

## Anti-Robo: A Tool Detection System

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**Abstract**— Tool Detection System is a web application which detects those objects and tools that are not generally used in public places, which are more harmful to public like gun, knife, etc. When someone like robber, theft get inside the shop or ATM with having weapon like gun, knife and wear a mask, this tool detection system detects all unusual tools like guns that holed by robbers and send notification to the police station and we can easily stop happening robbery. This tool when capture image of tool or weapon and can subtract background image. After subtracting background image, the system checks the tool with the installed objects in the system and if matched then it sends notification and location to the nearby police station and related authority for the alert.

**Keywords**— Object detection, image processing, notification, MVC algorithm

### I. INTRODUCTION

There are many places like ATMs, jewelry shops where cameras are installed for security purpose. But if someone like robber, theft get inside the shop or ATM with having weapon like gun, knife and wear a mask, the installed cameras only capture the situation but cannot control or help to stop robbery. So that we are developing such a tool or system, to resolve such a problems, that will be installed on the server that operates automatically through cameras. When someone enters in such places with unusual weapons, our system will automatically detect the weapon and capture image of that unusual tool and send that image with location to the nearby police station as well as the Bank authority for the sake of information of any misuse of weapon in that place. When police will receive the image they will first analyze the situation from the captured image about the situation and the person holding it and try to find the motive of that person so that they can decide whether to take the action or not. The police then decide whether to take action or not depend upon the weapon detected in the situation so if the situation is actually a danger or harmful to people and robbery may be happening in that place then by taking strict and immediate action the police can stop the happening robbery in ATM like places or any jewelry shops, etc. So in this way our tool detection system is very useful in many such situations and also further can be improved for the better security of expensive things through camera with better and efficient security functions.

### II. RELATED WORK

#### Vision Based Method:

It is one of the most popular techniques for traffic surveillance due to low hardware cost. Recognizing objects

in images is a very important research task in the field of computer vision and pattern recognition. It is an effective method for object recognition. In order to characterize the appearance of the objects, the SFIT features are extracted from the images. Then, these features are sent to train four classifiers i.e. KNN classifier, Naive Bayes classifier, Decision tree classifier and SVM classifier which are used to predict objects.

#### Object Detection:

It is process of finding instance of real world objects such as faces. We can use Local Binary Pattern, Histogram of Oriented Gradients and Hough transform descriptors.

#### Local Binary Pattern:

It is used for face recognition in computer vision. In this method image is divided into several small segments and from which features are extracted. It consists of binary patterns and describes surrounding of pixels. The features from segment are joined into single feature histogram. This method provides good result in term of speed.

#### Background subtraction:

This is one of the methods where image background is extracted for further processing. It is the best approach for detecting objects from videos taken by static cameras. There are many techniques and both expert and new comers can be confused about limitations and benefits of it. This method based on static background hypothesis not applicable in real environments.

#### Histogram of Oriented Gradients Descriptor:

It provides better performance than other existing feature sets. It is used to extract human feature from visible spectrum images. It has been determined that when LBP combined with HOG descriptor it improves, detection, performance considerably on some data sets.

**Hough transform descriptor:** It is a technique and can be used to isolate features of particular shape with an image. It requires some features in parametric form. It is most commonly used for detecting regular curves such as lines, circles, ellipses etc.

### III. PROBLEM STATEMENT

To provide better security system through installed cameras that are unable to control or to help stopping robbery by capturing image of any unusual tool used inside the place where cameras are installed with the tool detection system and the captured image need to be send to the nearby police station and the related authority so that they can alert about the situation that can be harmful or danger and the actions will be taken by police after manually giving complaints by owner or giving information by someone to the police station.

### IV. PROPOSED PLAN

Many times robbers with bad minds and wrong intentions comes inside the ATMs or Jewelry shops and steal money or jewelries and the installed cameras only capture image or record video but no one can do anything until they leaves the place and then someone calls to the police station and the investigation starts and takes many days. But what if we provide a system with tool detection system? So we proposed the tool detection system that detects all unusual tools like guns that holed by robbers and send notification to the police station and we can easily stop happening robbery. The objective is to detect the tool in places where expensive things are exchanged and security is provided only through cameras. Our system detects those objects and tools that are not generally used in public places, which are more harmful to public like gun, knife, etc. When someone like robber, theft get inside the shop or ATM with having weapon like gun, knife and wear a mask, the installed cameras only capture the situation but cannot control or help to stop robbery but with this tool we can detect the object/weapon to stop robbery by sending detected image to the nearby police station for further actions. This tool when capture image of tool or weapon and can subtract background image. This application with the web interface is very useful for better security in places where expensive things are exchanged. we can also stop robbery in houses and also such related places where cameras are installed for security purpose.

Following figure 1.1 illustrates the proposed plan.

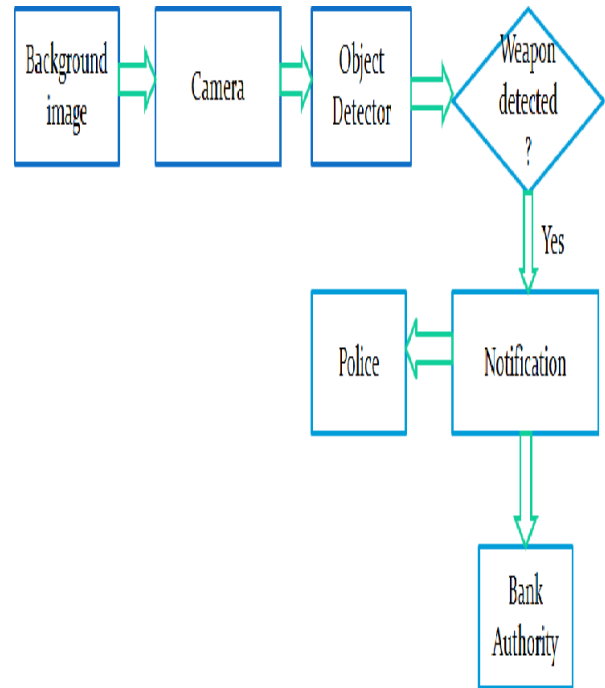


Figure 1.1: Control Flow Diagram

#### 1] Image Processing module :

It is our first model in which we are providing many image processing features and enhanced algorithms SURF and SIFT. This model basically handles all the image processing state and captures images of all the objects the people have in their hands entering in the place where the cameras are installed with tool detection system. This model operates with installed cameras and process on all the persons entering in the place and capture the image of those persons with object having any objects in their hands using object detection technique and process the image by subtracting the background image and focusing on identifying the objects the people have in their hands. It then matches that detected object with the provided some weapons or objects and give the results in terms that the object found is unusual or not. We also provide the machine learning algorithms so that the system will also learn and understand other similar images of the same object. So that every time we don't have to provide new objects and it will take very less time to process and identify the desired object from the image. If the system detects any unusual objects then it will store the captured image and immediately send the notification containing the captured image and location of that place with pin code to the nearby registered police station. The police will then further take the actions.

**2] Police Station Panel :**

This model contains the separate sessions for each police station. Whenever the system detects any unusual weapons or tools, it sends the notification to the nearby police station. We are providing different sessions for each police station. When the notification is sent by the system, it is received as the complaint with the complaint number, pin code, location and the name of the bank and also the captured image. The police station only sees the complaint received to it not all the complaint. As soon as it receives the complaint, the police analyze the image. If they found any danger situation or if they found any people in trouble then they can take immediate action on them without wasting time and the situation or robbery can be easily controlled. They don't need to check the whole cctv footage to find the criminal and it saves time and the police can arrest them on the spot. In this way we stop robbery.

**3] ATM Registration module :**

In this model, we have provided the registration form in which the new ATMs can be registered in order to manage that ATM in a similar way. As we are providing some known ATMs the new ATMs are not available in our system that means the new ATMs are not having our tool detection system. So to provide the same functionality to the new ones it needs to register through the ATM registration. After registration the data of that ATM will be stored into the server database and again if any robbery is going to that place then the server will send the notification of that place using the pin code and place available in the database.

**4] ADMIN Module :**

This is the main model which has all the rights. It is the main server in which the developer can control all the above models and can see all the sessions of all police station panels, it can create database, delete database any of the information from the database, add or remove any ATM and many more. So if any problem found in any place then the notification is sent from server to the respective client that is the police station and they will take further actions. So basically the main objective of this model is to make control, analyse the situation automatically and we do not need any manpower to control it.

**V. FLOW DIAGRAM**

Figure 1.1 shows the flow diagram of Tool Detection System. It detects the unusual tools or weapons used inside the place we have installed our system using camera with object detector. If the unusual object is detected through camera then it sends the notification with image of captured object or tool or weapon to the nearby police station as well as the Bank authority and they will further decide whether or not to take the action against the situation.

**VI. CONCLUSION AND FUTURE SCOPE**Conclusion:

Thus, we have proposed an approach which would detect approximately all weapons which are not necessary in public places or places where security is must. Also using this system, we can control robbery happening in public places where expensive shops, bank ATM's are there and only just cameras are installed and further process can be done using this system by scanning tools through cameras for immediate action.

Future work:

Extend the application's approach by using more advance technique for improving security in our day to day life and criminal detection.

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