Fishing Support System

-Replacing the bait into a fishing hook automatically-

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Abstract

The current fishing population is getting small. As one of the causes, it is conceivable that 20s and 30s of young people are away from fishing due to overuse smartphones. In addition, there are a lot of people who are not good at touching bait and caught fish. In this research, we developed a system replacing the bait into a fishing hook without touching bait in order to reduce the burden on such people. This system requires only one hand not only for people do not have one arm or the disabled, but for women and children who are not good at touching bait. I hope that this system will increase the fishing population in Japan.

Keywords: fishing, bait, fishing hock, motor.

1. Introduction

The current fishing population is getting small. It is estimated that the fishing population in 2011 is 9.3 million people and it is reduced by half, compared with 20.2 million in 1998 which was the highest ever. Some causes are shown that the law on the prevention of damage on ecosystems by specified alien species, which came into force in 2005, the black bass of popular target games of game fishing was identified, the port facilities prohibited from entering the area due to terrorism countermeasures, the price of fishing boats increased due to the high oil price etc. The most influential thing is that it is conceivable that 20s and 30s of young people are away from fishing due to overuse smartphones. In addition, there are a lot of people who are not good at touching bait and caught a fish. A lot of women who are not good at touching the fish, the trend of female participation rate such as fishing, picnic, and climbing etc. is shown in Fig.1, but we can say that there is

hardly change in the past 10 years. Furthermore, the fishing population increased in 2006 with bass fishing boom, but it has been decreasing year by year after that. It is shown in Fig.2.

Therefore, we proposed the "Fishing Support System: Hereinafter referred to as FSS) " as a method of supporting fishing so that the fishing population will increase in the future by this system. This system can help replace bait into a fishing hook automatically.

Fig. 1. Participation rate of women's fishing, picnic, and climbing etc.

Fig. 2. Changes in the fishing population

Fig. 3. Overall system diagram

Fig. 4. Explanation of the disk with a hole (top view)

Fig. 5. Explanation of the disk with a hole (side view)

2. Structure

2.1 The entire structure

The general view of the system is shown in Fig.3, and Fig.6 shows the structure of FSS. This system operates from ten steps.

- ① Bait is pinned to the hole of the disk with a hole.
- ② When inserting a fishing hook, it sticks to the magnet.
- ③ A user ensures that the magnet is fixed to a fishing hook and press the button.
- ④ The disk with a hole rotates and falls the bait.
- ⑤ Rotate the DC motor until the switch (1) detects a fishing hook, and fix a fishing hook and the bait.
- ⑥ After fixing, reverse the DC motor a little.
- ⑦ Move the servo motor (2) until the switch (2) hits the bait, and fix the bait.
- ⑧ A user pulls up a fishing hook, and the bait sticks to a fishing hook.
- ⑨ Separate the switch (2) from the bait about 5 seconds later.
- ⑩ Reverse the DC motor, and a user pulls up a fishing hook with the bait.

These operations are controlled by the arduino MEGA using a DC motor and two servo motors.

Fig. 6. Structure of FSS

2.2 The direction of a fishing hook

This system needs to insert a fishing hook in the certain direction, so decide the direction of a fishing hook. As shown in Fig.7, a fishing hook inserts that the tip of it turns toward to the DC motor. So you will be able to attach the bait smoothly.

2.3 Taking out the bait

As shown in Fig.4 and 5, the disk with the hole adhere to the servo motor (1), which is a device to rotate the disk with the hole. Put in the bait one by one, and use the dumpling-shaped bait about 15 mm. As shown in Fig.5, rotate the servo motor (1) by 90 degrees. Then the disk with the hole rotates in the direction of the arrow and the bait falls.

Fig. 7. Operation explanation 1

Fig. 9. Operation explanation 3

Fig. 8. Operation explanation 2

2.4 Fixing the needle

As shown in Fig.6, the DC motor is connected on the left side. It is necessary to fix a fishing hook in order to fix the bait to a fishing hook, and fix it by using the DC motor. When a user inserts a fishing hook as shown in Fig.7, a fishing hook sticks to the magnet and it is fixed on the spot. Next, ensure that the magnet is fixed to a fishing hook and press the button. When pressed the button, the bait falls from the disk with a hole. As shown in Fig.7, rotate the DC motor in the direction of the arrow until the switch (1) detects a fishing hook, fix a fishing hook and the bait. But a fishing hook is pushed too much, reverse the DC motor a little.

2.5 Fixing the bait

After fixing a fishing hook, the bait is fixed by using the servo motor (2). The switch (2) is attached to the action part of the servo motor (2). Move the servo motor (2) until the switch (2) detects the bait. When the switch (2) detects the bait, keep for 5 seconds. A user pulls up a fishing hook during that time. And the bait sticks to a fishing hook. Separate the switch (2) from the bait for about 5 seconds, and reverse the DC motor. Then a user pulls up a fishing hook with the bait. After that, a user pulls up the fishing line with the bait, a series of operations of the system is completed.

3. Experiment

We checked four operations.

- (1) Take out the bait.
- (2) Fix a fishing hook.
- (3) Fix the bait.
- (4) Replace the bait.

These items were examined.

3.1 Taking out the bait

In Fig.4 and 5, we experimented on whether the bait falls from the disk with a hole or not. The arduino MEGA was connected with the servo motor (1) and the bait properly fell from the hole.

3.2 Fixing a fishing hook

In Fig.7, we experimented that rotate the DC motor until the switch (1) detects a fishing hook and fix a fishing hook. The arduino MEGA was connected with motor driver and worked successfully.

3.3 Fixing the bait

In Fig.8, we experimented to move the servo motor (2) until the switch (2) hits the bait, and fix the bait. Similarly, the arduino MEGA was connected with the servo motor (1) and worked successfully.

3.4 Replacing the bait

In Fig.9, we confirmed that a user pulls up a fishing hook with the bait after the bait was fixed.

3.5 System operation check

Section 3.1 to 3.4 were tested for each item, and the system worked successfully.

4. Conclusions

In this study, we developed a system that the bait stuck to a fishing hook with one hand without touching the bait. As a result, you can go fishing safely even for people who have only one arm, or women. This system is extremely delicate because its hooks are small and easy to move. And it is necessary to experiment with various baits because size of the attached bait is not constant.

In the future, we would like to proceed with the research from fixing the bait to the fishing hook to taking fish away from the hook, so that a series of fishing operations can be performed with this system.

References

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