

Shark out of water: Augmenting classification of imagery from caught sharks with machine learning

The incorporation of machine learning (ML) into wildlife monitoring has the potential to revolutionize data collection and conservation initiatives. We outline a human-in-the-loop ML approach for the identification of sharks caught along Tanzanian coasts. The image sources for this monitoring come from marketplaces or landing sites, resulting in a vast range of image quality, the state and poses of sharks, camera angles, and background and foreground clutter. The ML integration aims to augment an existing manual identification process, which is time consuming and requires specialized training. Our strategy includes mapping the current workflow, identifying areas for ML optimization, and adapting existing classifiers to the context and imagery. The proposed approach includes an object detection model that identifies shark objects in images and a hierarchical classifier that classifies shark images down to genus and species level, both using deep learning frameworks. Key challenges include class imbalance, the image variability, and the effective use of multiple views for single specimen identification. A project interest is to integrate the ML approach into the species identification workflow of human experts to determine the degree of automation that is feasible and beneficial. This study provides a step towards combining technological advances with marine conservation efforts to improve data quality and operational efficiency.

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