# Intelligent Surveillance for Educational Institutes

Surveillance is a different subject of expertise. This is no network, this is no photography. This is "surveillance". The word surveillance comes from a French phrase for "watching over" ("sur" means "from above" and "veiller" means "to watch") therefore the concept of Surveillance is often taken as consistent perpetual monitoring.

Now the idea of monitoring would differ from place to place, application to application, agency to agency, region to region, so on and so forth. The obvious question is WHY? It's because the subjects to be kept under surveillance would be different in each case. For example, the purpose of surveillance in a mall could be prevention of any untoward activity and safety of people, but for border area, it's more about trespassing, for crèche it's for the safety monitoring of the children as the subject itself could indulge into some act of hurting while playing, for city again, it's more of policing and law enforcement.

Similarly, for an education institute, the requirement would be very different. Now here, we can divide the surveillance into four segments;

1- General Surveillance of the campus.
2- Lecture recording.
3- Administrative Surveillance.
4- Security Surveillance.

**General Surveillance**

Under this subject the campus, periphery, parking lots, etc. kind of areas are covered, wherein the general concepts of the respective fields are adhered to, like for parking lots, the basic intelligence is desired with ability to suspect and communicate the suspicion to the control room, so that the prevention of hazardous activity could be implemented end-to-end.

## Lecture recording for classrooms

Like we discussed last time, every application is different in IP surveillance. It is not like switching that a L3 is L3, no matter who is the customer. Here the need changes with the customer and with the environment. The idea for recording a lecture is very different from a normal surveillance need. The paper explains how different it is.

Unlike city Surveillance, wherein, we need the intelligence to suspect and communicate back to the security department / police / control room, here we don't need the suspicion capability. All we need is that the complete class room should be in good view, a 360° view of the classroom, and good voice quality capture capability and the ability to zoom in and zoom out.

That's the broad functionality, on the finer details, we need the camera to understand the basics of light availability and a capability to manage that abundance of light and still make crystal clear capture using the light to advantage, not over exposure. The shutter speed, the aperture etc., which are inherent techniques and understanding of the camera for photography.

## Typical environment:

- As the need is for a classroom session, wherein both the teacher, as well as the students, are expected to concentrate any movement could result into a distraction.
- As we need to capture a wide area, consisting of a black / white board, dais / podium, projector screen / LCD for presentation and the movement area of the lecturer, roughly we are talking of an area of about 10-15 feet.
- The placement of the camera cannot be very far away, as we need to record the voice too, with the same sharpness and high quality as video.
- We need to have a good compression technique too in the videos, as the recorded lecture would be kept in central repository for reference, enabling a smarter and smaller storage capacity.
- The light condition of the classroom will change according to the time of the day, as most of our universities / colleges / schools have spacious, well lit classrooms with a lot of natural light.
- Local memory and direct storage.

## Technology Solution

With the above parameters being prime, for lecture recording, some features become mandatory to meet the above mentioned criteria, which the cameras must have enabling it to be a successful recording session.

- **ePTZ:** as we do not want a physical movement of the camera, as it would distract the students / lecturer, but the need to focus on the lecturer / white board / LCD would still be there, we need to have the latest technology of ePTZ in place.
- **Wide angel of view:** as we need to cover approx. 10-15 feet. The minimum viewing angle supported in the camera must be (H) 55°, (V) 35°, (D) 60°, enabling it to cover the lecturer, LCD and the white / blackboard.
- **Built- in Microphone** and voice support, may be a G.726 standard or similar.
- **Compression technique** is a must, as discussed above, so we can go in for the best proven technique of H.264 compression.



Regular          BLC          WDR

- **For adjusting to light condition,** we need to have a good resolution camera, minimum of megapixel camera and the latest technology like WDR (wide dynamic range), which does come at a price, but there is a substantial difference in the quality of the video. (Refer the pictorial depiction below to understand the difference).
- **Memory and Storage:** the camera should have some flash or SD memory option for localized storage and should be supporting Samba Client for direct recording.
- **Back end infrastructure:** The back-end infrastructure, must be capable for sorting out the lectures for making a central repository, date wise / subject wise / professor wise etc., so that the library is maintained for the usage of the student for referring to the lectures on a later date by the students / faculties. The file system should be such that the compression technique make the file size smaller enough to be shared over the

network. The security should be robust enough to make access limited to the authorized users.

## Administrative Surveillance

Administration of an educational institute is a tricky subject, as the miscreants are all students, juvenile and mischievous. We need to be strict, but we also need to be soft, as per the demand of the situation. Similarly, the same emotion has to be built into our surveillance for administration too. Some features, which'll play a key role in the set-up are as under:

1- Face recognition.
2- Object to face linking.
3- Linking attendance system to face recognition.
4- Student attendance: Attendance to the institute & attendance to classroom.
5- Faculty attendance.
6- Examination invigilator.
7- Anti-ragging enforcement.
8- Disciplinary surveillance to monitor student mischief like loitering, smoking, teasing, etc.

## Security Surveillance

Students are no terrorists. But can be groomed in to one, provided they get misguided, manhandled, decoyed into one. From the security stand point of an institute, we need to put a check on entry of anti-social elements into the campus. We need to avoid the entry of unauthorized people in the campus. We need to put a check on coaching of the students by any outsider / un-authorized person inside the campus. Here again, face recognition linked to the database and access control, is the feature, to be used extensively.

Vehicular surveillance, is again quite important aspect of security for monitoring campus mischiefs, thus face and number plate linking plays an important role here too.

Perimeter surveillance for trespassing, shall also be critical for compliances.

Would play a major role during student elections, election campaigns, campus exhibitions, college festivals etc.
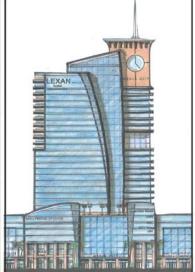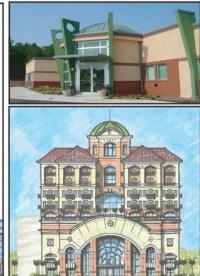
## Summary

All of the above would build an ecosystem, which is not just for recording of the system, but to make the whole educational campus aware of the happenings within the campus, from not just the surveillance stand point, but also the education point of view too.

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