

The Possibility Of Underwater Robots In Marine Development

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Background

In marine development, it is said that only about 10% of the ocean has been studied so far. In this research, we focused on developing underwater robots, which are indispensable for advancing ocean development. As per previous research, MONAKA of Tokyo University and SHINKAI6500 of JAMSTEC were used as references. We will verify what is necessary to manufacture a robot with higher work efficiency by conducting experiments obtained from previous research and using an underwater robot.

Theme

A common feature of the two previous research robots is that they are equipped with many sensors, sonars, and cameras making them suitable for numerical research activities. On the other hand, the robots are constructed unsuitable for a wide variety of physical tasks undersea. SHINKAI6500 is equipped with a sample basket and manipulators, both small compared to the main body.

Therefore, in order to promote ocean development and marine resource development, we should also develop robots that are more suitable for physical work.

Method

1 Using “TinkerCad” , a 3D CAD software, and a 3D printer, I created two small and large manipulators. A large one is 1.5 times larger than a small one.

2 When mounting large and small manipulators on an underwater robot, we tried three different mounting methods (A, B, and C)

Result

No significant change in balance was observed for A, B, and C in small ones.

There was no change in balance in A and B but in C the robot tilted forward and became uncontrollable.

Discussion

The result of the experiment shows that small manipulators have less impact on the balance of the robot than large manipulators and are more practical. On the other hand, we found that large manipulators have the advantage of a longer reach. For this reason, in order to improve the efficiency of work with a large manipulator, it is necessary to respond to changes in the balance due to the manipulators. As one of the methods, we propose a “mobile ballast” that moves the movable ballast to a position where the center of gravity is maintained according to the movement of the manipulators.

Keywords: Underwater robots, Manipulators, Marine resource development, 3D CAD, 3D printer

