

Cleaning Outliers Bathymetric Lidar Data Using Machine Learning Techniques: Shom's Feedback

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Cleaning outliers bathymetric lidar data is an extremely complex and tedious task, especially in the navigation safety scope. This is a completely manual task today by Shom hydrographers and operators. This processing is critical to nautical charting but also to give realistic and compliant environmental data assessing the impact of erosion, flooding risk and the effects of climate change on the coast.

In 2021, a Shom-INRIA-IMT Atlantique research cooperation team, developed and tested, directly with senior lidar operators, a method for processing bathymetric lidar data using machine learning techniques. This workflow is based on a relevant description of the data, an innovative structure to be integrated into a classical Random Forest model. A spatial regularization of the predicted point cloud is finally performed with a statistical descriptor based on the MAD (Median Absolute Deviation) distance computation. The objective of the presentation is to present these developments as well as the results on real data acquired by Shom on heterogeneous zones, thus allowing to judge the capacity of generalization of such a method. Emphasis will also be placed on the opinion of the operators to judge the relevance of such a tool in the processes currently used at Shom.

The use of this type of innovative technique will make it possible in the future to improve the processing capacities of the Shom, in a context of increasing amount of data within the framework of navigation safety. The conclusions will also address the remaining developments and the possibilities of using this method for multibeam acoustic echosounders (MBES) in the future.