Life Beneath the Waters: Design, Construction, and Testing of a Remotely Operated Underwater Vehicle for Visual Monitoring and Health Identification of Corals

A Project Study Report

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ABSTRACT

This study aimed to design, construct, and test an Underwater Remotely Operated Vehicle (ROV) for visual monitoring and heath identification of corals. The purpose of this study was to give researchers an opportunity to conduct their studies in a safe, efficient, and cost effective way through visual monitoring of the marine ecosystems that could help marine managing authorities address current and emerging science and management needs.

The system consisted of a topside control where the control box, laptop, and battery were located. Five underwater thrusters were installed on the device to allow its maneuver underwater and an endoscopic camera was used to visually monitor the underwater environment. The device is composed of a control system to control the ROV movement, lights, and system power; a monitoring system to access real time video from the camera; and a coral health identification system to identify and label healthy, bleached, and dead corals in real time. Captured images and recorded videos will be stored in the system storage. Multiple tests were performed to check the performance of the device in terms of functionality, efficiency, and operational time. Results proved the device to be fully functional. The efficiency test results yielded 80% for the coral detection and 87.5% for the coral health identification which could be further improved through upgrading both the camera and the data set in the training stage of the model. The system delivered an operational time of 2 hours and 45 minutes during standard use case scenario.

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