Assessing Bunker Operations Through AIS Data

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Objective

The aim of this thesis is to derive a benchmark that quantifies bunker delivery time with respect to anchoring time, by characterising delivery times within an interval of [0,1].

Based on this measure, statistics can be collected for single bunker barges, barge companies with several barges or entire ports to evaluate the credibility of bunker suppliers.

Introduction

A bunker operation is a process where a vessel is supplied with fuel for operational purpose, illustrated in the bottom figure [3]. The bunker industry encompasses numerous suppliers and buyers, and is characterised by large volumes of fuel transitioning rapidly between owners. Traditionally, this industry has been subject to concealment and little public insight. This lack of transparency prevents regulation and integrity of the bunker industry.

In commercial shipping, fuel expenditure can constitute up to 90% of operational costs (OPEC). Assuming that the amount of lost bunker is of significant value, the reduction in OPEC is potentially high. This strengthens the incentive for increasing awareness and knowledge about the bunker industry.

With the ability to track vessel movement and identify bunker operations, statistical analysis can be conducted in order to identify normal behaviour during bunker operations and consequently deviations. The motivation for this thesis is to investigate the possibility of using AIS data to characterise the integrity of bunker suppliers. On a higher level, the motivation laid to ground is reducing fuel costs and investigating the possibilities of utilising AIS data on a high resolution level.

References

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Port of Singapore
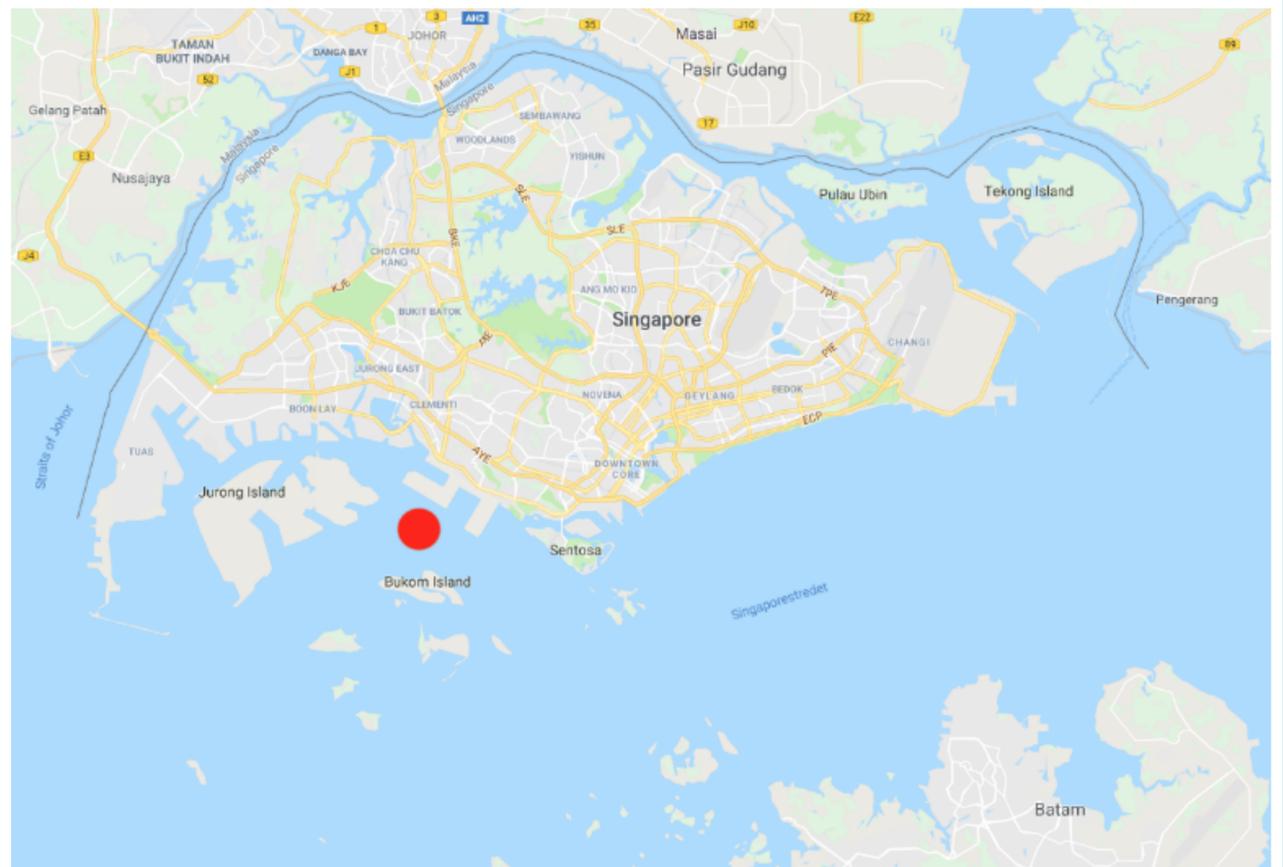
The geographic area is restricted to a square surrounding Port of Singapore, illustrated in the figure above [1]. The port offers connectivity to more than 600 ports in 123 countries [2], and it serves as a gateway for the East-West trading area. As one of the largest marine refuelling hubs in the world, it has been the scene for a significant amount of documented bunker fraud according to industry experts.

Method

A matching algorithm yielded approximately 19000 bunker operations performed during 2017 in Port of Singapore. 3779 unique IMO numbers are distributed over 33 ship types. The objective will be reached by applying statistical analysis to AIS data from these operations.
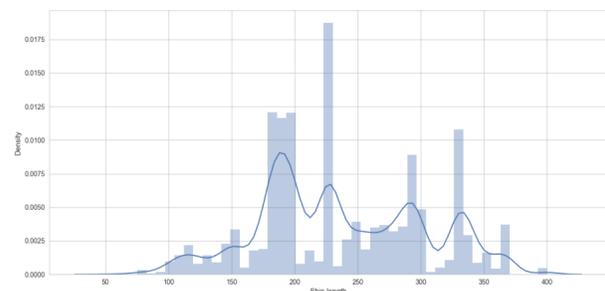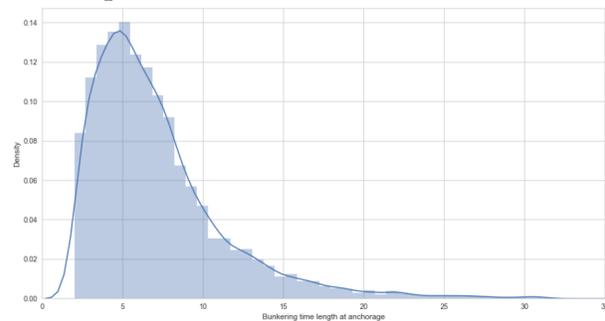
Results and Conclusion

The work with this thesis has led to the establishment of a quantifying index which is protected by confidentiality, and cannot be published at this stage.

Project Partner

The thesis is written in collaboration with DNV GL, represented by Thomas Mestl.

DNV·GL

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