Design of New Electronic Blackboard Management System for A Japanese teaching style

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Abstract: In this paper, we describe the new electronic blackboard management system design for A Japanese teaching style. This system is using IC-tags and networks. Handwriting data which written on electronic blackboard is tagged by using IC-tags automatically and data is sending to the management server. In Japan, teachers move the classroom at the class. Thus, teachers 'handwritten data is saved without division in a usual electronic blackboard. In this case, it is necessary to search out handwriting data at only the file name and the written date. Therefore, it is difficult to use handwriting data. The other side, someone understands easily the person who wrote the handwriting data in our designed system, because the system tags handwriting data automatically using IC-tags. Moreover, saved handwriting data can be used from any classroom, because the system unitary manages handwriting data by using networks.

Keywords: Electronic Blackboard, Pen-based Interface, IC-tag, Classroom Design

1. Introduction

A computer is used for the various places, and it is used for education now. The blackboard demonstration begins to be computerized with an electronic board, too. In late years in Japan, the introduction of the electronic blackboard begins slowly in the elementary and junior high school. However, many of current electronic blackboard systems are aimed for the use in the meeting in the company. Therefore it is difficult to use these systems by a class in a classroom. Some experimental classes such as Classroom 2000 [1] has held, but electronic blackboard system is not using at usual classes.

The general electronic blackboard system is small in comparison with the former blackboard physically. In addition, the design of the current electronic blackboard system has the problem that does not match Japanese education-style. As for many of classes-style such as U.S.A. and Europe, a student gathers in the classroom where a teacher is. Because a teacher is in the same classroom, the teacher is for exclusive use and can use the electronic blackboard system. A teacher does not confound the blackboard demonstration data that the teacher recorded in an electronic blackboard system with data of other teachers. Accordingly the data reduction is simple. The introduction of the electronic blackboard system in the U.K. really advances [2]. In the Japanese classroom, the teacher moves a classroom. Therefore the electronic blackboard system in the classroom is shared with plural teachers. The digitization of blackboard demonstration data is possible, but the data is incomprehensible because the data of plural teachers coexist which teacher wrote it. We describe design of a new electronic blackboard management system that utilized an IC tag and a network in order to solve a problem to be difficult in this paper.

2. Design and prototyping of new electronic blackboard management system

2.1 System overview

Fig. 1 shows constitution of a system. A system is made from 3 components; an electronic blackboard component, a management handwritten data component, data view client component. An electronic blackboard component consists of electronic blackboard unit control part and handwriting software part. Electronic blackboard unit control part detects electronic styles position and a kind and transmits to OS (Operating system) or handwriting software part as a blackboard device driver. Handwriting software part is draw on electronic blackboard surface by stylus kind and position which is transmitted by electronic blackboard component. This part reads writer's ID card, and then attaches this information and blackboard identifier to the handwriting data and transmits this attached data to a management handwritten data component. A management handwritten data component receives handwritten data from electronic blackboard components, and stores it to database. And a data view client component outputs handwritten data, which is stored in a management handwritten data component database.

2.2 System prototyping

I install two electronic blackboard units in the classroom (Fig.2). These electronic blackboard units are installed side by side for same size of current blackboard. It is four kinds of electronic styluses and an electronic eraser for change color shifting it. This prototyping system uses StarBoard F-75 made by Hitachi Software Engineering as electronic blackboard unit. Both electronic blackboards are connected to one PC with USB-serial port converters. In addition, DualHead2Go of Matrox company is used for outputting two screens from one PC to project two electronic blackboards surface.

Software for an electronic blackboard obtains the mouse events and position/kind of an electronic stylus that are sent from the control units, and draws lines on the screen in colors corresponding with the kind of an electronic stylus. Information of drawn lines are sent to the handwritten data management servers with sending date of mouse events, identifiers of an electronic blackboard, the date that an electronic blackboard is full-screen-erased in previous time, additionally with XY coordinate columns, colors of a pen, width of lines by each stroke (up of an electronic pen). Since a full-screen-erase function is used when the new item is wrote, it is utilized as a separation of an electronic blackboard data.
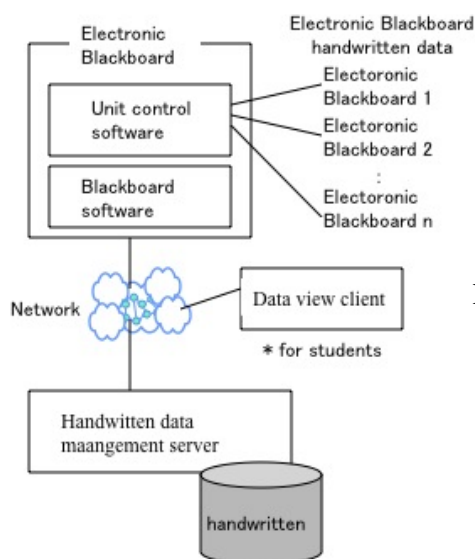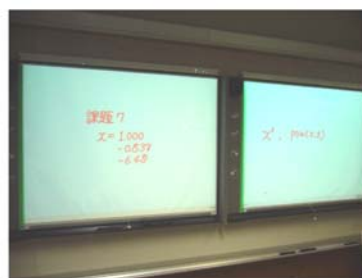

Figure 2. Electronic whiteboards in the classroom

Figure 1. System overview

Figure 3. IC-card R/W and IC-card

For web browser utilized client, the blackboard demonstration data is displayed with VML (Vector Markup Language). Browsers have increased to correspond with VML in standard, it is possible for client-side to view data without such preparation as to install the specific client soft and is less reliant on environment. It is available in case the students browse the blackboard demonstration data for self-study and so on.

2.3 Reading IC cards

An IC tag is necessary to use the ID of the teacher for binding with handwritten data. By this prototype system, I use an IC card as an IC tag. Fig.3 shows IC card and IC card reader. Our university distribute IC card using Felica made by SONY to faculty. Because an ID number assigned to each staff of university is stored in the IC card, this system reads this. When the student whom it is not distributed an IC card to by the university uses the system, the system can read IC card of Felica standard. Many people have IC card of Felica standard, SUICA, PASMO, EDY in Japan to use you as a train and a bus, the payment of the shop. Because there is peculiar number IDm (Manufacture ID Block), as for Felica IC card, the system can use this as ID. Because this system using IC card, it is very simple operation; put an IC card to IC card reader when a user uses an electronic blackboard, take the card from IC card reader if a user finishes using it. I build it with low cost and use Sony RC-S320 to raise versatility.

2.4 Test usage of the system and system enhancement

The constructed system in this paper has installed in usually used classroom. With considering the adequate timing, I have a plan to release all functions gradually. In current, the system can be retrieved by the date/writer ID/identifier of electronic blackboard only. I have already studied the frameless handwritten characters recognition servers [3]. To embed them to the system, it becomes possible to input handwriting of keyword for searching blackboard demonstration data.

3. Conclusion

In this paper, I described studies in the new electronic blackboard management system utilizing IC tags and network. By using the method described in this paper, it becomes easier to use the electronic blackboard that is equipped in the classroom for Japanese classroom style. Since blackboard data is tagged automatically with an IC card that teachers have, it is easy to find and reuse the data later. These data are centralized with handwritten data management serve, it becomes possible for students to use of self-study, or for teachers to continue the class by retrieving the blackboard demonstration data of the previous session even when the class room has been changed.

Acknowledgements

References

[1] Gregory D. Abowd.: "Classroom 2000: An Experiment with the Instrumentation of a Living Educational Environment," IBM Systems Journal, Special issue on Pervasive Computing, Volume 38, Number 4, pp. 508-530, 1999.
[2] Keisuke Shimizu: "Denshi Kokuban de Jyugyou ga kawaru (in Japanese)," ISBN 4771106576, 2006.
[3] Mitsunori Yorifuji, Takeshi Sakurada, Naoki Kato, Masaki Nakagawa: " A Frame-less Handwritten Character Recognition system through network using Client-Server method," Proceedings of the 65th Annual Convention IPS Japan vol.3, pp.523-524, 2003.