

Maximizing the quality of AI-based seabed object detection

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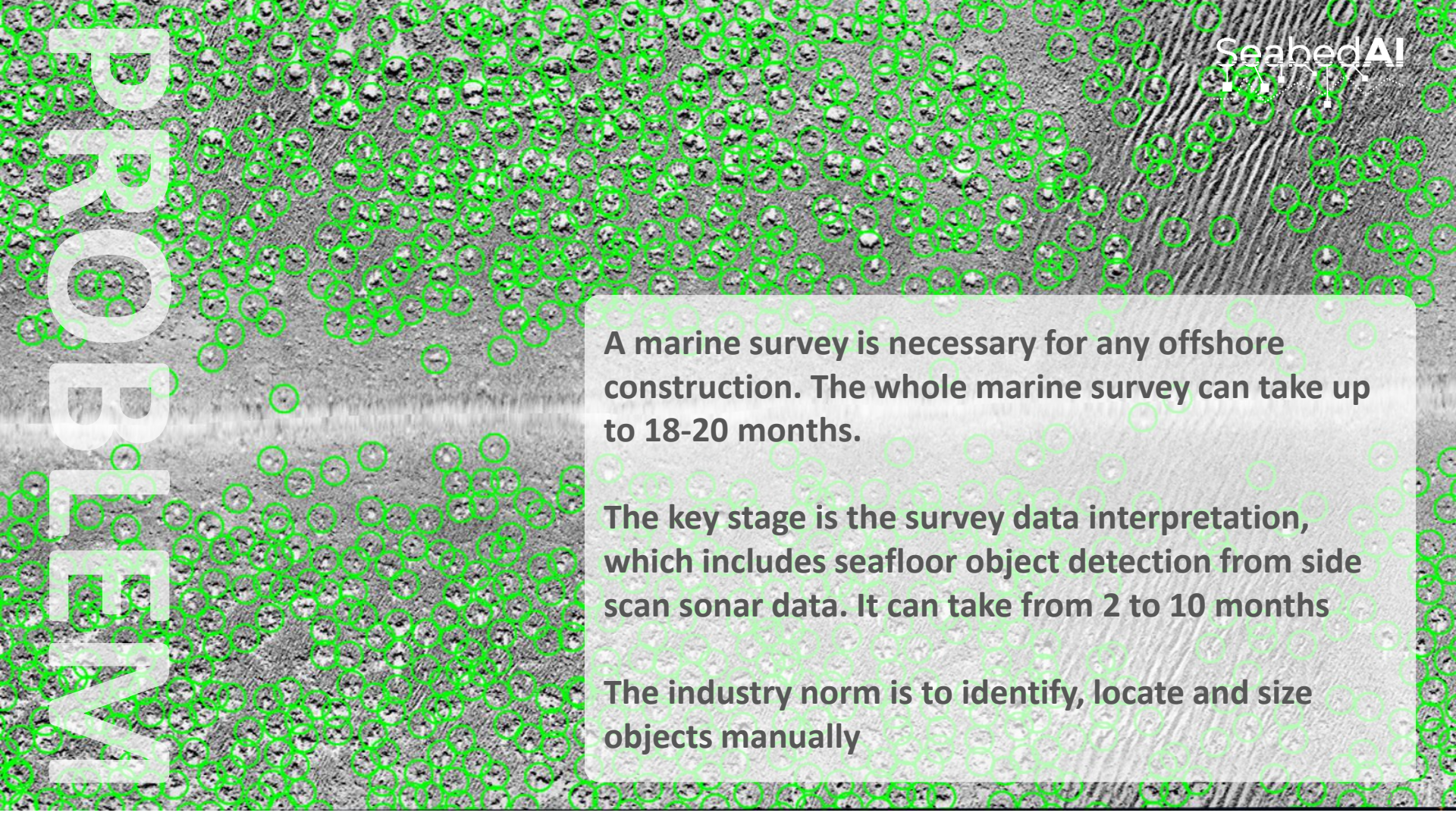
QUESTION

Are you a marine surveyor?

Are you an offshore project operator?

Have you already tested AI technology?

Are you happy with the results?



A marine survey is necessary for any offshore construction. The whole marine survey can take up to 18-20 months.

The key stage is the survey data interpretation, which includes seafloor object detection from side scan sonar data. It can take from 2 to 10 months

The industry norm is to identify, locate and size objects manually

PROBLEM



Geophysicists spend months marking up objects on seafloor mosaics or sonar source files. Some survey routes can contain over 10,000 objects per line-kilometer.

Achieving flawless object detection is highly challenging. Sometimes marine survey reports understate the actual number of seafloor objects threefold.

Inaccurate survey results can significantly disrupt schedules during the object removal phase.

AUTOMATION IS DIFFICULT

1. DATA QUALITY

Sonar fish fluctuations, low resolution etc.

2. DIFFICULT TERRAIN

Rock outcrops, interconnectors, sand ripples etc.

AI IS LIKE A CONSULTANT

Could be a powerful tool if used correctly

SOLUTION

Seabed.AI solution automatically locates and sizes objects on the sea floor using sonar data.

In addition to the core AI engine, Seabed.AI's solution includes a "Swiss army knife" set of tools to maximise the recognition quality for difficult cases, like complex terrain or flaws in raw data.



WORK PROCESS

SOURCE DATA

- Side-scan sonar file types (XTF, JSF)
- Mosaics
- Optional: other data for cross-check (MBES, magnetometer etc.)

PRE-PROCESSING

Own tools:

- Gain correction
- Removal of across-track artefacts
- Producing multiple resized tiles

External tools

1st RUN OF THE AI ENGINE

The results are reviewed and QC'd manually. We tailor the sensitivity of the engine to customer's needs.

ACCURACY IMPROVEMENT

We choose ways to improve the results:

- improve source data by applying new pre-processing methods
- cross-check with other data (mosaics, MBES, magnetometer)
- create an ideal training set for the survey and re-train the engine.

After that, we make as many cycles of review-improvements-engine rerun as needed to get the best possible result.

Each run takes a few hours, irrespective of the data volume.

FINAL RESULT

- Excel with geocoordinates of the objects, their sizes and, if needed, snippets
- Geo-coordinates of boulder fields

POST-PROCESSING

- Filtering the results
- Intelligent merging of the results
- Define boulder fields

RESULT

AI can dramatically reduce the time and costs required to interpret side-scan sonar data, simultaneously increasing its quality.

You can assess the site **hours** - not months - after the sonar files are ready.

**AI DOES NOT REPLACE, BUT
COMPLEMENT MANUAL WORK**

CONSIDERATIONS

1

ACHIEVING 100% ACCURACY BY SOLELY AI OR HUMANS IS HARD

A combination of automation and human supervision is recommended

2

FIRST 80% OF ACCURACY TAKES 20% OF EFFORTS

Each next 5% of accuracy takes twice the effort invested before

3

USE RAW SURVEY DATA

with verified geopositioning
Cross-check against mosaics

4

IF HUMAN EYES CAN'T SEE OBJECTS – THE AI WOULDN'T SEE THEM EITHER

The quality of the source data (scans) is the key.

5

USE DIFFERENT AI SENSITIVITY SETTINGS FOR DIFFERENT PROJECT STAGES

- Precision-focused engine for the “quick” result. You can get it hours after the input data is ready
- Sensitive engine for preparing the final report.

RESULTS ACCURACY

1. Priority to the Recall / Sensitivity scenario: Precision - 71% / Recall - 94.2%
2. Priority to the Precision scenario: Precision - 90.8% / Recall - 84.1%

5 FREE PILOTS WITH MARINE SURVEYORS

Per Norvald Boge, Principal Technology Engineer, DEEPOCEAN

"Seabed.AI results can potentially shorten the contact identification cycle during marine surveys significantly.

We have been positively surprised by the algorithm's ability to identify even small objects and the positive attitude of the Seabed AI team to optimize the solution and data output for the specific project.

The methods and services provided by Seabed.AI is a great option to know of for support in future projects where such detection from Side Scan data will be required."

We welcome
your feedback

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