Design and Implementation of Biomimetic Fish-Robot Control System based on Underwater Acoustic Communication

Nam-Yeol Yun [1], Seung-Won Shin [1], Sardorbek Muminov [1], Soo-Hyun Park [1]
Jun-Ho Jeon [2], Tae-Hee Won [2], Chang-Gi Hong [2], Sung-Joon Park [2], Chang-Hwa Kim [2]
Gi-Hun Yang [3], Hyeun-Seok Choi [3], Young-Sun Ryuh [3]

[1] Ubiquitous System Lab., Graduate School of BIT, Kookmin University
[2] Underwater Sensor Network System Research Center, Gangneung-Wonju National University
[3] Underwater Robot Center, Korea Institute of Industrial Technology

{anuice, pubssw02, smuminov, shpark21}@kookmin.ac.kr
musician1222@nate.com, tieits@nate.com, hongs_idea@hanmail.net, psj@ieee.org, kch@gwnu.ac.kr
{yanggh, hchoi, ysryuh}@kitech.re.kr

Introduction

In our paper [1], we designed a control system which is an interrupt driven mechanism for biomimetic fish-robot control system based on underwater acoustic communication. In above mentioned paper, we have implemented and demonstrated fish-robot control system using acoustic communication in underwater environment. We developed an interrupt driven mechanism for control system.

In the experimental tests we used a fish-robot equipped with an underwater modem and MAC base-board. The MAC base-board links a biomimetic fish-robot to an underwater modem. For the physical interface between MAC base-board and underwater modem, there is SPI (Serial Peripheral Interface) used.

The Demonstration

In the demonstration[1], we are going to show how to control the biomimetic fish-robot by interrupt driven control system as shown in figure 1.

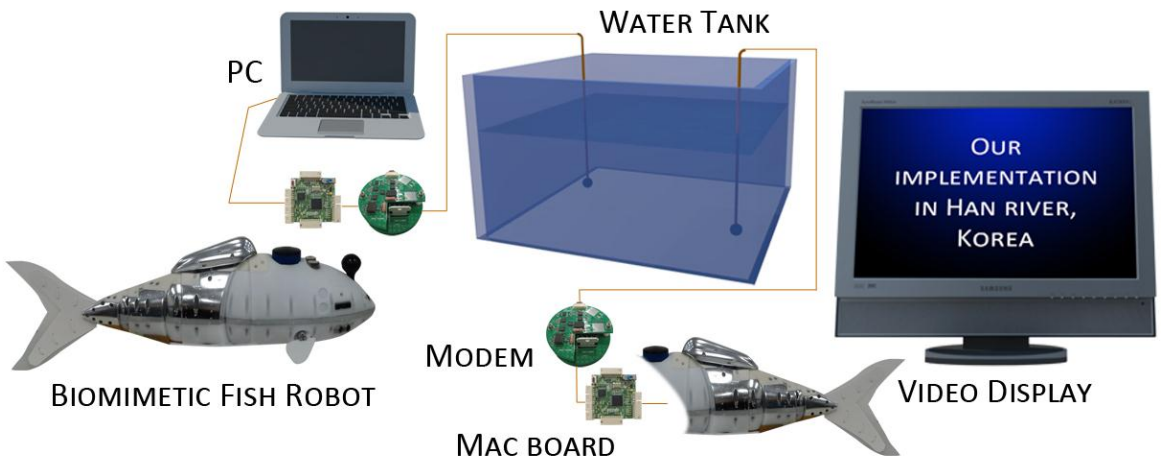

Figure.1 Demonstration of Biomimetic Fish-Robot Control System based on Underwater Acoustic Communication

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In this demonstration, we are going to introduce our idea of controlling biomimetic fish-robot by interrupt driven control system and show how we control fish-robot using underwater acoustic communication. We will also present our implementation which illustrates on monitor how the fish-robot was controlled by showing the recorded video in past. The key ideas of the demonstration and the architecture of the control system will also be explained during the demonstration. Our control system consists of a fish-robot equipped with underwater modem and MAC base-board, PC equipped with transmitter modem and MAC base-board. And both of MAC base-boards are attached to PC and fish robot via RS-232C interface. We use simplex communication which means the communication that occurs in one direction only, in our case from PC to fish robot.

Demonstration Requirements

- ✓ The demonstration requires the following equipment (which we provide)

Quantity	Part
4	Underwater Modem Board
4	±14.8V Battery
1	Monitor
1	USB connectors for implementation
4	MAC base-board
2	Omni-directional Transducer
1	5 port power connector
2	Laptop computer
1	80 centimeters long plastic container
2	Biomimetic Fish-Robot

- ✓ The demonstration requires the following equipment (which we need)

Our demonstration requires a demonstration table (70 cm X 180 cm), nearby having access to a power outlet, and to a water hose to fill the plastic container with water.

Quantity	Part
1	Demonstration table (70 Cm X 180 Cm)
1	Water hose

Reference

[1] Nam-Yeol Yun, Seung-Won Shin, Sardorbek Muminov, Soo-Hyun Park, Jun-Ho Jeon, Tae-Hee Won, Chang-Gi Hong, Sung-Joon Park, Chang-Hwa Kim, Gi-Hun Yang, Hyeun-Seok Choi, and Young-Sun Ryuh, "Interrupt driven mechanism for biomimetic fish-robot control system based on underwater acoustic communication," The Sixth International Workshop on UnderWater Networks (WUWNet 2011), December 2011.