**A Study of Using Webcam in Computer Classroom**

**Implementation and Research of a Real-Time Monitoring System for Computer Classroom**

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**Abstract.** The webcams are installed on students’ LCD monitors to take, via an ordinary video processing program, the half-length pictures of students in a real-time manner whenever they are distracted from the class or not in their seats. Result shows that the grades of the students in the experiment group become less scattered. This means the difference among students’ grades have been reduced and students’ overall grades have also been improved.

**Introduction**

It is found in our continuous teaching activities that students are more enthusiastic about computer and the Internet than what teachers teach in computer classes. Also, we find in the teaching process that a good classroom order can be maintained if teachers’ teaching is displayed on the monitors through a teaching broadcasting system and when a DV is recording the class because most students don’t want to become the focal point in the video [1,2]. Considering this, a system has been designed using a local network and webcams [3-6]. The webcams are installed on students’ LCD monitors to take, via an ordinary video processing program, the half-length pictures of students in a real-time manner whenever they are distracted from the class or not in their seats. This system allows teachers to publish unobservant students’ grades on the teaching broadcasting system or a teaching website to serve as a warning to further achieve a better classroom order. In addition, it also enables teachers to fully grasp students’ learning situation.

**System Design**

As webcam is used to grab pictures in this study, it is necessary to know how to operate a webcam. Due to the wide use of webcams, many mobile phones, all-in-one PCs and laptops nowadays are equipped with a built-in video camera. When Microsoft was developing its Windows 95 operating system, it put forth a resolution to video multimedia. For example, Meeting Server, Microsoft’s video server in early stage, allows users to connect their webcams to the server so that people around the world could see each other. To enable webcams produced by different manufacturers across the world to grab pictures via its operating system and drivers, Microsoft also came up with highly compatible VFW (Video For Windows) for easy control of webcams.

In this study, Visual Basic 6.0 is used to develop a system in which the writing of a picture grabbing program needs to take into account the connection of the operating system and video camera [1], sound card as well as device. The device here acts like an interface we use to control the video camera and sound card. After the webcam become controllable, a program is written to grab pictures and video clips.

This study focuses on the search for the movement of students’ upper body in a real-time video and the reduction of background noises to the minimum. As a result, people’s movement is the focus. A webcam is used as the input device and its refreshing rate is set at 60Hz the same as that of...
the fluorescent light in the room. Two pictures are grabbed using the webcam to obtain the outlines of the figures in the pictures by eliminating the background using background subtraction method. Fig. 1 shows that the two pictures are grabbed at a fixed position for background subtraction. After that, the grey-scale value is checked to see if it has reached a certain threshold value. If yes, the target can be judged to be a moving object and when a minor difference is detected between the two pictures, a judgment can be made as to whether this moving object is within the monitoring scope.

Fig. 1: Example of a ONE-COLUMN figure caption.

![Diagram of process]

Fig. 2: Example of a ONE-COLUMN figure caption.

Results

The analysis focuses on influence of the classroom monitoring program on the two group students’ learning effect in computer class and the comparison of their pre-test and post-test grades.

SD indicates the extent to which the grades of students in the same group scatter. Tables 1 show the SDs of the pre-test and post-test grades of students in the control group and experiment group. In the pre-test, the SDs of the experiment group and control group are 6.529 and 5.454 respectively, as opposed to 5.038 and 6.214 for the post-test. This shows that after the computer classroom
monitoring program has been installed, the grades of the students in the experiment group become less scattered. This means the difference among students’ grades have been reduced and students’ overall grades have also been improved.

Table 1: A comparison of grades between the experiment group and control group – a t-test of independent samples

|                | Group            | Number of students | Average grade | SD   | t value | Significance (two-tailed) |
|----------------|------------------|--------------------|---------------|------|---------|---------------------------|
| Pre-test       | Experiment group | 42                 | 71.90         | 6.529| 1.723   | 0.089                     |
|                | Control group    | 42                 | 69.64         | 5.454|         |                           |
| Post-test      | Experiment group | 42                 | 85.48         | 5.038| 9.837   | 0.000*                    |
|                | Control group    | 42                 | 73.33         | 6.214|         |                           |

*p<.05

Conclusion

In this paper, a computer lab area network design real-time monitoring of student learning conditions and order of the state system, teachers can monitor the program through a local area network management students in computer usage, if the students on site and installation of illegal software piracy program, through the regional network monitoring program will shut down the game program and website, and record the Internet case, another student sitting in front of computer monitors, his every move on the computer screen at the top of the camera monitors, through this network cameras, the students leave a record number of seats, and the students recorded illegal information, to achieve the orderly management of computer classes to classes.

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