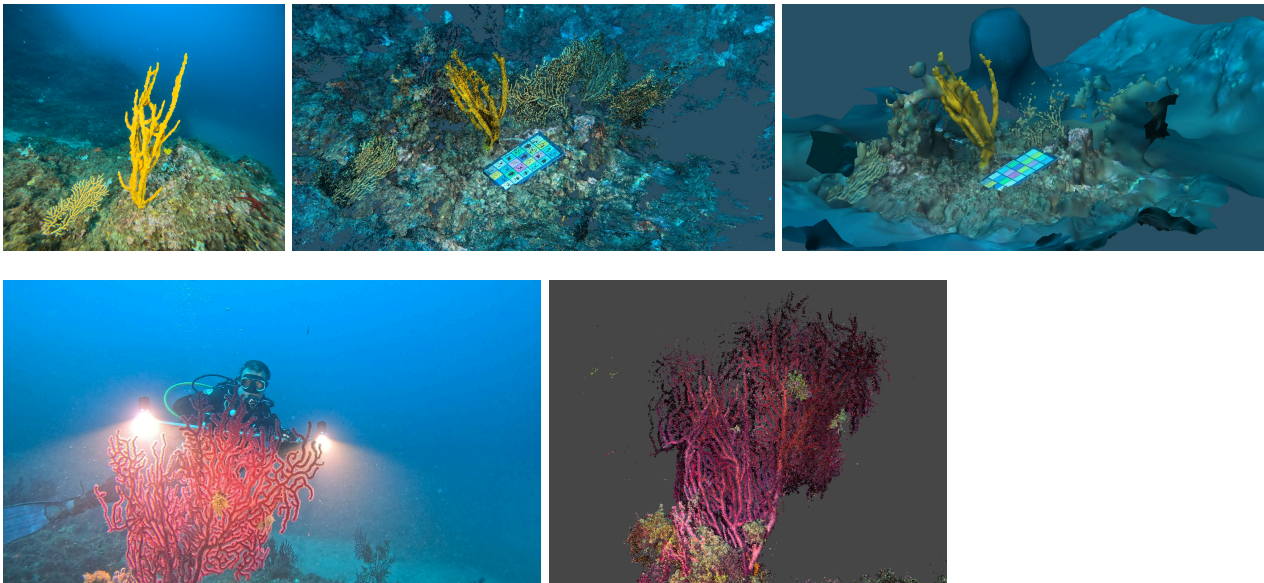


High-Fidelity 3D Meshing from Point Clouds for Marine Habitat Analysis



Photogrammetry provides powerful tools to generate dense, high-resolution 3D reconstructions from images. However, these methods often struggle with natural environments, where fine, complex structures can be smoothed out or merged into unrealistic volumes. For example, branches of underwater sponges (axinellae) or tree-like marine organisms such as gorgonians are frequently oversimplified when converting point clouds into textured meshes. This project explores methods for producing high-fidelity 3D meshes from point clouds of such organisms, with the goal of preserving their intricate geometry.

Students will:

- test and evaluate meshing techniques adapted to fine-scale natural structures,
- develop a processing pipeline to generate geometrically accurate and ecologically usable meshes,
- experiment with 3D ecological analysis tools to assess habitat characteristics: structural complexity, density, refuge volume, and more.

The overarching goal is to provide advanced modelling tools that support marine biodiversity research.

Required skills

- Python
- Curiosity and interest in computer vision, biodiversity, or underwater environments

Additional Information

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