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## **The best of a BAD situation: Optimising an algorithm to match course resolution SAR vessel detections to sparse AIS data**

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### **Abstract**

The detection and classification of SAR imaged vessels at sea is a valuable ability for organisations interested in the marine environment or marine vessels. Matching the SAR detected vessels to their AIS messages allows vessels to be identified and context given to their activities. With sparse AIS data, or other identifying geospatial data, an amount of positional uncertainty is introduced that makes matching more difficult and the difficulty is only increased in high traffic areas such as ports or shipping lanes. Different vessel classes can have different behaviours; cargo and tanker vessels tend to move in the most efficient manner between ports while tugs and fishing vessels move in more haphazard tracks while performing their tasks. Using a single method or algorithm to match these different behaviours to SAR detections would result in sub-optimal matching for all classes. In this paper a general method of matching is described and optimised with tailored weights for each vessel class.