Estimation of Sea Ice Concentration from SAR Images

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ABSTRACT

Recently, the effect of climate change has been that new ship routes through the Arctic ocean has opened, routes that are shorter and faster, and thereby fuel saving which is of great interest. This suggests a significant increase in sea traffic in the formerly ice covered areas. This expected increase in traffic poses a greater demand for accurate mapping of the remaining sea ice, mapping that is today done manually by the various ice services around the world. Moreover, there is a significant interest in the evolution of sea ice coverage and its interaction with the atmosphere from a climatological point of view.

The primary tool for estimation of sea ice is today synthetic aperture radar (SAR) images from various satellite systems. These images allow ice service operators to detect and monitor ice regardless of weather conditions and time of day. The sea ice mapping is done by skilled experts within the field, who based on a combination of texture, intensity and shape are able to produce fairly precise ice charts. The task of such ice mappings is, however, a time and man-power consuming operation, leading to the fact that the increasing demand for sea ice concentration estimates cannot be fulfilled by manual operators in a cost-effective way. Alternatively, automatic or semi-automatic systems for ice estimation could be used.

In this project methods are studied and developed for (semi-)automatic estimation of sea ice type and concentration. This is done, using the recently developed texture-segmentation approach "Learning Dictionaries of Discriminative Image Patches" (Dahl and Larsen, 2011) on scale-space representations of SAR imagery.

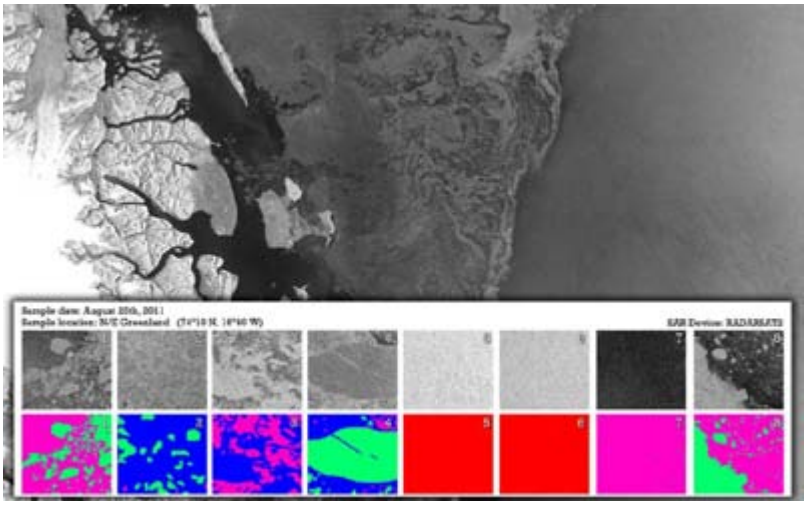

Figure 1: Typical SAR sea-ice image, with segmentation samples overlain.

REFERENCES

Dahl, A. L. and Larsen, R. (2011). *Learning Dictionaries of Discriminative Image Patches*