica's proprietary policy analytics algorithm (not a complete search due to time constraint)
- Currently there's no global tracker of deep sea trawling law and activities
- There are 3 types of bans:
  - Country level ban (e.g. Palau)
  - Region level ban (e.g. Brazil)
  - Seasonal ban (e.g. Indonesia)



https://carlosaupwork.users.earthengine.app/view/james-zhang

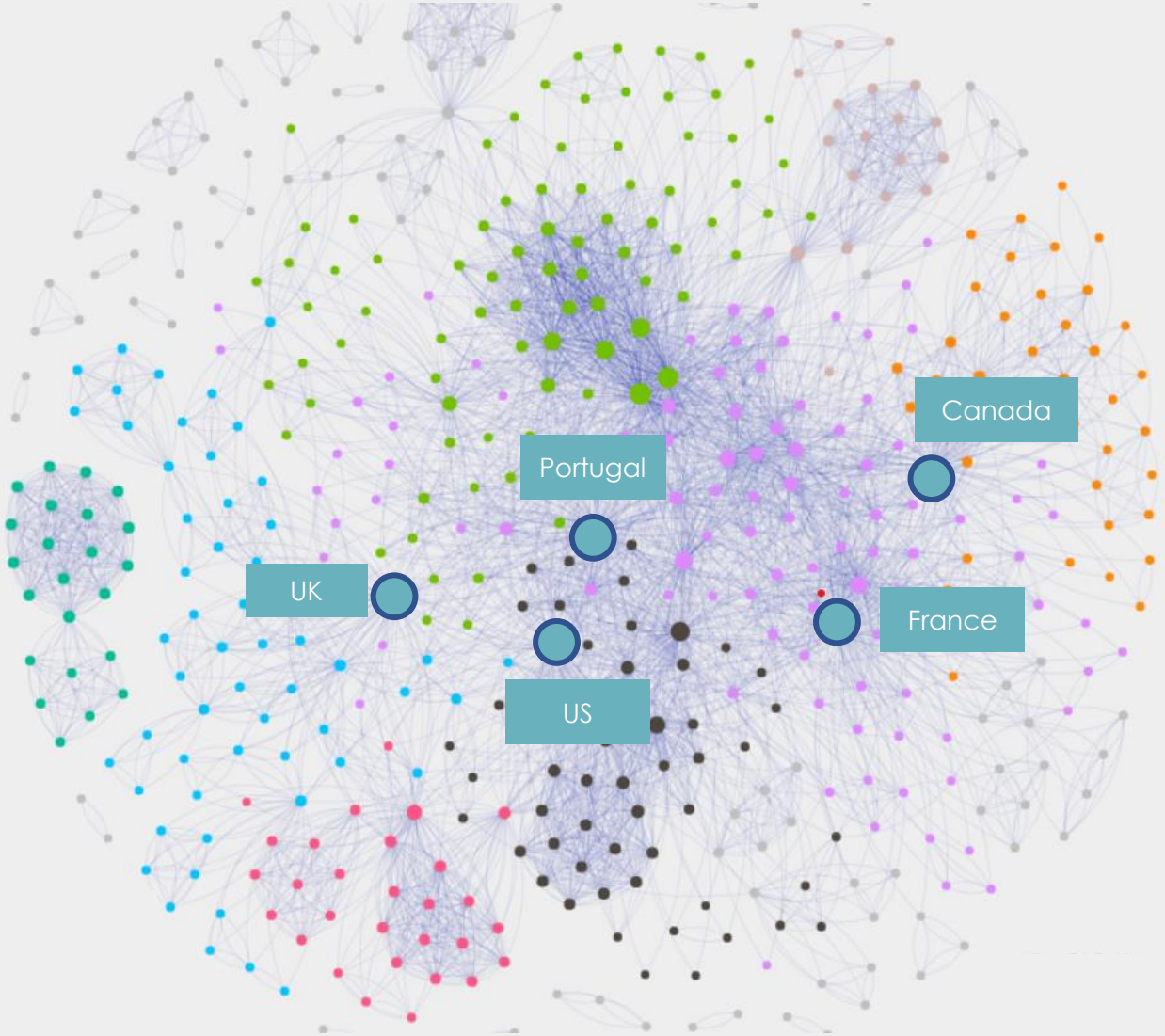
Use Cases 4

Which country is at the center of ocean protection discussion?

Example

A little surprised, **Portugal** took the center of the world's news around ocean protection

The same exercise can be applied to analyze the word/content network from news and social, or analyze the language used in ocean policies, to understand what content strikes the most influence in the topic



https://ohmanman.github.io/Datathon-Network-Example/network/#

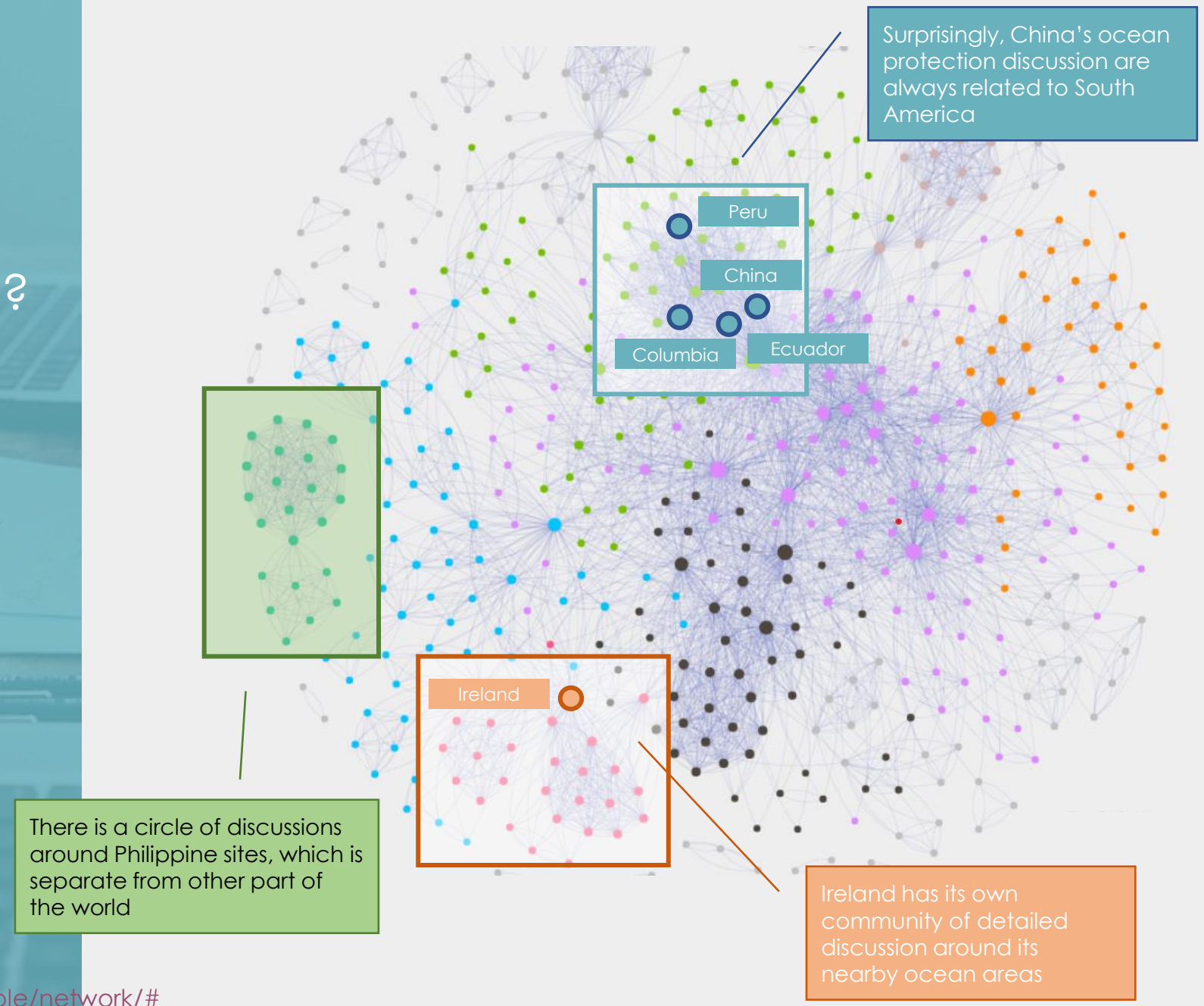
Use Cases 5

Which locations are related when talking about ocean protection?

Example

This tool can help you identify some very unexpected yet potentially valuable insights

- This tool can be enhanced with a time factor to see the trend
- This tool can be modified to map out influencers in the ocean protection topic, which potentially support policy making efforts



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Summary

Highlights of the toolkits

Scalable

The tool is built on top of open-source solutions, such as Google Earth Engine and Gephi. It can be expanded with new layers of data source as needed

Interactive

The tool has a highly interactive feature, which made it accessible for non-technical audiences

Detail-oriented

The tool can drill down the insight and analysis from country level to region, city, policy, and even keyword level

Key areas to improve

Smart Alerts

The tool should be able to automatically identify area of interest to help researchers monitor. For example, automatically label ocean protection areas which has increasing shipping activities

Data Completeness

Some of the datasets (e.g., deep sea trawling, news etc.) were quickly collected to demonstrate the tool. A more complete data source should be collected to complete the analysis

Policy – Activity interaction

The tool can potentially be expanded to see which policy in which country has what impact on a specific area on the ocean. The data is read to enable such a function on the map

Time-series

Some of the datasets (e.g., news, Ocean Health Index etc.) have time factor, which can be used to monitor progress of ocean protection around the world

Links, tools and datasets

Data Sources

- Protected Areas (WDPA: https://www.protectedplanet.net/en/thematic-areas/wdpa?tab=WDPA)
- Global Shipping Traffic Density 2021 (World Bank: https://datacatalog.worldbank.org/search/dataset/0037580/Global-Shipping-Traffic-Density)
- Ocean Health Index (OHI: https://oceanhealthindex.org/global-scores/data-download/)
- Deepsea Trawling Countries (Arboretica)
- Global ocean protection news (Arboretica)

Technology used

- Google Earth Engine(https://earthengine.google.com/)
- Gephi (https://gephi.org/)
- Sigma.js (https://www.sigmajs.org/)

Thank you

About Arboretica

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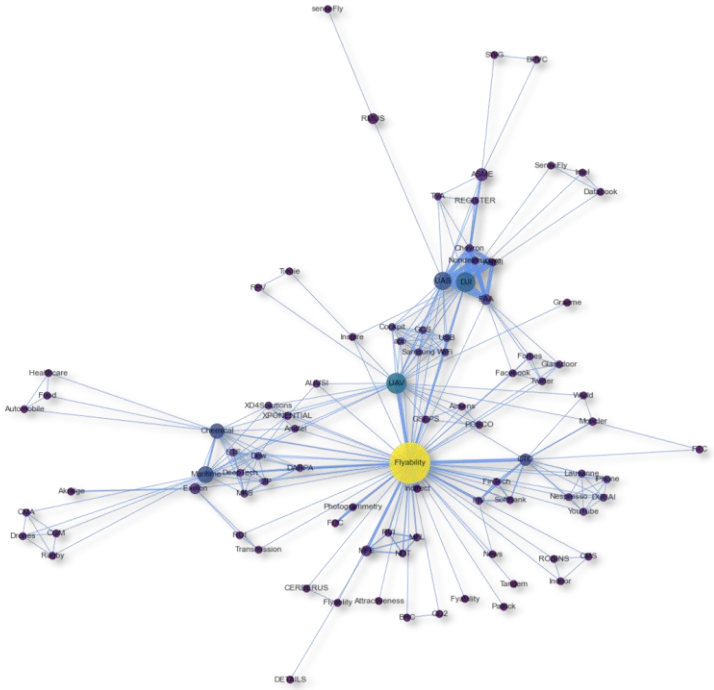
What we do

We transform the way of your traditional environmental analysis with **rigorous machine learning capabilities** dedicated to environment science

Arboretica
Environmental
AI



Search and collect all data needed for your topic of interest beyond reach by manual process

Connect fragmented information into meaningful pictures from a large volume of unstructured data

Dig layers deeper to derive the answers behind your research questions and make science-backed decisions

Extract key information and insights beyond reach by manual process

Free up manpower and ensure consistent output quality

Empower traditional research with data science and automation

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Our partners

Our technology is being recognized by decision-makers from world-leading organizations

DATA DRIVEN ENVIROLAB

Yale

Delivered net-zero target tracker for 20K+ entities at nation, city and company levels using a fully automated process

Nature 4Climate

BEZOS EARTH FUND

Built the world's largest nature policy database within 4 weeks using our proprietary AI-driven policy analytics process

WWF

METABOLIC

Track national-level nature protection actions and outcome in coordination with WWF and UNEP - WCMC

The Nature Conservancy

Constructed knowledge base from text-heavy academic sources to support agroforestry meta-analysis

Trusted by Global Leaders

WWF · The Nature Conservancy · Nature 4Climate · METABOLIC · Yale · EMPIRICAL · TAPIO · DATA DRIVEN ENVIROLAB · ING · ALSTOM · ROGER DUBUIS · re+ connect · 天津天任大数据科技有限公司 Tianjin Tianren Big Data Technology Co.,Ltd · Erasmus Centre for Entrepreneurship · SINEORA

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Recent Highlights

Our data-driven environmental analyses has been featured in global media and was being presented at COP 26

THOMSON REUTERS · Forbes · the japan times · TheStar · environmentanalyst · Global AgInvesting · NATIONAL POST


Forbes

Oct 29, 2021, 10:00am EDT | 889 views

$8 Trillion Nature-Based Solutions Market Rises Up The Global Agenda With Launch Of Policy And Investment Tracker

Forbes

The world's largest nature policy database developed with help of AI


THOMSON REUTERS FOUNDATION NEWS

Can tech help hold climate polluters to their net-zero pledges?

by David Sherfinski | @dsherfinski | Thomson Reuters Foundation

Wednesday, 27 April 2022 01:00 GMT

Thomson Reuters

Can tech help hold climate polluters to their net-zero pledges

COP 26

There's power in Nature-Based Solution (NbS)

Contact us

Want to get in touch? We'd love to hear from you!

Drop us an email and we will get back to you in no time.

Our team is here to help you.

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