Coral Restoration

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Autonomous Coral Health Monitoring & Restoration

Abstract

In our world today, coral reefs are being damaged and destroyed by Humanity. Coral reefs provide oxygen and are protection for some endangered animals. Scientist are helping to restore and plant coral around the world, using modern technology we can use ROV to restore coral reefs more faster. We could use ROV to plant coral without danger other ocean animals. We chose this project due to the scenario of the 2025 SeaPerch competition and the interest of coral reefs in our team. We expect if we use this method coral reefs will restore and increase to protect the aquatic animals.

Background & Motivation

why did you chose this project?
we chose this project because we all believe that coral reefs have great use to humanity today and the future, we need to protect them and restore to prevent from being extinction.
Utilizing the knowledge we have acquired , to better detect , Arrange detectors around the coal , and put the Planted corals back .We also think this is a great way to develop our ROV for other task. We also think this is a great way to develop

our ROV for other task why is it important ?
we think coral reefs because coral reefs product oxygen for our globe and coral reefs can provide protection for aquartifc animals. If coral reefs are destroy, our oxygen will decrease and some aquartifc animals which rely upon coral reefs might be extinct.
provide general background information to give readers context

coral reefs use a way called photosynthesis to product oxygen for the globe, coral reefs are also homes to clown fish, they use the coral as home and protection from predators .

Acknowledgement

who helped conduct this project ?

We first want to thank all members of our teams and Mr.fu for helping us create and design the ROV, we want to special thank our members who made this poster.

There aren't any organization or individuals you want to recognize.

Results & Discussion:

What did you discover?
Our robot demonstrated outstanding buoyancy and maneuverability, successfully completing tasks such as object retrieval and obstacle - avoidance navigation. The 3D - printed components proved to be highly effective in customized design.
Was there anything that surprised you?
We found that minor design modifications, such as the angle of the propellers, had a significant impact on the robot's performance. These adjustments greatly improved its operational efficiency. What lessons did you learn?
We recognized the importance of repeated testing, teamwork, and adaptability. Collaboration was the key to solving technical problems and optimizing the design.

Next step

What are the future plans for your project?
We plan to enhance the robot's functionality by integrating advanced sensors and an autonomous navigation system. Additionally, we intend to explore its applications in environmental monitoring and underwater exploration.
What questions have emerged from this project that you want to explore next?
- How can we improve the robot's autonomy when performing complex tasks?
- What are the potential applications of this technology in marine conservation?
- How can we make the design more cost - effective and easier to implement to meet educational needs?

Methodology

How did you carry out this project? And what were the reasons?
Initially, we delved into the principles of buoyancy, propulsion, and underwater navigation. We designed a lightweight and durable robot using PVC pipes as the framework and 3D - printed components as customized parts. We opted for this approach because of its cost - effectiveness, easy accessibility of materials, and high adaptability.
Did your approach change over time?
Yes, based on test results and feedback, our initial design underwent several iterative improvements. For instance, we adjusted the positions of the motors and propellers to enhance the robot's stability and added waterproof measures to safeguard the electronic components.
What materials did you use?
- PVC pipes and fittings for the framework.
- 3D - printed components for customized mounts and connectors.
- Waterproof motors and propellers for propulsion.
- A control system, including a remote controller and sensors.

Conclusion.

Summarize the goals and outcomes of your project.
Our goal was to create a well - functioning underwater robot for the Seaperch Competition. The results indicated that our design was highly effective in performing the required tasks, and we achieved our set objectives through innovation and teamwork.
How did this project impact you personally? And what about its impact on your community?
This project deepened our understanding of marine robotics and inspired us to pursue further studies in this field. Simultaneously, it increased our community's awareness of the potential of underwater technology in addressing environmental and industrial challenges.