

# IMPROVING EFFICIENCY OF CLOSED CIRCUIT TELEVISION CAMERA

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**Abstract :** Closed Circuit Television camera popularly known as CCTVs are widely known for video surveillance. Commonly CCTV is either used to monitor live activity on a screen or to store the data on a drive that can be reviewed later when it is required. We are basically aiming to optimize the efficiency of traditional video surveillance. Instead of monitoring entirely without any activity our aim is to use an array of motion detector paired with infrared sensors to detect any activity. Which will, in turn, trigger the CCTV camera on and begin recording.

**Index Terms - Video Surveillance, CCTV, Efficiency, Motion Detection, PIR, Sen sors**

## I. INTRODUCTION

If we are trying to improve the efficiency of a CCTV then a gist of working would only benefit in understanding the concepts.

### What is CCTV?

When a video camera is used to transmit the video signals to a specific place then that camera can be categorized as a CCTV.

### What is Video Surveillance?

It may be referred to a system for monitoring activity in an area using a television system in which signals are transmitted from a camera via dedicated link forming a closed circuit.

### CCTV Solutions

There are typically three types of CCTV Systems

- Analog with Digital Recording
- HDTVI
- IP

## II. SCOPE OF STUDY

CCTV cameras are widely used all around the world in many Business, Industries, Offices, Hospitals, Schools and Homes.

Despite the declining growth in the Installation of CCTV camera's, there are 350M[1] cameras as of 2016. 65% of which are installed in Asia.

Our study would directly affect a large majority of them. The proposal of triggering the camera on when motion or activity is detected will save a lot of power and storage space which will ultimately result in the longevity of the camera and more meaningful information.

### Uses

- **Crime Prevention**

Using CCTV resulted in the reduction of the crime rate on an average of 16% [2]. Petty crimes such as package theft were significantly reduced in the presence of CCTV cameras.

- **Monitoring Employee**

CCTV cameras are used in Organizations to monitor the activities of the employees.

- **Schools**

Many schools in the United States, Britain, Australia and New Zealand, use CCTV cameras to prevent bullying, vandalism and monitoring visitors and also maintaining the record of evidence in event of a crime.

### III. IMPROVING EFFICIENCY

Traditionally all the CCTV camera record and save data until they are stopped. This seems to be an inefficient way when there isn't any activity in the field of view. Recording without any activity is a waste of storage and energy which could be resolved if we use them smartly.

There are multiple approaches that can be used to improve the efficiency of CCTV cameras. If we are not bounded by any technological restrictions then the simplest way would be to use the latest video encoding format. Currently, the most widely used video encoding format is H.264[3]. It is quite popular and supported by almost all devices. However, it is not as efficient as the latest H.265[4] video encoding format.

#### H.265 or HEVC (High-Efficiency Video Codec)

It is the video encoding format and the successor of widely popular H.264 or AVC (Advanced Video Coding). HEVC offers 25-50% better data compression at the same level of video quality. It also offers significantly better video quality for similar bit rate.

Bit Rate - It is bits per second, generally determines the size and quality of the video.

#### Motion Sensing

CCTV cameras have motion detection and continuous recording options. Unlike continuous recording in motion detection does not record unnecessary events. They are based on the principle of difference in two captured frames. Compares the first few images, I-frame against p-frame or subsequent changes in the image.

Though stationary objects such as Houses, and Trees are neglected. Motion detection will save bandwidth and recording storage. It is crucial to remember that both continuous and motion detection record 24 hours a day. Motion Detection maintains a buffer in which it continuously compares the frames and only saves those frames in which motion was recorded.

We have to keep a few things in mind such as

- Motion Area
- Sensitivity of Detection

There are alternative ways of detecting motion that doesn't involve comparing two images to detect motion. Thus we can trigger camera On/Off when the motion is detected.

#### Passive Infrared (PIR)

It detects body heat. These type of sensors are most widely used in home security systems. The sensor can detect head and movement in the surrounding area.

#### Ultrasonic

They continuously send an inaudible burst of sound in the surrounding to create an augmented image of the surrounding and when an obstacle is introduced it will trigger the alarm.

#### Micro Wave

Sends out a pulse of a microwave and detects the changes in the reflection received. They can cover a larger area than PIR (Infrared Sensors). They are more expensive and prone to electrical interference.

## CONCLUSION

It is possible to improve the efficiency of the CCTV camera when equipped with a motion sensor.

Motion detection works best in small areas and it is ideal for household use or retail environment. For a large area such as inside of a warehouse or parking lot, it is recommended to use a conventional setup.

Recording combined with Motion Detection can result in saving of 50-60% of the bandwidth and 60-70% of the storage capacity.

## REFERENCES

- [1] Number of CCTV Camera's Installed -<http://www.sdmmag.com/articles/92407-rise-of-surveillance-camera-installed-base-slows>
- [2] Reduction in Criminal Cases - <https://journalistsresource.org/studies/government/criminal-justice/surveillance-cameras-and-crime/>
- [3] H.264 Encoding - [https://en.wikipedia.org/wiki/H.264/MPEG-4\\_AVC](https://en.wikipedia.org/wiki/H.264/MPEG-4_AVC)
- [4] High Efficiency Video Coding - [https://en.wikipedia.org/wiki/High\\_Efficiency\\_Video\\_Coding](https://en.wikipedia.org/wiki/High_Efficiency_Video_Coding)

