Revolutionizing Marine Mammal Survival Through Multi-Spectrum Imaging, AI-Powered Detection and Innovative Disentanglement Strategies

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Entanglement is the leading cause of death in marine mammals each year and it is estimated that only 10% of entanglements are detected and reported. Rescuers have been injured and lost their lives during these entanglement removal attempts. The goals of this research were to improve whale and entanglement detection and develop entanglement removal devices. This research successfully identified methods to optimize wavelengths used to enable detection during day/night and clear/turbid water conditions. Filtering and illumination methods were tested for their abilities to enhance whale and entanglement detection in various marine environmental conditions. Additionally, image augmentation was developed to enhance wavelengths, which would improve entanglement and whale detection performance. Field testing demonstrated that depending on the environmental conditions, combinations of visible light, green pass filtering, infrared, ultraviolet and additional variations allowed the highest confidence of entanglement and whale detection. A custom AI model was developed that successfully identified and automated the identification process allowing quantitative analysis of optimization tests. Once researchers find an animal in distress, they must free it, so within this project two separate remote entanglement removal devices were developed to be inherently safe to the animal and operator. Each of these devices was competed against each other for performance and attributes that enabled success were implemented into a final design for the optimal entanglement removal device. Overall, this project demonstrated the ability to enhance entanglement and whale detection, safely remove the entanglements remotely, and reduce the risk to the animal in distress and the human operators.

Awards Won:
Second Award of $2,400