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Cooperative Fishing Boat Robots Model for Extreme Worker

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Abstract

According to the Korea Robotics Industry Association, the number of robots companies, sales and production are steadily increasing until 2016, and the global robot market outlook is expected to continue to increase until 2025. We need to develop more attention to robots that can make life easier for us and can replace human tasks that we cannot do. It is predicted that robots will be more developed in the future with the above statistics, and future robots will be more activated by robots that can depend on each other, fix each other, and adapt to the changing environment without humans. Therefore, the shape of the robots in the future will be developed as a group robot(swarmbot) that cooperate with each other while the robot works. These robots have been studied for a longtime, but there are only two community robots that are applied in real life, only two of which are jailbreaking robots made in KAIST and KIVA robots made in Amazon company. In the future, as these robots develop more and more, and environment where robots can live without human intervention is created, so that a plurality of robots can collaborate and do individual work.

Keywords: *Swarmbot, Fishing Boat Robots, MQTT Structure.*

1. Introduction

In recent years, as arguments and interest about the transition from the third industrial revolution to the fourth industrial revolution grows, the robots industry, which is part of the 4th industrial revolution, has also made a lot of progress. Currently, robots are being used in various fields, as Machine-Learning robots that learn themselves and AlphaGo which played Baduk with Lee Sedol are seen around us, in the future, robots will be more developed and the robots will be dependent on each other. Looking at the opening ceremony and closing ceremony of the PyeongChang Olympic Games, several drondes form a single form, and the appearance of the pentagram is animated around the world, and the robots cooperating with each other have become issues. A group robot, which is called as a swarmbot, has the advantage of being able to deal with a lot of difficulties which one robot cannot do but deal with those tasks with many robots in a short time. Several robots collaborate together to exploit the terrain where is hard to accessed by humans, or they can carry heavy objects together. For Jailbreaking robots developed by Kaist, several robots hold the mesh to catch the jellyfish and release deeply into the sea which is difficult to do by humans, and that tells us swarmbots are being well used in real life. This paper proposes a model that, the rest of the robots gather

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around the main robots, which is a part of many group robots that will be introduced in the future, will help fishermen, one of the ultimate occupations, to reduce the number of deaths about 300 people by marine accidents every year.

2. Method of Communication

2.1 MQTT Structure

Mqtt stands for Message Queuing Telemetry Transport, and is and optimized messaging protocol for mobile devices and low-bandwidth small devices. It is designed to reliably deliver messages over low-quality and slow networks, and uses fewer resources in many aspects of the protocol, especially focusing on lower power consumption. The smallest message can be up to 2byte, and you can view data in multiple devices by taking the Publish type which is sending data and the Subscribe type which is subscribing to data. Also, you can specify the number of times that a message can be received while providing three levels of reliability, called Quality of Service(QoS). It was developed by IBM and standardized by the private standardization organization called OASIS. If you have a subject called Topic and send the data to the Broker, which is a bridge between the Publisher and the subject, you can see data that matches the subject if several subscribers have the same subject. To use MQTT, you need a server called a message broker. The message broker acts as an intermediary between Publish to send messages and Subscribe to receive messages. There are several programs used by this broker to handle actual packet transmissions, such as ActiveMQ, Apollo, IBM MessageSight, JoramMQ, Mosquitto, RabbitMQ, and Solace. This paper uses Mosquitto, and Mosquitto is an open source project based on the Eclipse IOT project. It is a free broer program written in C, C++ and Python.

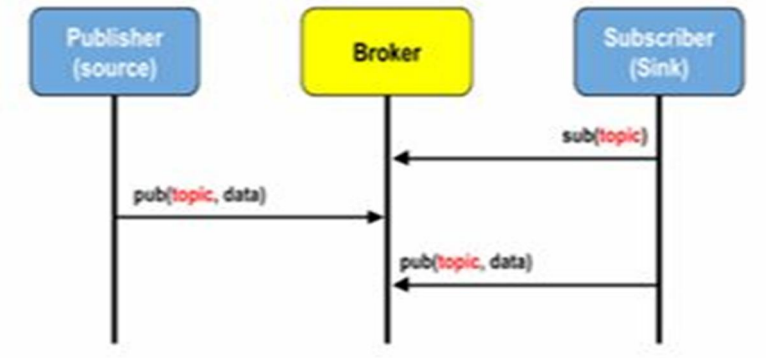

Figure 1. MQTT Structure

2.2 Node MCU

This Device was made up Communication. The ESP8266 is a low-cost WiFi SoC designed by a Chinese company called Espressif Systems. The ESP8266 module is divided into two types:'Use it as an adapter' when using Wi-Fi only and connecting it to another micro-controller, and 'Use it as a controller' when using it as a micro-controller with the capacity of Wi-Fi communication. If you use the ESP8266 module as a controller, you do not need an additional controller, but you must create and upload firmware for the ESP8266 module. ESP8266 SoC-based boards(modules) are now sold in a variety of formats and have the

advantage of being cheap. The ESP8266 board uses the ESP8266 module as a controller, and it can use digital pins, enabling the use of Wi-Fi communications and other roles. The development environment can be connected to many other boards, that is, it can be used by serial communication, and it also can be used independently. In the case of independent use, it also works with Arduino IDE and Lua-based scripts or MicroPython-based Script commands. There are various kinds of boards, such as Nodemcu, Wemos D1R2 and Wemos mini, and they have chips of ESP-XX type. In the case of the ESP8266, which is present in this type of board, it is usually a board with the ESP-12 series module.

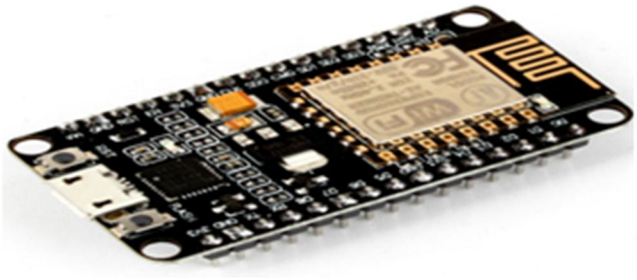

Figure 2. Node MCU

3. Model Proposal

Since the camera is mounted on the main fishing boat, it can confirm the world coordinates of the sub-fishing vessels in real time and publish them to the fishing vessels, and the sub-fishing vessels can know their position while subscribing the world coordinates. If you click on the autonomous navigation button on the web server created with python flask, each fishing boat will make autonomous navigation. If you push the collect command button, the positions are calculated from the world coordinates received by the sub-fishing boat through the camera and assembled around the main fishing boat. Also, sub-fishing vessels are also configured to allow multiple sub-robots to catch a fish with a net, and it can send information to the main fishing boats by publishing the information by attaching sensors to explore the deep sea area. It can move the main fishing boat and sub-fishing boats remotely at the same time by inserting the go, left, right and back buttons, and big data can be collected through sensors of sub-fishing boats.

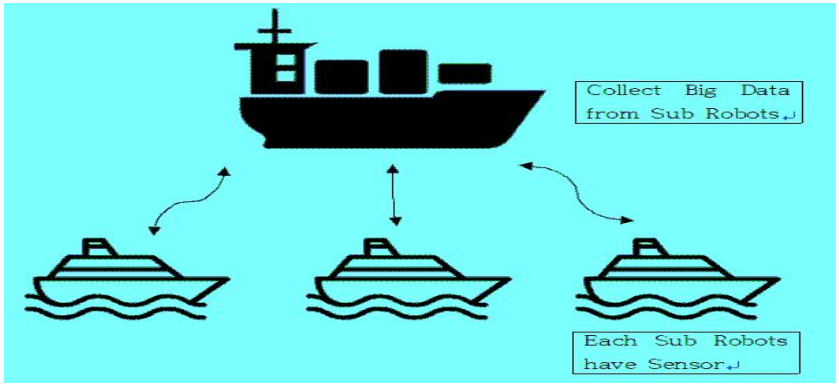

Figure 3. Cooperative Fishing Boat Robots Component

Next, Figure 4 was using Python Flask. Python Flask provides simple functions to develop web servers simply. Building a web server with Python is a great advantage, and this means that even beginners can easily touch and create.

Figure 4. Web Server using Python Flask

4. Conclusion

As the interest in the 4th Industrial Revolution increases and robots become more developed, as more and more robots learn themselves, robots will become more intelligent in the future, and will not depend on humans but will depend on robots. As a result of this development, this paper proposes a model that cooperates with each other without human intervention. You will be able to navigate and explore the dangerous places through the autonomous fishing boat robots where the general fishing boats are difficult to reach, and it can contribute to reducing marine accidents of fishermen, which is one of the extreme occupations.

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