A Preliminary Study of an Indoor Guidance System using Fluorescent Lights

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1 Introduction

Fluorescent light has been used in an indoor guidance system. In 2003, Yamanouchi et. al. presented a method which uses fluorescent light, wireless LAN, and control equipment to complete a stand alone indoor guidance system [1]. In this system, each fluorescent repeatedly transmits a signal giving positional information such as longitude and latitude.

On the basis of Yamanouchi's research, we expanded the system for network use. Here the system uses wireless LAN to communicate with another server directly, rather than communicating with the control equipment. Also the server can now send guidance data to each fluorescent light, as a transmitter, in real time. Thus it becomes possible to control all the data that are transmitted through the fluorescent lights into the network.

2 Method

2.1 System configuration

Figure 1 shows the configuration of the developed system. The system was divided into two sections. In the upper section, transmission data are output through fluorescent lights. In the lower section a user is able to receive guidance information via a personal computer (pc). The data are then updated by the guidance server.

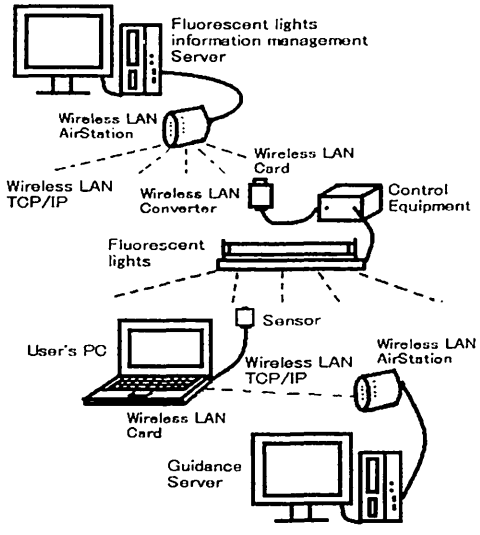

Figure 1 System configuration

2.2 Guidance method

The management server sends position related information to the fluorescent lights using the wireless LAN. Then the user receives the information via a sensor and the user's PCs are connected to the guidance server. Figure 2 and 3 show the communication method.

3 Result

The functionality of the system using 3 fluorescent lights has been confirmed in an experiment on the 8th floor of the Information Engineering building in Niigata University. The results are given below.

(1) Position data were transferred to the sensor correctly when the user walked under the fluorescent lights at a speed of 1 m/sec.

(2) When the user received the position related data correctly, he/she could communicate with the guidance server. The user received the information as shown in Figure 4.

(3) In the guidance server, the program used software ArcGIS8.3 (ESRI) to show the position and the route.

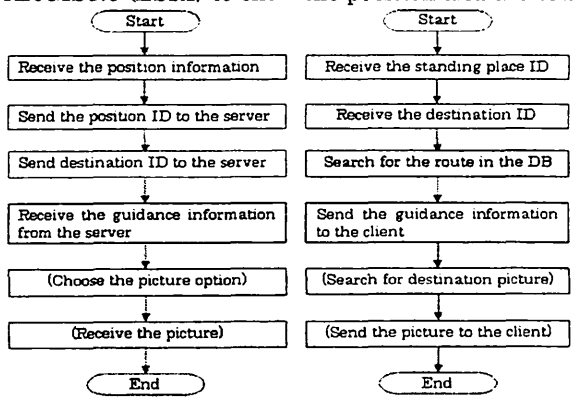

Figure 2 User terminal part Figure 3 DB server part

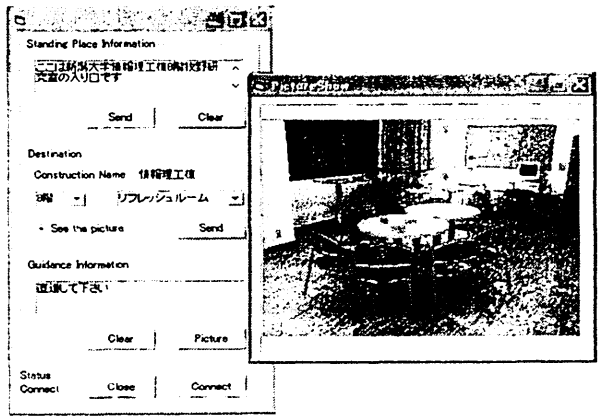

Figure 4 The result of the experiment

4 Discussion

The functionality of an indoor guidance system using fluorescent lights and wireless LAN has been established.

In the experiment, it was possible to communicate between the user and the database server interactively via the fluorescent lights and a wireless LAN.

In the guidance server section, GIS software was helpful enabling us find the user's position, destination and the route, directly.

In future, I will focus on network management in a situation with more users and more fluorescent lights. Also, the relationship between the data transmission speed and the user's moving speed will be considered.

Acknowledgment

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Reference

[1] H. Yamanouchi, H. Makino et. al., Basic research for indoor position management system by distribute processing, Proc. 13th conf. of IEEJ Niigata branch, 2003