OCEAN INFINITY®

Automated Marine Growth Classification

Segmenting Inspection images to determine marine species extents

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1. KEY PERSONNEL

PRODUCT OWNER
TBD

TECHNICAL LEAD / TEAM
TBD

PROJECT MANAGER
Iris Duranovic

PROJECT SPONSOR
TBD

2. SUMMARY

Current processing workflows for inspection survey data, from an environmental perspective, often includes a lot of manual processing and manual assessments to estimate coverage, thickness, zonation and finally the faunal (and floral) community composition.

Each still image and/ or video sequence is processed manually and assessed by a Benthic Ecologist. Assessments are primally based on estimations, thus subjective. The ROV is equipped with two parallel lasers, which provide a rough scale that aids the assessment.

The analysis of the acquired video data is performed in two steps. In the first step, the data is analysed in real-time from the live video feed and includes documenting zonation and common species. The second step included QC of the first step as well as enumeration of individuals and assessment of percentage coverage and thickness.

3. BUSINESS CASE

This is a highly manual process.

The ratio of collected data compared to processing time is 1 to 4, i.e., every minute of video data takes 4 minutes to manually assess this data. In the most recent project, from which the imagery below is derived, approximately 24 hours of the recorded video was acquired. This data set took all of 400 reporting hours to process and to compile a report. The project involved an inspection of a wind park with all components and subcomponents of the turbines i.e. mooring lines, suction anchors, monopiles etc.

120 hrs/turbine (4 x video speed.)

With OI targeting renewables, and the sheer volume of turbines on the drawing board globally, a system that can automate and standardise this process will be of great benefit in delivering a more accurate and repeatable product at greater speed, with fewer resources.

4. SCOPE

Produce AI model that analyses inspection images, and produces a segmented image for the entire structure, with species type identified.

Differentiate between colonised / not colonised.

Make volumetric assesment by species type.

5. TECHNICAL SOLUTION

TBD

Potential to combine segmented image with 3D model/SLAM derived product to give volumetric assessment.

6. EFFORT

TBD

7. SUCCESS CRITERIA

Automates image segmentation.

Automates species identification.

Integrates with 3D model for volumetric assessment

Final product includes Digital Twin compatible output.

A base case of taxa with enumeration. Ex. How many fishes were observed in/around a structure?

8. RISKS AND MITIGATION

Potentially limited volumes of training data for model.

If model cannot determine actual species but can group similar types for ecologist to identify and label, this would still be a significant benefit.

More TBD

9. BUDGET

TBD

10. COMMENTS

Thickness and coverage will further indicate successions stages of colonising flora and fauna which is comparable to already existing studies and datasets. These datasets can, in turn, be used to model changes over time and to in a more effective and targeted way to plan inspection maintenance.

A function that enables a grouping of structures based on coverage, thickness and species composition would benefit the asset owner as priority order for cleaning/maintenance can be then established and monitored. – Predictive maintenance.