

# Development of Notetaking Instruction System with Handwriting Interface

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**Abstract:** It is known that notetaking instruction leads to improvement of students' motivation for learning and understanding. However, it is not easy to instruct how to take notes enough for each student in classroom. We have developed a notetaking instruction system with handwriting interface. Our prototype system is designed for arithmetic calculation by writing. The user can take notes on the system the same as usual notetaking because our system is equipped with a handwriting interface. We have defined three instruction rules. They are laying out group heads, inserting blank spaces and separating the page for additional information. The diagnosis results and instructions are immediately presented to the user. Our system has realized individual notetaking instruction in which the user can learn the basics of how to take notes through real-time instruction.

**Keywords:** Notetaking, notetaking instruction, handwriting interface

## Introduction

The purpose of notetaking instruction is to instruct students how to take notes. Notetaking instruction is an important educational guidance because it leads to improvement of motivation for learning [1]. In addition, doing notetaking instruction improves students' performances [2]. It is preferable that teachers check the note of each student and instructs each student. However, a lot of time and labor are necessary for continuing notetaking instruction.

Meanwhile, a handwriting input becomes popular. It is able to take notes on a computer in handwriting by using a handwriting interface.

In this research, we have developed a notetaking instruction system with a handwriting interface. It is possible to instruct notetaking individually by using our notetaking instruction system. We have focused on instructing how to write arithmetic calculation by writing. There are basics of how to take notes in the arithmetic calculation. They are laying out group heads, inserting blank spaces between the lines and separating the page for additional information [3]. If group heads are laid out and blank spaces are inserted, it becomes easy to review the note. If the note information is written, it is easy to find what is written in the page.

## 1. Behavior of our system

Figure 1 shows a function diagram and behavior of our system. This system performs evaluation and instruction based on information of the user's notetaking. When taking notes, the user uses a handwriting interface. The note data analysis module analyzes user's note data based on notetaking rules. Analysis results are given in the evaluation module. The

evaluation module evaluates user's note based on analysis results. Instruction messages and the instruction position are selected based on evaluation results.

We have used Microsoft Windows Business, Visual Studio 2008(Visual C++2008) for development. We have used WACOM DTU-710 for handwriting interface.

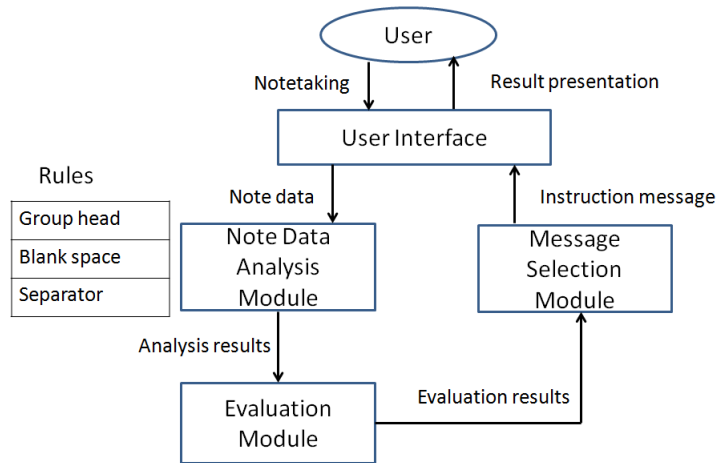


Figure. 1: Function diagram and behavior

## 2. Development of our system

### 2.1 An Example of display

Figure 2 shows an example of notetaking instruction. The user writes notes in the writing area with handwriting as if he/she writes in the note of papers. Instruction messages are displayed in the message area according to the evaluation of the note.

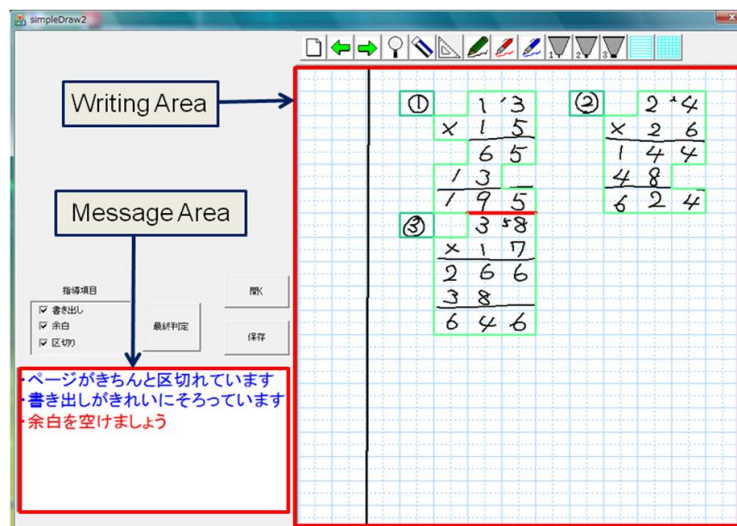


Figure. 2: An example of notetaking instruction

In this instance, blank spaces between question 1 and question 3 are missing. The system highlights the position and gives an inducing message to leave a space between them.



## *2.2 Analysis and instruction functions*

### *2.2.1 Group analysis function*

The group analysis function is a function for grouping the hand-written calculation process of each question. This group analysis is carried while the user is writing. The system watches which cell has handwriting input. When the cell of latest input is away from the prior ones, it is judged that the user has moved to the next question (a new group). Each group is surrounded with the frame.

### *2.2.2 Instruction function for laying out group heads*

The system watches whether question numbers are tidily laid out along the line or the row of the note. The question number is a cell isolated in the group. When the system judges that group heads are not laid out, the question number is enclosed with a red frame. In addition, the message “Let’s lay out group heads” is displayed.

### *2.2.3 Instruction function for blank spaces*

The system watches whether there are blank spaces between the groups. It is necessary to insert blank spaces by one line or more. When the system judges that there is no blank space, the line is drawn at the position where the blank space is required. In addition, the message “Let’s insert blank spaces” is displayed (See Figure 2).

### *2.2.4 Instruction function for a separator*

The system watches whether the separator line is drawn first. Moreover the system watches whether the separator line is drawn in position. When the separator line is not drawn, an assist line and the message “Let’s separate the page.” are displayed.

## **3. Conclusions**

In this paper, we have described a notetaking instruction system with handwriting interface. Our prototype system is designed for arithmetic calculation by writing. The user can take notes on the system the same as usual notetaking because our system is equipped with a handwriting interface. We have developed instruction functions for laying out group heads, blank spaces and a separator for additional information. Our system analyzes and instructs user’s note immediately. As a result, our system is able to instruct basic notetaking rules.

The next tasks we are planning are adding storage and management functions for storing users’ data and histories of instruction. After that, we are going to do evaluation experiments to evaluate the validity and effectiveness of our system.

## **References**

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