

# Innovation in the Study of Gun Detection in Bank to Prevent Weapon Attacks of Surveillance

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**Abstract:** *The security in the public places as well as in public assets is needed, because of the increasing visual surveillance. The paper defines the solution for attacks that can happens in the assets places to save the people form such unpredictable and uncertain attack. Gun detection in the privilege places such as bank, mall is very much important for human safety side as well as assets safety. The innovation in the process of gun detection intimated the percent of result for predicting attacker in such places by using the image processing and new object detection technology. In public places the Closed Circuit Television(CCTV) cameras are fixed for the security purpose. The illegal activities are captured by this cameras. The bank robberies is prevented by using this camera and the gun detection technology. These video footage is used to tress and then by using object detection technique and image processing the weapons can be detected.*

**Keywords:** *Image Processing, Feature Extraction, Automated Surveillance System, Gun Detection.*

## 1. INTRODUCTION

The criminal action have increased in the assets area in the recent year, to resolve this crime it is necessary to enhance the development in the techniques of concealed weapons. Previously many radiation devices are introduce to detect suspicious objects, such as X-ray scanner and metal detector. These devices are based on energetic radiations. In this work the combination of human and computer is propose by using image fusion to detect hidden objects in human body with the help of visual sensors. The combination of visual sensors and image processing is used to find weapons image inside cloth. The person walking in the bank normally, we can determine the intension of that person. If this system is not available in bank, then it is not possible to identify weather a person coming with a hidden weapons or not. So the person with a weapons is only identified with help of gun detection system. These gives the combine output of person detection and weapon detection with person. Security of people and people worth is the first aspect in the increasing technology. So no technology is invented to introduce and make such a meaningful devices that can help to provide

security for people worth. In this work this technology of work is induces with the existing methods and process.

In this work, the automated surveillance system is used to detect and alert CCTV operator a dangerous situation which is reflected in camera. These alert will alert all the people near to bank as well inside the bank. They should make faster call to cop. If we use the person sitting on table to monitor CCTV camera then it is difficult to find person with weapons manually. It can be distracted for a while. So this automated surveillance system is used to help CCTV operator to easily detect the thread. The alarm automatically pick on the occurrence of object or weapons.

## 2. INTERNET INFRASTRUCTURE

The security in the public assets places like Bank, Financial Bank, ATM and Mall, Shops is very much important. The internet of thing is working with physical devices and buildings, to collect the information of anonymous objects by sensors and electronic software. The CCTV camera is used by cop to collect such information. Now a days such cameras are fit in all safety side places. These

internet infrastructure help automated system to find suspicious weapons in security places. These being playing an important section of part in the surveillance gun detection system. The smart cities are adopted with this network sensor technique and cyber security is working hard by hard with this technology.

### 3. RELATED WORK

The image processing technique is playing an important role in the security of Bank. These technique is based on the combination of image fusion and sensors to enhance the object detection in the places. The weapon detection problem is solved by these sensor network and gun image identification. No one can directly determine the threads by visualization orally. In bank persons are casually walking with weapons it cannot be identified without these surveillance system of detection.



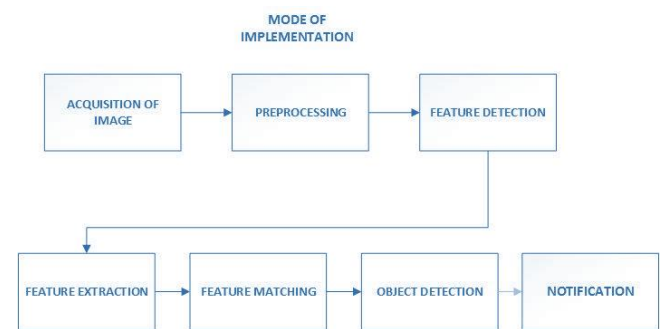
**Fig 1: Structure of Bank**

They proposes the neural network for the fetching of image and combine the facial recognition with the point of neural system. The metal detector is used in the entrance of Bank, Mall. When the suspicious object with person enters in the Bank it get alarm in Bank to aware people inside and outside of the bank and mall. It is very convenient method in such places and it is mostly use for the people security in assets places and public places like railway station. These also intro to detect knife with a person by image processing for any type of object determination. But we have proposed the model for detecting gun only as a main aim of this paper in surveillance system.

The people in the bank must feel safe so these is important to have protective system in this place. The image processing is used to trace image object and the feature extraction is carried out for the weapons identification.

### 4. PROPOSED METHOD

The proposed method provide the better solution for gun detection in Bank and other assets place as well public places. The first hand CCTV camera is used to capture the video that is monitor by CCTV operator. Then the main focus is done on the object detection for that image processing method is used to trace image of object.



**Fig.2: Proposed System for Gun Detection**

The Proposed system is shown in the above figure, gives the proper sequence of gun detection. The CCTV camera video or image is capture and acquisition of image is done by image processing. After that feature detection and feature extraction is taken out, these will goes to the feature matching with database images. Then object detection is done. These object detection is notify by operator using sensor alert or notification. The Gun detection system have more importance in the field of human security. The places like railway station, mall and banks, attackers comes with gun. The weapon detection technique is used to detect weapon with person. These technology first detect human body and then weapon with that human. Many electronic devices are used to indicate weapons, in the entrance of door, it will help people to alert.

#### 4.1 Image Processing

The image processing method is important for tracing the captured image from CCTV camera. This CCTV camera is places in all public places like mall, railway station and banks. The operator sitting in the places continuously looking for the uncertain activity of person if it is found then it will glow alarm. This technology is a real time technology so it will detect threads live by using sensors. For that firstly video or images from camera is process by image processing method. Image processing method process image by pixel matrix from gray to RGB color combination. For these the mathematical calculation is done by segmenting the image. In segmentation large image

is divided into the small segments by sliding window mechanism. First point is to match person or find person in video then it goes to find weapons with a person. The human detection is proceed by segmentation using formulas. For these the mathematical calculation is done by segmenting the image. In segmentation large image is divided into the small segments by sliding window mechanism. In the image below a general view of CCTV camera footage is shown. In that the attacker comes with a gun in bank. How they do the robberies in banks with the help of gun on person is seemed. These is first step to capture the pictures of person and gun with the help of CCTV cameras. These image are further proceed to face detection and gun detection method in real time for human security. The image quality difference is also shown in figure bellow, for image processing pixel by pixel calculation is done using black and white color. The person detection as well as weapon detection is done by matching images to the store database of images. These gives the primary result of image detection.



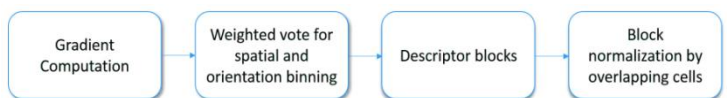
**Fig. 3: Human Detection by Image**

Pixel by pixel calculation is done on image matrix and if the complete pixel of image is match to the testing images. Then the person with object is detected by rectangle on image. After that CCTV operator get alert of this suspicious person.

#### 4.2 Feature Extraction

The feature extraction is necessary after image processing of video. The features of image indicate the shape, color of object which is important for finding perfect match object. In proposed system our first task is to find Human by image processing then after that find the weapons of that person. The weapon identification shows the mind of criminal on that movement.

The Histogram Oriented Gradient (HOG) algorithm is used for feature extraction. The feature extraction is firstly used in the gun or object detection.



**Fig. 4: Implementation of HOG**

The gradient computation is done for color of object image the formulation is carried out for descriptor blocks and lastly cells overlapping is done. These method helps for pattern recognition of image in proper way. The feature matching is carried out with the sample object image and if the match is found then it with notify by automated surveillance system.

After feature extraction of an image, the feature matching is done. The feature matching is important for matching feature of tested image to object image. The human feature matching technique matches the facial feature like face, eyes, and nose. After that object feature matching is start to match weapons detected with person and the object save in dataset. If object match the gun is detected with person.

#### 4.3 Automated Surveillance System

The automated surveillance system is a real time system for gun detection in Bank. The fetching and detection can be done on time in such places. So after image processing of human, the feature matching is done then if feature matches to the sample object. At that time automatic alarm is start for indicating alert to people inside the bank and outside the area. These will instantly call the cop for safety side. So these surveillance system is important for people safety and assets security. These is most secure method to detect gun with person on time. For security purpose the many electronic devices are use in the entrance of public places like airport, railway station, mall and financial banks. These electronic devices such as metal detector, sensors are used for detection the weapons with a person at the time of entrance in public places. So this real time sensors and metal detector are merge with the detection technology and camera, to identify threats.

#### 4.4 Gun Detection

The gun detection process is done with the proposed method. These is the combination of image processing, feature matching automated surveillance system by fetching and tracing real time gun object in bank and other places. The experimental result is shown in the bellow figure.



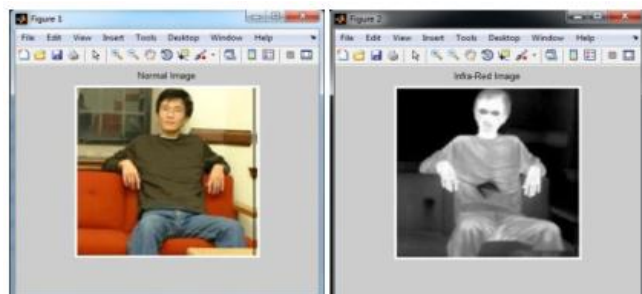
**Fig. 5: Gun Detection by proposed system**

like gun is detected and indicated by automated system using alarm. These paper have given a better solution for security in bank with gun detection.

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The above image is an object image of weapon which is match to the database weapon images. In figure it shows the points of pixel matching in matrix. It gives the perfect result of gun detection using defined methods and algorithm. Security of person in crowd places is very much important for maintenance in India. So this solution is proposed to feel secure in public place and also in assets place. The person and assets are equally important for countries growth. The below images shows how the detection of gun with a person is done by capturing images from video of CCTV camera in real time. The normal person who comes in bank for some work, we manually cannot determine that he come with weapons in bank, as shown in below figure. So the gun detection method is important in such type of detection in assets places.



**Fig.6: Result of Gun Detection with person**

The normal image is shown on left and after processing the gun is detected in right image, these is the experimental result of these system. In this format the gun or weapons is detected for people security purpose. These is combination of person detection and the weapon detection with a person. It gives the proper solution for gun detection technology using image processing method. These can be used in financial banks and ATM for safety side.

**5. CONCLUSION**

In this work, gun detection in assets place is performed by using various methods such as image processing, feature extraction. The object matching is done by feature matching process. The object