

Automatic Lecture Recording and Broadcasting

Pradnya Shinde¹, Sima Jadhav², Priyanka Andhalkar³, Swapnali Bhujbal⁴

¹PES-MCOE, Pune University,
Shivajinagar, Pune
Shinde.rani12@gmail.com

²PES-MCOE, Pune University,
Shivajinagar, Pune
Jadhav.sima.dhanaji@gmail.com

³PES-MCOE, Pune University,
Shivajinagar, Pune
Priyanka.andhalkar@gmail.com

⁴PES-MCOE, Pune University,
Shivajinagar, Pune
Swapnalibhujbal69@gmail.com

Abstract:

Lecture recording has a significant role in online learning and distance education. Usually lectures are recorded by a cameraman or a stationary camera. The recorded video consists of the complete training room including trainer, students and the projector screen.

In regular lectures, presenter will speak more than changing presentation slides; hence more time will be spent in explaining the slide. Video recording of such lectures will not have changes in consequent frames.

In this project, we propose an intelligent lecture recording & broadcasting system that will automatically filter out the projector screen and the presenter face if it appears in front of the screen. Optimal video with changed images will be distributed to all the students through online streaming.

Keywords: Camera man, Optimal video, online streaming, Video recording

1. Introduction

Some academic or commercial institutions will conduct the lecture with the aim of carrying on the education, the propaganda or the communication. To assist these audiences in receiving information without the limitation of time and places, we will record the lectures and broadcasts in the network. Such recording will have the following works: First, we need to explore the lecture room to decide the camera setting. Second, a cameraman operates a camera to make a recording. Third, a post-production is designed. However, recording a lecture is really expensive. It would include of the fixed and labor cost. In fixed costs, we may require computer server, microphone, camera, and etc. Fortunately, fixed cost is only paid in construction. Labor costs, such as the payments for equipment, operating cameras, and post-production, may need to pay for each lecture recording. Since labor cost is required every time, many researches focus on automatic recording systems in order

to reduce the cost. We propose an automatic lecture recording system. In this system, we use a camera shooting in a lecture. Only image information is considered right here. The lecturer and the screen are the main information captured in our system.

2. Scope

All In this project, we propose an intelligent lecture recording & broadcasting system that will automatically filter out the projector screen and the presenter face if it appears in front of the screen. Optimal video with changed images will be distributed to all the students through online streaming. Lecture recording plays an important role in online learning and distance education. Most of the lectures are recorded by a cameraman or a static camera. The recorded video consists of the complete training room including trainer, students and the projector screen.

In regular lectures, presenter will speak more than changing presentation slides; hence more time will be spent in explaining the slide. Video recording of such lectures will not have changes in consequent frames.

Table 1: Literature Survey

| Sr. no | Author | Camera | Recording | Broadcasting |
|--------|--|-------------------------|---|-------------------------------------|
| 1 | Michael N. wallick, Young Rui, Liewei He | PTZ camera | DirectX media object , move from one room to another easily | Null |
| 2 | Cha Zang, Young Rui, Jim Crawford, Li-wei He | PTZ camera | Live full video, audio recording , no video processing | Video, audio, slide broadcasting |
| 3 | Matjaz Debevc, Primoz Kosec | PTZ Camera | Full video, sound recording & subtitle addition | Video, audio, subtitle broadcasting |
| 4 | Robert Mertens, Ruidiger Rolf | Static multiple cameras | Live full video, audio recording , no video processing | Video, audio, slide broadcasting |
| 5 | Han-Ping Chou, Jung-Ming ang, Shih-Chi Lin | PTZ camera | Video recording with detection of face and screen | Null |

Explanation-

- 1. A Portable solution for automatic lecture room camera management** is published by Michael N. wallick, Young Rui, Liewei He. In this paper recording system is made movable by using trolley with recording setup. It does not broadcast video.
- 2. An automated end to end lecture capture and broadcasting system is published by** Cha Zang, Young Rui, Jim Crawford, Li-wei He. This system records video without any processing on it and it is broadcasted to client with slid.
- 3. Lecture based automated video recording system is published by** Matjaz Debevc, Primoz Kosec. This system records lecture without processing send it to client with subtitles
- 4. Automated techniques for broadcasting and recording lectures and seminars are published by** Robert Mertens, Ruidiger Rolf. By using multiple static cameras records lecture without processing & send it to client with slides.

- 5. Automated lecture recording system is published by** Han-Ping Chou, Jung-Ming ang, Shih-Chi Lin. This System detect face and screen from recording and records video. No broadcasting.

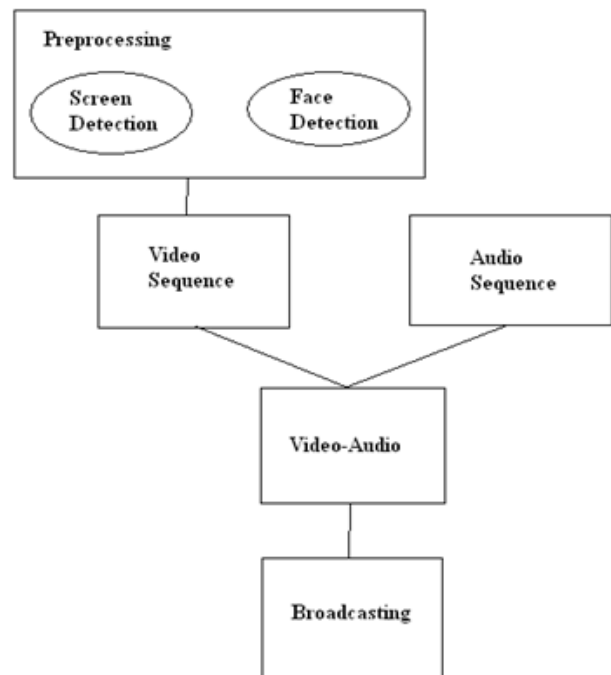


Fig.1 System Architecture

3. User will be able to do following tasks

The project suggests that the camera should be mounted on the central back hall and at the eye level of the audience. Under this setup, the lecturer and screen can be captured in our recording.

4. Processes

4.1 Lecturer Detection

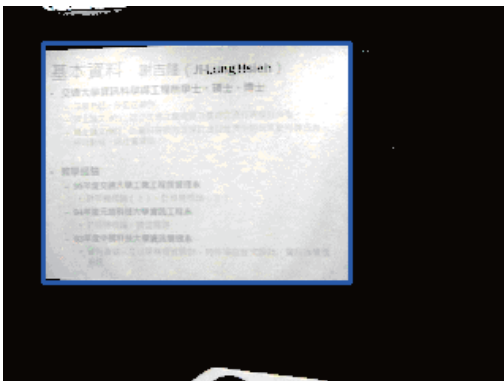
Assume that there is only one person standing in the front of the lecture room, and that person is our lecturer. We also assume that the lecturer would face to the audience, then his or her face will be shown in the video because our camera is mounted on the back wall. Under the above assumptions, we can apply face detection method to locate the lecturer's face.



Figure 2. Face detection

4.2 Screen Detection:

Assume that there is only one person standing in the front of the lecture room, and that person is our lecturer. We also assume that the lecturer would face to the audience, then his or her face will be shown in the video because our camera is mounted on the back wall. Under the above assumptions, we can apply face detection method to locate the lecturer's face.



5. Features

5.1 Capture Video Module

Captures running video from the camera and stores it on the file system.

5.2 Filter Input Image

Presentation screen and the presenter should be filtered from the input image. Administrator will have 2 options.

- a. Broadcast with presenter
- b. Broadcast without presenter

5.3 Apply image filtering techniques

- a. Edge Detection: Edges are the sharp black shadow surrounding the screen.
- b. Threshold Control: for controlling sharpness of edges.
- c. Finding Contours. contours are nothing but shadow areas of screen.
- d. Detect edges. Set the proper beginning of the contours. i.e. the beginning of the screen.

- e. Detect defects in the picture. Defects are the points which are having thick edges. Remove area which are not part of screen
- f. Detect Defects: Detect defects, the ending points of the edges. i.e. ending points of the screen.
- g. Face Detection: Detect Presenter Face using Haar Classifier.
- h. Background Subtraction for clearing background.

5.4 Broadcast Streaming Video Audio

Optimal Recorded images will be sent to multiple students. Once we apply image pre-processing the size of the image will be reduced in size and same will be broadcasted to students.

5.5 Access Control

Only authenticated students will be able to view the video on the remote computer. List of students will be stored in the database and maintained by administrator.

6. Acknowledgements

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