The Surveillance System for Lab Security based on Image Processing

Siruruang Phatchuay, and Mahasak Ketcham

***Abstract*—**The surveillance system currently an important role in security applications for monitoring, tracking and recognition of student behavior in the lab. In this paper, the researchers present algorithms for surveillance monitoring student behavior in the laboratory and identified student behavior. With activities while learning disorders. The camera used to focus attention on the students. And image processing techniques for face detection. To monitor behavior With multiple video cameras (MVC), the result is facial recognition. And the system will alert the Lecture to recognize abnormal behavior of students. Sanctions and to find out how the students are interested in learning more, 20% of the test before and after school hours whenever practical.

***Keywords*—**Surveillance system, Lab security, Image processing

I. INTRODUCTION

NOWADAYS, the face recognition problem can be formulated given an input face image and a database of face of known individuals, how can we verify or determine the identity of the person in the input image[1]. One of the objectives of advanced video surveillance applications is the automatic identification of people for security purposes. An effective solution for enhancing monitoring and control capabilities of remote human operators without requiring the participants cooperation or knowledge can be provided by person identification systems based on the analysis of face images. Recognition of faces from a video sequence in an uncontrolled environment is one of the most challenging problems in face recognition[2]. Therefore, the development of a system of intelligent video surveillance based on DaVinci technology. Is the study moving target detection and tracking, face detection and recognition, imaging compression and other related algorithms; apply the background subtraction, the Kalman filter, the Adaboost[3].

In this research, the researchers present algorithms for surveillance monitoring student behavior in the laboratory and identified student behavior. With activities while learning disorders. The camera used to focus attention on the students. And image processing techniques for face detection. To monitor behavior With multiple video cameras (MVC), the result is facial recognition. And the system will alert the Lecture to recognize abnormal behavior of students. Sanctions and to find out how the students are interested in learning more.

Siruruang Phatchuay, is with Department of Computer Engineering Technology, Faculty of Industry of Technology, Rajamangala University of Technology Rattanakosin, Thailand. (Email: siriruang.pha@rmutr.ac.th)

Mahasak Ketcham, is with Department of Information Technology Management, Faculty of Information Technology, King Mongkut's University of Technology North Bangkok ,Thailand. (Email: maoquee@hotmail.com)

II. PROPOSED METHOD

A. Image Processing

RGB color video images were resized to a 480 × 480 resolution, converted to grayscale, and then adjusted for uniform illumination. In general, the image processing stage of the visual prosthesis adjusts the image resolution by combining a set number of pixels into a single output pixel for stimulating the tissue interface array[4].

B. Image capture

The illumination should be as diffuse as possible, so prominent features in the surface of the leaf do not cast any shadows that could harm the segmentation process. This also prevents specular reflections, which can be very damaging. This condition can be easily met in laboratory, as long as direct illumination is avoided, that is, the leaf is not put directly beneath the light source. In the field, if the weather is overcast, the illumination is usually naturally diffused. However, sunny conditions require that a semi-transparent or opaque screen be used to cast a shadow over the leaf. The screen should be distant enough from the leaf so the image can be comfortably captured[5].

C. Face detection and recognition

The detecting and moving target, the program of face detection and recognition runs. It will do the comparison between the detected one or more face images in the video and the stored face images, and determine the identity of the face[3]. and system detects motion in the area subject to suspects behaviors in order to facilitate a first face detection. Once a face is detected (or a group of faces in case of a group of people), the active tracking module switches his operative mode from survey to focusing. In this phase, track able features are extracted within the bounding box containing the face and are tracked to estimate the motion of the pattern of interest[6]. By shows four original face images and the processed images using our proposed algorithm. The experiments demonstrated that the eye areas can be extracted regardless of ethnic groups, wearing of glasses, and illuminations[7].

D. Image Enhancement

The illumination This process changes the color (RGB) image to a grayscale. Its analysis detects objects within the image frames. Using the color image causes a slow computer process, because it accesses all of the chromaticity within the image. Thus, it would be easier to access only the grayscale image (black and white color). According to the color of each pixel that contains red (R), green (G), and blue (B), it can be converted to grayscale image in many

formulas[8]. But the most commonly used is the formula of Craig Markwart given as below:

$$Y = 0.3 * R + 0.59 * G + 0.11 * B \quad (1)$$

Fig. 1 Original face images and processed face images

III. METHODOLOGY

The main components of the algorithm with multiple video camera surveillance (MVC). The cameras are installed in top view for monitoring student behavior clearly. The image data can be recorded from the camera with real-time data will be applied to the data, and then analyzed the behavior of the condition accuracy. The importance of this research is to identify, detect behavior described by the Block diagram below.

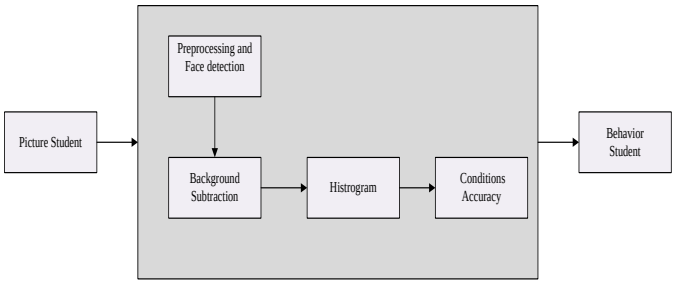

Fig. 2 Block diagram of the surveillance system for lab security based on image processing

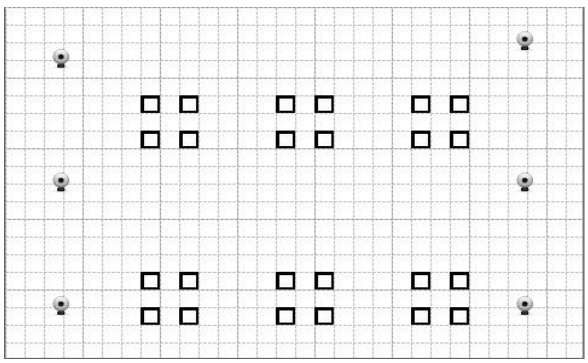

Fig. 3 A simulation using multiple video cameras

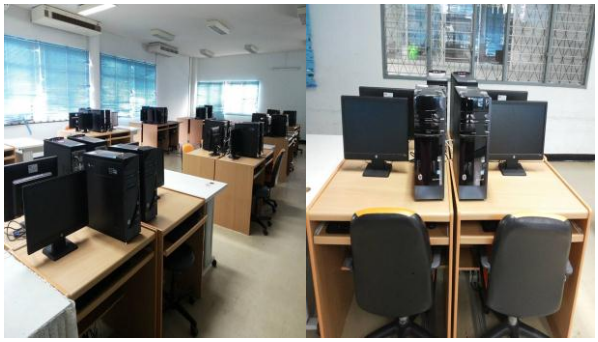

Fig 3 Image received from multiple video cameras surveillance svstem

Step1: Receiving image: a system has been images from video files are saved in .avi files.

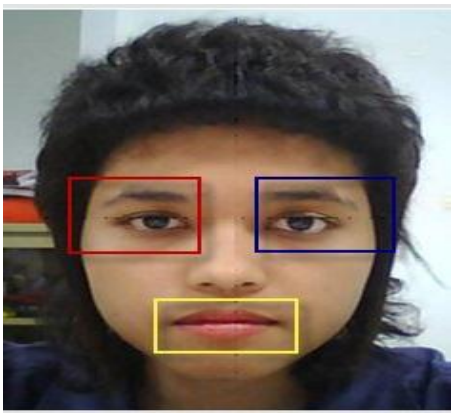

Fig. 4 Receiving image

And will be compared with the behavior of a design template. Model design Be used to plot points along the X and Y are input to the model. This is the first step in algorithms for motion detection.

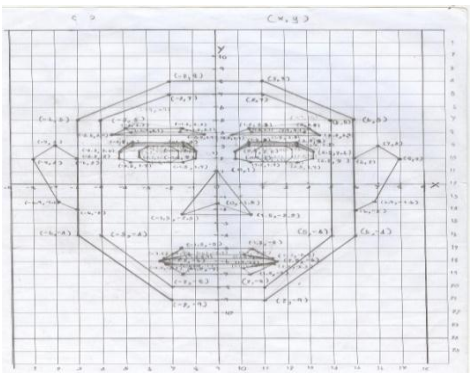

Fig. 5 Behavior of a design template

Step2: Segmentation image: The system analyzes the video file to apply to When a facial image and then The face images are divided into several parts. Then sent to the processor in the eye. The results of the template matching to detect eye. By the white circle is the result of processing the eye. The white circle indicates that the image has pixels that are the same template is open eye.

Fig. 6 Segmentation video to image frame process open eye

But, not have white circle indicates that the image has pixels that are the no same template is close eye.

Fig. 7 Segmentation video to image frame process close eye

Step3: Image enhancement (from RGB color to grayscale image): In this process, the system conducts the frame in the storage module for converting RGB color image into grayscale. After this process, we have the grayscale image.

Step4*:* Identified student behavior: In this process, the Determine the behavior of students in the case of the eyes open. Is intended to show off, but if fall asleep while studying.

Step5: The analyzing the image If the results match the behavior asleep while studying. The system alerts the instructor.

IV. Experimental Results

A. Test Conditions

In this section we will explore the experimental results of student behavior detection from multiple video camera (MVC) surveillance and describes its performance based on image processing by the picture in 2 conditions as follow:

- Open the eyes : Studying.

(a) Open the eyes : Studying

- Close the eyes : Asleep

(b) Close the eyes : Asleep

Fig. 8 performance based on image processing by the picture in 2 conditions

The results of the surveillance system, the behavior of students is shown in Table 1. The results of our proposed method. Video data received from the camera. The detection is performed using the Students image processing. The number of system errors calculated by comparing the raw data from observations and information from system. The accuracy of program is 95% that represent method results in good quality. And the results of students whose behavior is not accidental. I like to fall asleep while studying The scores increased by 10% is shown in Table 2.

TABLE I.
THE RESULTS OF SURVEILLANCE SYSTEM

Test conditions	**The results of Intruder detection system**			
	Information from system	***Raw data from observation***	***Number of error***	***Accuracy of program (%)***
No students were in Movement.	0	0	0	100
Students is Open the eyes.	32	32	0	100
Students is Close the eyes.	6	8	2	75
Total	38	40	2	95

TABLE II.
THE RESULTS OF SCORES

Amount-Student	**The results of scores**			
	Score Pre-test	***Score Post-test***	***Score Increase***	***Percent (%)***
Student :1	4	8	4	50
Student :2	5	7	2	71.43
Student :3	4	7	3	86.36
Student :4	3	7	4	57.14
Student :5	4	7	3	86.36
Student :6	4	8	4	50

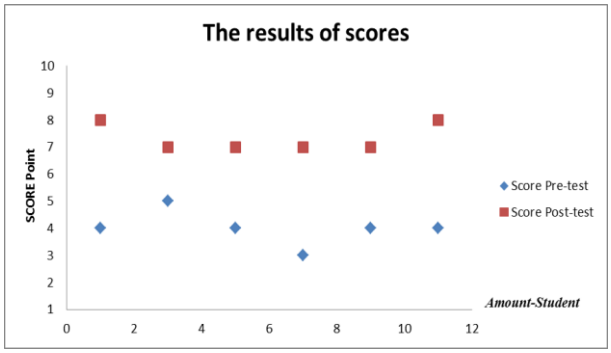

Fig. 9 The result graph of the students' behavior

V. Conclusion

The Surveillance behavior of students in a computer lab using multi-camera video surveillance based on image processing have been developed to monitor the behavior of students at disregard. By monitoring the movement of the face. The system alerts the user when teaching students with behavior, not a computer screen. By Open the eyes : Studying, close the eyes : Asleep, while the teachers were motivate the students are interested in learning increased 10% to enhance the teaching and learning of teachers.

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