WINDWARD

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DATA ANALYSIS TASK

ABOUT WINDWARD

Windward is a maritime data and analytics company, bringing unprecedented visibility to the oceans. We are the first company in the world to take all of the data on ship activity worldwide, make sense of it, and make it accessible and actionable across industries.

TASK DESCRIPTION

One of the problems that our analyst team deals with is mapping the world. This includes, for example, defining correct port borders and analyzing their capabilities. The accuracy of the mapping is essential in order to make the correct decision about ship activity.

In the satellite image below you can see an example of a 280 meter tanker which transfers oil. The ship is located at a unique dock, designed for oil transportation only and handles ships 250 meters long and larger. This dock will never accommodate smaller ships, for reasons of economical inefficiency.

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Your mission is to find the location of such docks based on the data described in the next section. You can see the example below where the satellite image does not include the tanker ship but on the basis of the provided data this unique oil dock was found with proper orientation and dimensions.

Define at least three docks and their properties:

- Location
- Direction/Angle
- Dimensions (maximum ship size, depth/draught, width and etc.)
- Any additional properties such as the oil type (crude oil/refined product oil), commodity movement (import/export) and etc.

You can use any program in order to solve the problem. Any open source information can be used as well. If you find any specific source which might be valuable in order to solve the problem, let us know.

Keep in mind that the method you propose will have to work on a large scale - our goal is to map the world...

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DATA DESCRIPTION

The data includes the following variables:

- Time – the time of transmitted AIS signal.
- MMSI – the identity number of the ship.
- Latitude – a geographic coordinate that specifies the North-South position of a point on the Earth's surface (proper values are between -90 and 90).
- Longitude – a geographic coordinate that specifies the East-West position of a point on the Earth's surface (proper values are between -180 and 180).
- Speed – speed of the ship in knots (proper values are between 0 and 20).
- Heading – the angle between the vessel's nose and the North (proper values are between 0 and 360).
- Class – the vessel's type. id number of the ship's class:
    - 0 – Unknown
    - 1 – Cargo
    - 2 – Tanker
    - 3 – Fishing
    - 4 – High Speed Craft
    - 5 – Service Vessel
    - 6 – Military Or Law
    - 7 – Passenger
    - 8 – Pleasure
    - 9 – Other
    - 10 – Rig
- Size – overall length of the ship (distance from stern to bow).
- DistanceToBow – distance from AIS transmitter to bow.
- DistanceToStern – distance from AIS transmitter to stern.
- DistanceToPort – distance from AIS transmitter to port.
- DistanceToStarboard – distance from AIS transmitter to starboard.

Find below an illustration of the last four distances and some additional remarks regarding the data signals.

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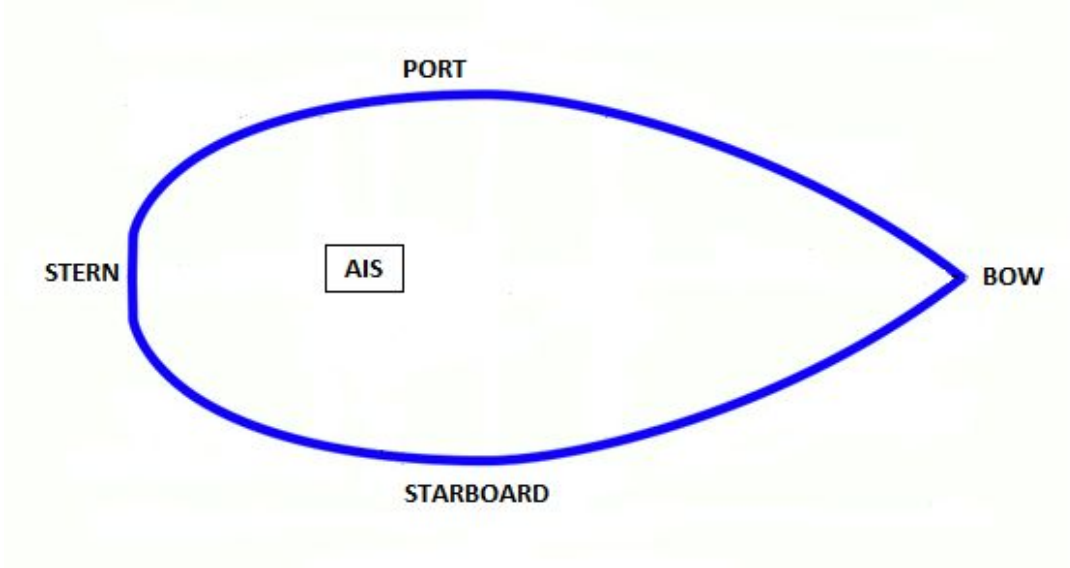

The variables Latitude, Longitude, Speed, and Heading are automatically calculated by the vessel's GPS and sensors and reported to the satellite by AIS transmitter. The signal and its values may be damaged on the way to the satellite and on the way to you.

The variables Class, Size, DistanceToBow, DistanceToStern, DistanceToPort, DistanceToStarboard are entered manually and may be incorrect also by the damaged signal or in mistake or in purpose by the ship operator in order to distort the ship profile.

GOOD LUCK.
WINDWARD'S DATA ANALYSTS TEAM

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