#### A MINOR PROJECT ON

# ABANDONED OBJECT DETECTION USING EDGE DETECTION

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### Introduction

- As crime rate is increasing day by day, video surveillance has become a need. It helps security monitor the day to day events.
- Incidents of bomb blasts by terrorists at busy public places are among the prime concerns to security agencies across the globe.
- All of these places are well equipped with CCTV's and are not able to make the best use of them.

### Motivation

- We hear about bomb attacks which are held all over the country, which is a huge amount of loss in terms of both property and life.
- It becomes a crucial task to have safety all over public places as to cause maximum destruction the bomb is placed in Public places.
- To stop this incidences, i was motivated to help us detect an unwanted placed object and providing an alarm to the Security.

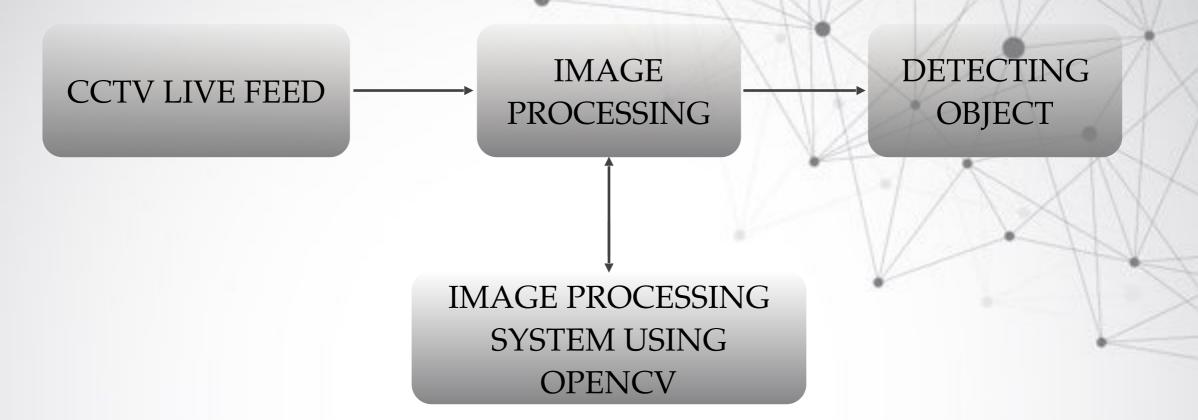
### Statement of Problem

- Presently cameras are being used only for storing recordings with imprinted time and date.
- The existing device is not proactive and is not efficient to alarm the security personnel who can immediately check the incident
- A system is being presented which is smart enough to detect an abandoned object and mark it on the screen.

### Work Done

- 1. We are processing the live feed of the CCTV camera with image processing.
- 2. If a person is releasing off some piece of luggage the camera will catch the activity.
- 3. This frames are been detected and been image processed by Edge detection. The processing is done by the OpenCV.
- 4. If the bag is untouched for a some period of time the analyser decides and further gives an alarm to the authority.

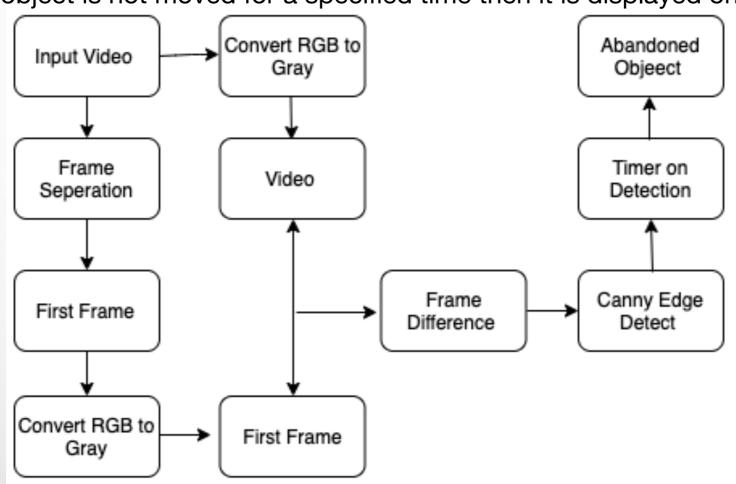
#### **First Solution:**



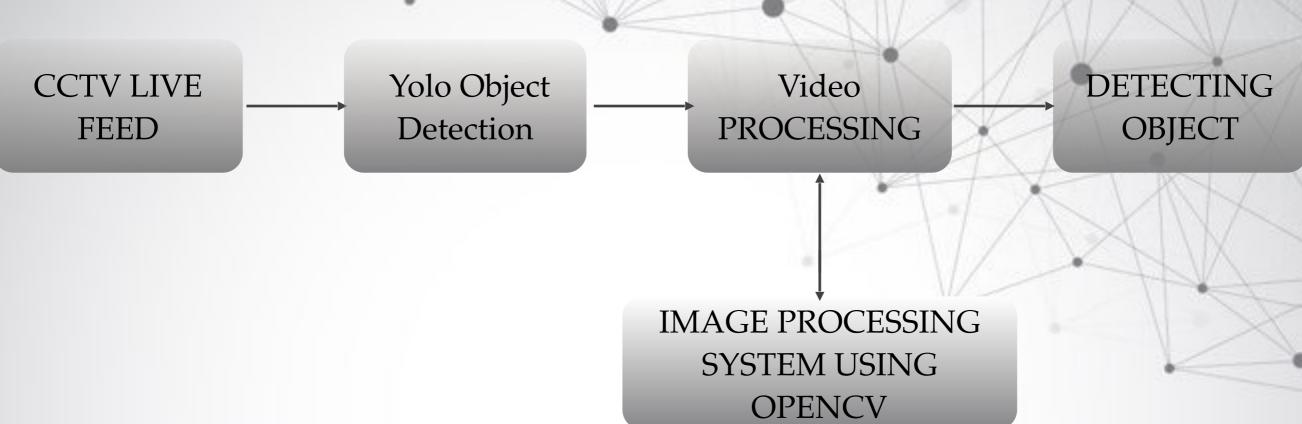
- OpenCV is an open source computer idea and machine learning software public library.
- The library has more than 2500 elevated algorithms.
- These algorithms can be used to perceive and distinguish faces, identify objects, organise human actions in videos, track moving objects, follow eye activities, recognise scenery etc.

#### Steps:

- 1. The input video is divided into frames.
- 2. The first frame is converted to Grey from RGB.
- 3. The video is converted to Grey from RGB.
- 4. Frame difference of first frame and the video is taken.
- 5. Canny Edge Detection is applied.
- 6. A timer is started in case of a detection.
- 7. If the abandoned object is not moved for a specified time then it is displayed on the screen.



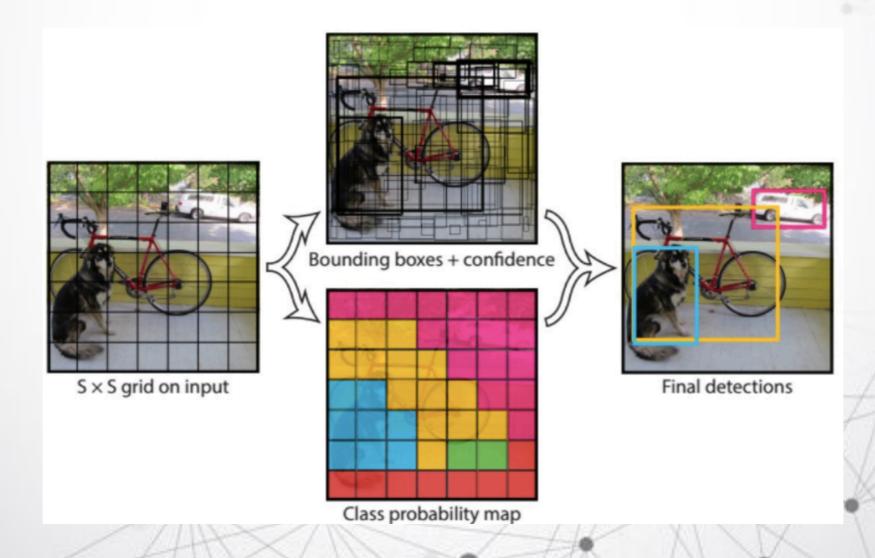
#### **Second Solution:**



- YOLOv3 is used in this project.
- The YOLO model is trained on the COCO dataset.
- The COCO dataset consists of 80 labels, including, but not limited to:People, Bicycle, Cars, bench, animals, suitcase etc.

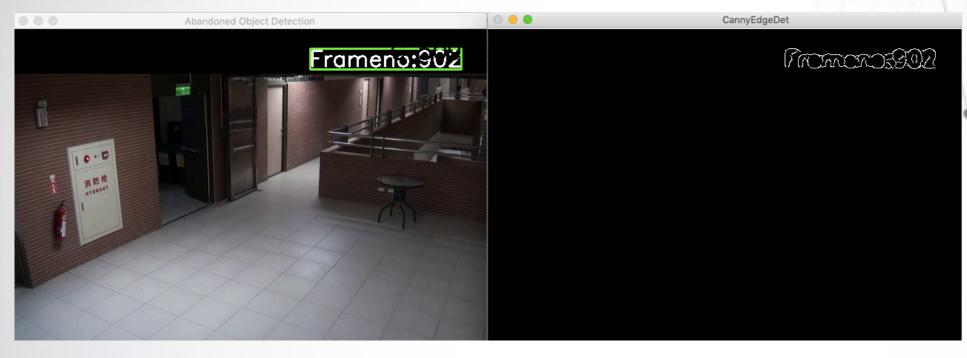
#### Steps:

- 1. Our system divides the input image into an  $S \times S$  grid
- 2. Each grid cell predicts B bounding boxes and confidence scores for those boxes
- 3. Each bounding box consists of 5 predictions: x, y, w, h, and confidence.
- 4. Each grid cell also predicts C conditional class probabilities
- 5. These predictions are encoded as an  $S \times S \times (B * 5 + C)$  tensor.



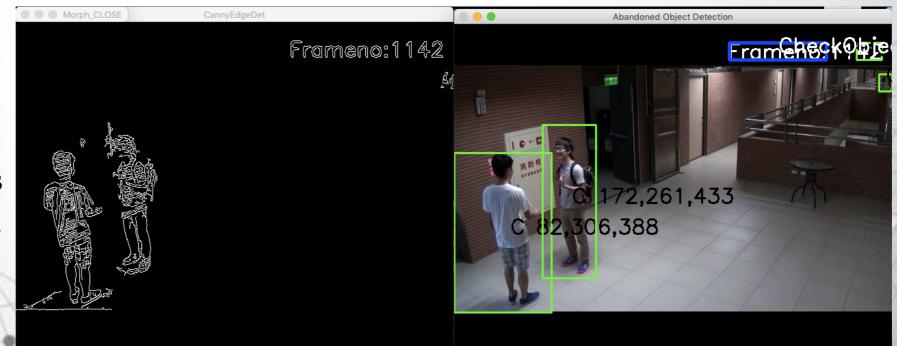
### Result

#### **First Solution:**



Scenario 1: this is the reference frame with only the permanent objects.

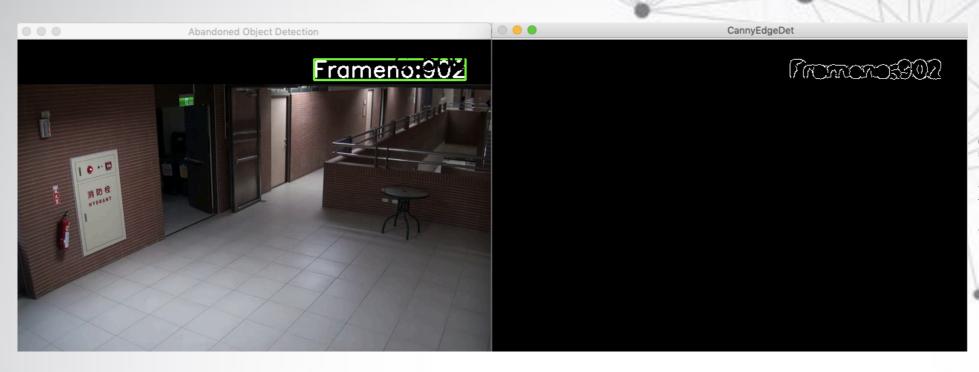
Scenario 2 : objects are being detected and bounding boxes are being made around them.





Scenario 3 : object has not been moved and therefore a message to check object is being displayed.

#### **Second Solution:**



Scenario 1 : this is the reference frame with only the permanent objects.

Scenario 2:Objects are being detected and being classified into different classes .





Scenario 3 : object has not been moved and therefore a message to check object is being displayed.

### Further works

- Further improve the detection algorithm.
- Implement a suspicious object detection.
- Improve the system by checking if the objects are attended or not and then classifying it as abandoned object.

### Conclusion

- \* This system introduces a framework to discover the abandoned objects in the public areas such as railway stations, shopping malls.
- The YOLO Detection were carried out on COCO dataset.
- \* This system detects and classifies object into different classes and also detects abandoned.
- \*This system becomes very helpful to the guards monitoring the public places as they get alerted before any dangerous circumstances occur.

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