2011 11th IEEE International Conference on Advanced Learning Technologies

Design of a Long-Distance-Controlled Robot System for Distance Education

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Abstract

This paper described the design of a new Long-Distance-Controlled Robot (LDCR) System for distance education.

Distance education is a teaching method with the aim of delivering teaching to students who are not physically present in a traditional educational setting such as a classroom. It is difficult to keep student's motivation for learning though an educational technique that uses various technologies is designed for the distance education. Therefore, the new LDCR system was designed as one method of keeping student's motivation for learning.

In our designed LDCR system, the students operate the robots on one physical site via the Internet. Because it is possible to play a game as two or more students in the LDCR system, the student will be able to be exchanged mutually.

In this paper, the outline of LDCR system that we designed for distance education is explained.

1. Introduction

Distance education is a field of education that focuses on teaching methods and technology with the aim of delivering teaching, often on an individual basis, to students who are not physically present in a traditional educational setting such as a classroom. [1]

To help overcome barriers that hinder the education of isolated and overseas students, Brisbane School of Distance Education implemented a learning management system and created a successful cyber community for students, tutors and carers. [2] However, it is difficult to keep student's motivation for learning though an educational technique that uses various technologies is designed in distance education. There seems to be a problem that the student lose interest in tired so that the teacher and the student may often study by the one to one using the Internet. To solve this problem, we thought that it was important to introduce an activity different from current study, and to urge the student's exchange.

Up to now, we have developed the Long-Distance-Controlled Robot (LDCR) system for international exchange of the student in Japan.[3] We had already held the international exchange between Singapore Polytechnic and Kanazawa Technical College students. by the LDCR system, and clarified the effectiveness in the international exchange. [4]

In this paper, the problem of the LDCR system that has already developed for international exchange is explained first. Next, an outline of a new LDCR system that redesigns for distance education is described.

2. Problem of LDCR system for international exchange

Figure 1 is an outline of the LDCR system for international exchange. Students at a different school access the Linux server from the Internet and operate the robot in the field. To feel the presence of the pitch in each school, the Web camera that can be remotely controlled from a browser is installed. The image of this camera is projected onto a large-scale screen in each classroom. The motor and the controller of the robots for the drive used goods on the market (ROBOCUBE). [5]

The condition of the robot system for Distance Education is shown as follows.

- The system must be comparatively inexpensive.
- The system must be easily securable.
- The operation of the robot must be easy.

It was difficult to introduce the robot in an overseas school because ROBOCUBE that made in Japan did not obtain easily in foreign countries and was high-priced.

978-0-7695-4346-8/11 $26.00 © 2011 IEEE
DOI 10.1109/ICALT.2011.62

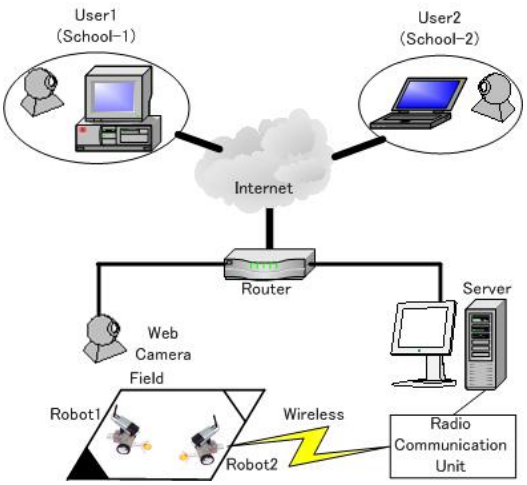

Figure1 Outline of the LDCR system for international exchange.

3. Redesigned LDCR system for distance education

LEGO is popular all over the world as the educational robot. If the LDCR system can be constructed with LEGO Mindstorms NXT (LEGO NXT), schools of distance education can be activated more. In this research, the robot is changed from ROBOCUBE to LEGO NXT that has generality, and new LDCR system is constructed.

Because the user of the robot was a school child, the robot of a simple car type decided to be produced to operate it easily. Figure 2 shows the robot made for trial purposes. The robot is composed of NXT Intelligent Brick and two motors, and it has two driving tires and one supplementary tire.

Figure 2 Configuration of new robot for elementary school students.

Figure 3 shows the composition of a new LDCR system for distance education. The students in home or the hospital operate the mouse of the client PC, and can move the robot in the school freely. The running course of the robot was contrived so that the students might enjoy it. We made the running course and the field of the robot. The course is composed of some elements, and the inclination, the stairs, and the ruggedness, etc. are made in each element. Because various courses are made from changing how to put elements, students will be able to enjoy it.

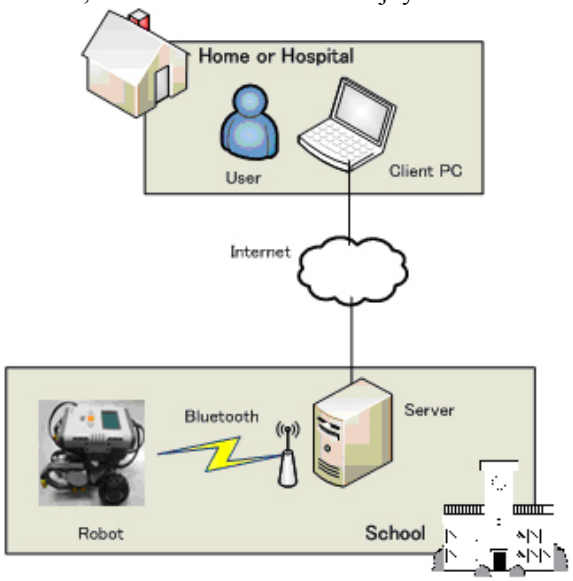

Figure 3 Outline of new LDCR system for distance education.

4. Conclusions

The problem of the LDCR system for international exchange and the outline of redesigned LDCR system for distance education were described.

In the near future, students will confirm the effectiveness by using a new LDCR system in Brisbane School of Distance Education.

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