

Characterizing the AIS data of tugs in the port of Barcelona

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Abstract

Port tugs play a vital role in port activity and navigation safety issues. They ease big vessels entering, maneuvering, mooring and unmooring safely and efficiently, and also assist in other port operations, such as fire protection and search and rescue operations. To achieve efficient tug operations, studying the features of tug activities is of crucial importance. The Automatic Identification System (AIS) is a system that makes the tracking of vessels possible, originally introduced as a tool for the identification of vessels in maritime navigation. AIS data is used for a variety of applications such as protection of the environment, the management of vessels in waterways, and overall surveillance to improve safety.

This study aims to use AIS data to characterizing the tugs. The AIS data from nine tugs in Barcelona port, Spain, in March 2023 were analyzed by Jupyter Notebook. The findings and implications could shed light on the deployment of tug berths, scheduling, and evaluation of tug fleet operation.

In this study, status of tugs ranges from 0,5,15, which means under way using engine, moored and undefined, respectively. You can see the AIS trajectories of the tugs with their MMSI numbers in *Figure 1*. In some cases we have missing data in turn, heading and speed in AIS data. It depends on various parameters such as the equipment used, technical issues, external conditions, human factors and dense traffic etc. As AIS data does not function well in dense traffic areas. In this article we just try to characterizing the data of each tug.

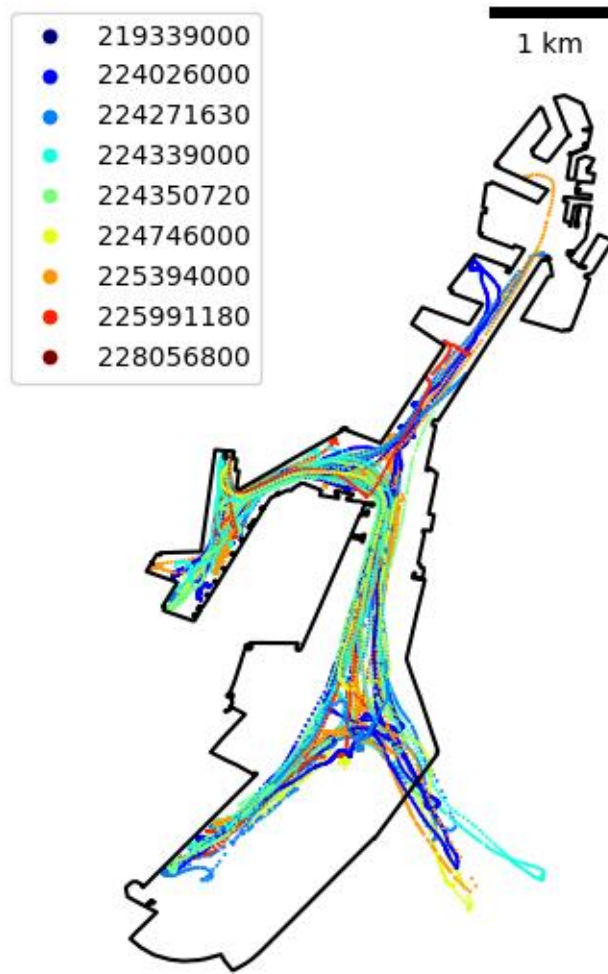


Figure 1. AIS Trajectories of tugs in the Port of Barcelona on March the 1st, 2023.