

Metadata

Title	Detection and tracking of belugas, kayaks and motorized boats in drone video using deep learning
	Abstract
Publication general type	journal article
Project Name	∅
Keyword Vocabulary	Polar Data Catalogue
Keyword Vocabulary URL	https://www.polardata.ca/pdcinput/public/keywordlibrary
Theme	
Version	1.0
Publisher	Drone Systems and Applications
Date Published	2022
DOI	10.1139/juvs-2021-0024
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License Name Other (Open)

Licence Type Open

other-open

Licence Schema Name SPDX

Licence URL <https://spdx.org/licenses>

Awards

Related Resources

Language English

Data and Resources

URL	https://cdnscepub-com.uml.idm.oclc.org/doi/full/10.1139/juvs-2021-0024
Name	Detection and tracking of belugas, kayaks and motorized boats in drone video using deep learning
Description	<p>Aerial imagery surveys are commonly used in marine mammal research to determine population size, distribution and habitat use. Analysis of aerial photos involves hours of manually identifying individuals present in each image and converting raw counts into useable biological statistics. Our research proposes the use of deep learning algorithms to increase the efficiency of the marine mammal research workflow. To test the feasibility of this proposal, the existing YOLOv4 convolutional neural network model was trained to detect belugas, kayaks and motorized boats in oblique drone imagery, collected from a stationary tethered system. Automated computer-based object detection achieved the following precision and recall, respectively, for each class: beluga = 74%/72%; boat = 97%/99%; and kayak = 96%/96%. We then tested the performance of computer vision tracking of belugas and occupied watercraft in drone videos using the DeepSORT tracking algorithm, which achieved a multiple-object tracking accuracy (MOTA) ranging from 37% to 88% and multiple object tracking precision (MOTP) between 63% and 86%. Results from this research indicate that deep learning technology can detect and track features more consistently than human annotators, allowing for larger datasets to be processed within a fraction of the time while avoiding discrepancies introduced by labeling fatigue or multiple human annotators.</p>
Format	PDF
Resource Category	documents

Related Datasets

Title	Churchill Beluga Boat Drone Imagery
URL	https://lwbins-dev.ad.umanitoba.ca/data/dataset/churchill-beluga-boat-drone-imagery