

Crime Detection and Avoidance in ATM: A New Framework

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Abstract— Nowadays research is going on in the field of crime detection and avoidance in the ATM. But till now there is no advanced technology came in the field of ATM. So the idea of designing and implementation of security for ATM project are born from the observation of our real life incidents happening around us. Over the past three decades consumers have come to depend on and trust the ATM to conveniently meet their banking needs. In recent years there has been a proliferation of ATM frauds across the globe. The suspicious action in ATM are many. The suspicious object's visual properties so that it can be accurately segmented from videos. After analyzing its subsequent motion features, different abnormal events like Crimes and robbery can be effectively detected through videos. This paper deals comparison existing technologies and propose a new frame work for ATM security in cooperation ATM software. The proposed method will uses multiple object detection method and event recognition techniques of computer vision.

Keywords: ATM, Computer Vision, Multiple object detection, Event recognition

I. INTRODUCTION

Recently, the demand for using automatic video surveillance systems has been increasing. Video surveillance systems have been introduced in various fields of our daily life to enhance security and protect individuals and sensitive infrastructure. Object detection and tracking has wide applications such as People tracking, Safety monitoring, Security and Biometrics, Traffic and road management, Web applications, Object recognition for Mobile Devices, Medical and biomedical, Sports analysis and others. Video surveillance pays a great attention in the field of robbery detection. Automatic Teller Machine (ATM) is a profitable service of bank which allows the customer to access the financial transaction in public space. A customer need a magnetic chip card to access the financial transaction. ATM agents are used to replace the function of bank teller or clerk of bank Nowadays research is going on in the field of crime detection and tracking in the ATM. But till now there is no advanced technology came in the field of ATM. So the idea of designing and implementation of security for ATM project are born from the observation of our real life incidents happening around us. In recent years there has been a proliferation of ATM frauds across the globe. The suspicious action in ATM are many, such as using mobile phones, multiple persons

trying to access the ATM machine in same time, kicking of each other, idle object and it shows event corresponding to Vandalism and robbery. To overcome this theft and crime in ATM an intelligent system framework is proposed, whose objective is work with coordination of ATM software and make the secure financial transaction of customers

II. AUTOMATIC TELLER MACHINE

An automated teller machine (ATM) is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space. With the use of an ATM, customers can access their bank accounts for cash withdrawals and check their account balances . Nowadays Automated Teller Machines is considered as very common technology for dispensing notes to cash-holders. The ATM structure for cash withdrawal differs across countries. The first ATM was installed in the USA in 1969. ATMs have a positive effect on the nominal currency growth, but this effect is not very robust. Among all services of bank ATM is consider as more profitable service because it attract number of non-bank customers. The structure of ATM comprise on main components such as CPU, magnetic chip card, PIN pad, Secure crypto processor, function keys and vault.

Since the introduction of the first automated teller machine (ATM) in 1967, perpetrators have been devising ways to try to steal the cash inside. Because ATMs eliminate the need for round-the-clock human involvement and tend to be located in places that make them more vulnerable to attack, they are often attractive targets for perpetrators.

ATM crime is not limited to the theft of cash in the ATM. Many ATM attacks seek to obtain a consumer's personal information, such as their card number and personal identification number (PIN). While these types of identity theft attacks take more effort to net cash for perpetrators, the result is the same—illegally obtaining money.

According to estimates by Retail Banking Research, there are more than 2.2 million ATMs deployed worldwide. This is a figure forecasted to exceed 3 million by 2016. As the number of ATMs in use increases, so do the frequency and sophistication of security threats, making the development of fraud prevention measures a top priority for financial institutions (FIs) and ATM manufacturers.

ATM fraud is not confined to particular regions of the world. To further complicate matters, perpetrators and victims are often on different continents, and the problems of one region can quickly become the problems of another.

III. TYPES OF ATM THREATS

ATM threats can be segmented into three types of attacks: card and currency fraud, logical attacks and physical attacks.

The main theft and crimes which are relevant to ATM are .Theft of couriers who fill ATMs with cash

- Theft of personal identification numbers
- Theft by electronic data interception
- Theft by fraudulent electronic transactions
- Theft of money from ATMs by bank
- □Burglary of ATMs
- Vandalism of ATMs
- Multiple persons issues
- Murder attempt in ATM
- Physical attacks.

A Global Problem

Sophisticated criminal networks have enabled far reaching ATM fraud, affecting FIs and consumers on a global scale. With this in mind, FIs and ATM Manufacturers must look at ATM fraud from a global perspective, as what is a problem in one country one day can be the problem of another country’s the next.

IV. Architecture of proposed system

The function of proposed system is incorporated with the function of ATM software .The structure of proposed intelligent system with ATM agent is shown in figure-1. The architecture of proposed intelligent system is divided into three parts. The first part comprise on video camera which capture the images. Second part is multiple object detection module which detect the existence of more than one person in room of ATM .If it detect multiple objects then it will display a prompt for user. If the customer allowed multiple persons, then the information passed to activity recognition module. Activity recognition module recognizes human behavior. If it is normal interaction then it s passed to normal transaction module and transaction take place. If there is multiple objects and customer not allowed multiple objects ,then it will produce alarm and make call to nearest police station.

Also if there is abnormal behavior it will produce alarm.

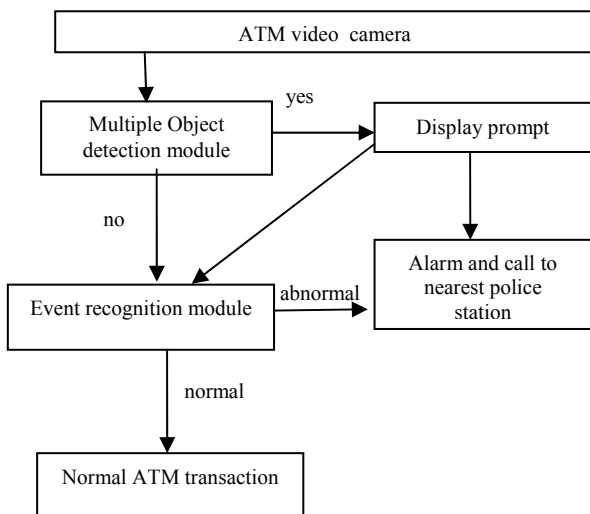


Figure 1: Different units of proposed system

Information flow in proposed intelligent agent as follows: When a customer enter in to the ATM room ,his image will captured by camera. When customer started transaction ,then the control and information flow in proposed system as shown in figure 2.

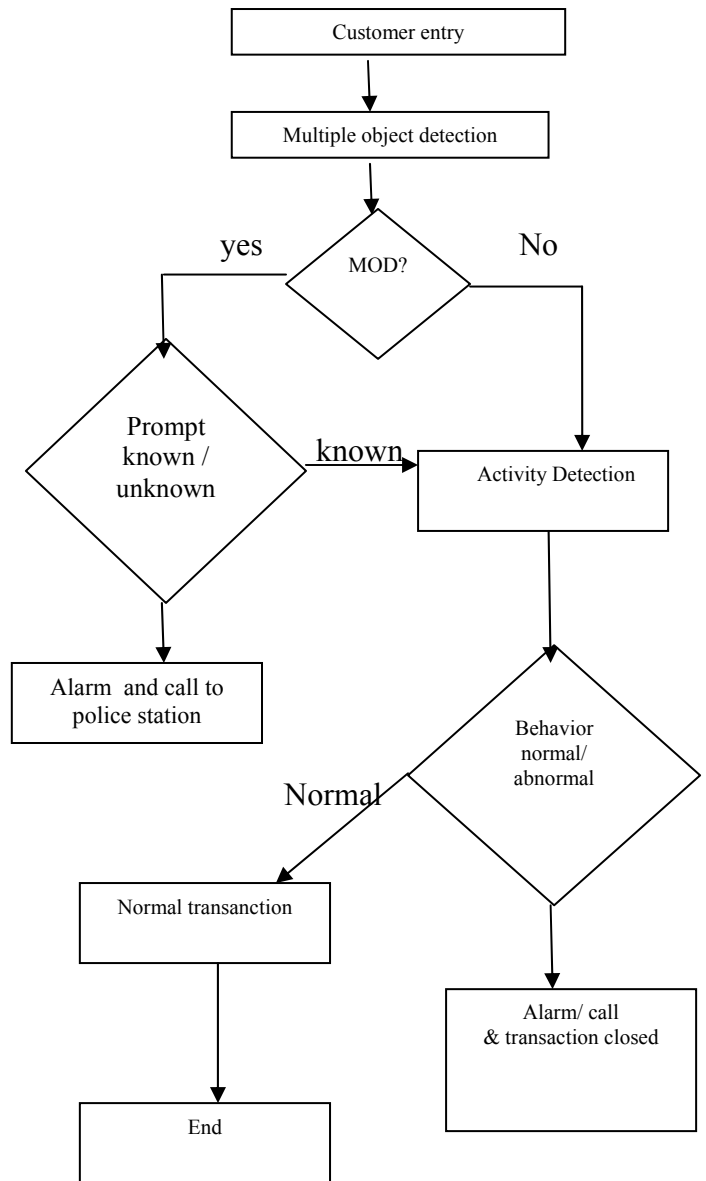


Figure 2: Information flow in proposed system

IV. MULTIPLE OBJECT DETECTION

Multiple object detection is the one of the important task in computer vision. In many computer related vision technology, it is critical to identify multiple moving objects from a sequence of videos frames. Video tracking is the process of locating a moving object (or multiple objects) over time using camera. It has a variety of uses, some of which are: human-computer interaction, security and surveillance, video communication and compression, augmented reality, traffic control, medical imaging and video editing. The objective of video tracking is to associate target objects in consecutive video frames. To perform video tracking an algorithm analyzes sequential video frames and outputs the movement of targets between

the frames.

Multiple Object Detection, or MOD, is an experimental technique used to study how our visual system detects multiple moving objects. Moving object detection in digital image sequence involves identification of the presence of an object in consecutive frames whereas object tracking is used to monitor the movements with respect to the region of interest. Frequently used techniques for moving object detection are background subtraction, statistical methods, temporal differencing and optical flow.



Figure 3: Video that have multiple moving objects

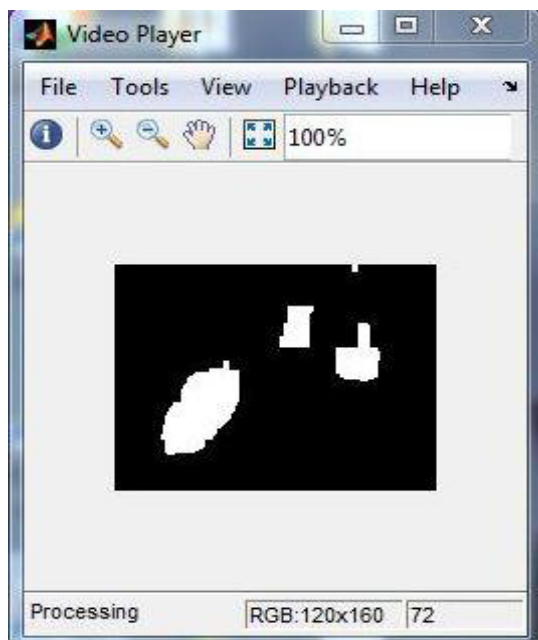


Figure 4: Detecting multiple moving objects

V. ACTIVITY DETECTION:

Automatic human action recognition in video has many important computer vision applications, such as video surveillance, human computer interaction, video browsing, and analysis of human behavior etc. In a surveillance environment, the automatic detection of abnormal

activities can be used to alert the related authority of potential criminal or dangerous behaviors, such as automatic reporting of a person with a bag loitering at an airport or station. For identifying the activity three main processing stages are considered, i.e., object segmentation, feature extraction and representation, and activity detection and classification algorithms. The human object is first segmented out from the video sequence. The characteristics of the human object such as shape, silhouette, colors, poses, and body motions are then properly extracted and represented by a set of features. Subsequently, an activity detection or classification algorithm is applied on the extracted features to recognize the various human activities. There are different method used for human activity recognition in computer vision..

VI. CONCLUSION

In this paper, a new framework is proposed which will be useful for the current world. Financial transactions of customer through ATM are faced by number of thefts. Among these thefts one is related with the existence of more than person in ATM room. The focus of this research is to propose an intelligent agent, whose function is incorporated with the function of ATM software, to make the transaction of customer more secure. Suspicious actions are increasing in the ATM sectors. The aim of this paper is to prevent the ATM crime by using computer vision techniques. This methods used here produce a robust atmosphere, which evaluate each moments inside the ATM.

REFERENCES:

- [1] K. Kausalya, S. Chitrakala, "Idle Object Detection in Video for Banking ATM Applications". Research Journal of Applied Sciences, Engineering and Technology 4(24): 5350- 5356, 2012 ISSN: 2040-7467.
- [2] Hadi Aliakbarpour, Kamrad Khoshhal, João Quintas, Kamel Mekhnacha, Julien Ros, Maria Andersson, and Jorge Dias, "HMM-based Abnormal Behavior Detection Using Heterogeneous Sensor Network".
- [3] Mahmoud Abdulwahab Alawi, Othman O. Khalifa and M.D. Rafiqul Islam, "Performance Comparison of Background Estimation Algorithms for Detecting Moving Vehicle". World Applied Sciences Journal 21 (Mathematical Applications in Engineering): 109-114, 2013 ISSN 1818-4952 © IDOSI Publications, 2013 DOI: 10.5829/idosi.wasj.2013.21.mae.99934.
- [4] Abhishek Singh, Padmini Jaikumar, Suman K Mitra, Manjunath V Joshi and Asim Banerjee, "Detection and Tracking of Objects in Low Contrast Conditions".
- [5] Vinayak G Ukinkar, Makrand Samvatsar, " Object detection in dynamic background using image segmentation: A review". International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 Vol. 2, Issue 3, May-Jun 2012, pp.232-236.
- [6] Rahman Farnoosh, Gholamhossein Yari and Behnam Zarpak , "Image Segmentation using Gaussian Mixture Models".
- [7] Himani S. Parekh, Darshak G. Thakore , Udesang K. Jaliya, "A Survey on Object Detection and Tracking Methods". International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Vol. 2, Issue 2, February 2014.
- [8] Shivprasad Patil, "Moving Object Detection Using Statistical Background Subtraction For A Rotating Camera". International Monthly Refereed Journal of Research In Management & Technology Volume II, September'13 ISSN – 2320-0073.
- [9] D. Hari Hara Santosh, P. Venkatesh, P. Poornesh, L. Narayana Rao, N. Arun Kumar, "Tracking Multiple Moving Objects Using

Gaussian Mixture Model”.

- [10] Michael S. Scott, “Robbery at Automated Teller Machines”, Guide No.8, 2001
- [11] Heli Snellman, “Automated Teller Machine network market structure and cash sage”, ISBN 952-462-318-8, 2006
- [12] Image based fraud detection in Automated Teller machine, *International Journal of Computer Science and Network Security*,
- [13] *Shian-Ru Ke, Hoang Le Uyen Thuc, Yong-Jin Lee, Jenq-Neng Hwang, Jang-Hee Yoo, Kyoung-Ho Choi*, “A Review on Video-Based Human Activity Recognition”. *Computers* **2013**, 2, 88–131 ISSN 2073-431X.
- [14] *Kanchan Gaikwad, Manoj D. Patil*, “Human Activity Detection and Recognition Algorithm from Video Surveillances”. *International Journal of Technological Exploration and Learning (IJTEL) ISSN: 2319-2135 Volume 2 Issue 5 (October 2013)*.