

NOVEL VIGILANT REAL TIME MONITORING AND SECURITY SYSTEM FOR ATM CENTRE

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ABSTRACT

The increased threat encountered by customers and ATM machines, have drifted the ATM center to a danger zone. The present day monitoring system is much vulnerable which in turn encourages the fraudulent activities and crimes in ATM centers. This is high-time for banking sector and government to join hands to weed out this crisis in security system. So it becomes indispensable to strictly monitor the do's and don'ts inside the ATM centers, very specifically the facial recognition is considered to authenticate the entry of any individual inside the ATM center, it is achieved by employing classifier technique. As an additional feature, a combinational biometry system is used to access the ATM machine. The entire security module is incorporated with an easy access panic button and a sound sensor-cum-alarm, which alerts the cops as well as the bank's security wing, ensuring immediate rescue to the victims including physically challenged people. This overall system proves to be an autonomous, continuous and secured surveillance system.

Keywords: ATM Centre, Security, Fraudulence, Face detection, Classifier.

1. INTRODUCTION

In recent years, the usage of ATM service is increased drastically as it offers more sophistication for the customers to withdraw their amount at 24*7 hours. The growth in electronics transaction has been adapted by banking sector [7]. Yet ATM service suffers lots of security issues, which threatens the entire banking sector and customer. Due to the prevailing fraudulent act like card skimming, cash trapping etc., the secure financial transaction is not ensured [16].

According to the recent survey, rate of robbery and theft is increasing in every year [1]. The following statistical report shows the crime rate.

Table I: Atm Center Misconduct Report [1]

S.NO	YEAR	THEFT	ROBBERIES
1	2007	112,5304	2,384
2	2010	269,4104	4,139
3	2011	270,1094	4,509

The ATM crimes are happening at a frequent rate because of lack of security system in center. Mostly robberies are taken place during off-peak hours, such activities leads to 11% of transaction and 60%

of crime on day to day routine [11]. A statistics stated that, about 5500 crimes have been recorded in a year [22]. The lack of security encourages these types of crimes which are increasing steadily.

ATM centers play a vital role for money withdrawal. Other than the application it has many purposes like money transactions, cash deposits, registrations. Such wide usage of a card demonstrates as how it is indispensable for modern age. Instead of carrying money which is vulnerable for attacks in a society where the unemployment and inflation dominates so it is safer to carry thin flat card which is compactable in wallets. It holds the identity of a person which is unique and subjected to personal usage.

The prime responsibility is to ensure a secured ATM service by providing enhanced security system in centre. In this technically advanced world automation is grabbing attention in every field. So the ATM centre can be made fully automated without manual mode of monitoring and intimation as a solution to the troubles faced.

2. RESEARCH BACK GROUND

ATM centre are now a day's increasing large in number, which will be comfortable for people to do easy transaction at any point of time. Though many

procedures which are indispensable to be followed inside a centre people fails to do. This paves way to crimes like ATM thefts, manhandling prevails inside the centre [12].

There are several DO'S and DONT'S inside an ATM center which are captioned outside the center but people in their busy schedule even fail to have a notice at the boards. Small faults can lead to unpayable consequences. As stated in an English proverb "LOOK BEFORE YOU LEAP" precaution measured must be taken before you step in danger zone. The classic scenario which falls in this category is smoking which will lead to dangerous fire accidents causing damage both to life and property. So, smoking inside ATM is strictly prohibited shows in figure1. The figure also depicts prohibition to the usage of cell phone, which makes use of electromagnetic waves for communication. It is observed from basic physics that two electromagnetic waves can undergo constructive or destructive interference which deteriorate the performance of a machine. ATM is also an electronic machine uses EM waves. For high degree of transaction and resolving EM interference usage of cell phone is forbidden.



Figure: 1 Restriction in ATM

As there are increasing transactions in a single day people would have to wait in a long queue to perform the required actions. So banks provide more number of machines in a single centre shows in figure2. This is an advantage for the culprits to attack the nearby person to grab their money and other valuables.

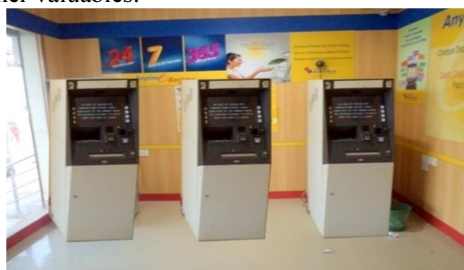


Figure: 2 More than one machine in ATM centre

The CCTV camera are provided at the door step to identify the people entering the centre but then when the customer enter with the helmet there is no use in providing CCTV shows in figure:3.

When the crime occurs inside the centre, legal evidences can't be gathered and the criminal cannot be traced even if they are arrested they will escape from the hands of law.



Figure: 3 Infringing the ATM center codes

2.1 RELATED WORKS

Implementing biometric as the only authentication to access ATM machine [17] it provide single stage security to operate ATM machine, it is not monitoring number person entering nor their facial identification thus it lack in providing surveillance and protection against man handling of customers.

Incorporating ATM theft monitoring system [1] concerned only on alerting banks and cops, if ATM machine is damaged and it never give protection to the customer nor facial identification to trace the intruders.

Availing digital lock system [5] suffer from card scammer and card skimming issues it fail in monitoring dos and don'ts of the ATM center thus doesn't ensure the safety to customer against man handling.

3. PREVILING ATM CENTRE IN INDIA

Traditional ATM systems authenticate generally by using a card and a password or PIN [17]. Prevailing technique of user authentication, involves the use of either password or user ID's, suffer from several limitation [6]. Password can be hacked easily so that the customer financial transaction will not be safeguarded. A magnetic stripe is provided in purchase cards, smart cards of corporate. These cards are enough to enter an ATM centre. The system at the entry point does not make use of any key to prevent unauthorized entry of person. This loop holes in security can be utilized by criminal to perform illegal activities.

The conventional method does not provide security against miscellaneous attacks. Manual monitoring of the centres are provided at present manual mode always leads to error as people will not be alert all the time. So the security system has to be completely automated. In figure: 4 CCTV cameras are provided to monitor people entering

the centre but they don't employ mask detection methods because of these legal prosecutions can't be carried out by the cops^[2].



Figure: 4 Flaws in existing monitoring system

4. METHODOLOGY

This project offers high level of security in the ATM transaction by implementing mask detection in CCTV camera^[13] the classifier technique is utilized for the purpose of face detection^[4], this is done using MATLAB software tool^[7]. The client/server model is used for facilitating online monitoring for better security features^[3]. The finger print biometric is used as unique password for each person so the fraudulence can be prevented^[20]. MEMS are utilized for detecting the vibrations occur during mishandling of doors and machines.^[14] The panic button and sound sensor are provided to find the suspicious activity^[15]. Now a day's sightless as well as deaf and dumb people make use of ATM centres some people cannot give a panic input and some cannot make noise. This system is designed keeping them in mind. The frightened noise made by them can be realized using sound sensors. Similarly, deaf and dumb can make use of panic button to intimate they require rescue aids. These messages are sent to police station and bank sector via GSM when any emergency condition prevails^[5].

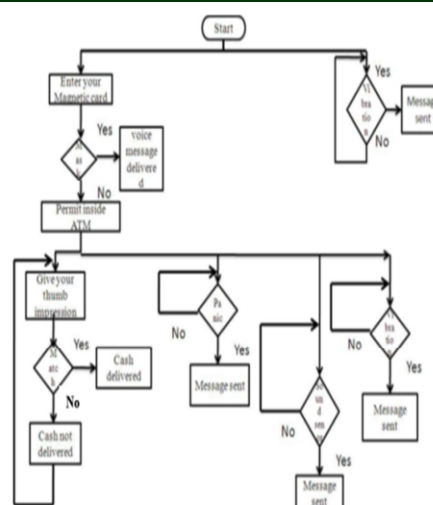


Figure: 5 Process Flow Diagram

ALGORITHM

STEP 1: Enter magnetic card to permit entry

STEP 2: MEMS input at doorstep sensed. If output is high which detects rough handling alert message delivered to cops else continues.

STEP 3: CCTV input is processed. If mask detected voice message to remove mask is delivered else permission to proceed is granted.

STEP 4: Thumb impression is input for transaction. If thumb impression match request processed else denied.

STEP 5: When emergency situation persist, Panic button input is sensed. The input is high then the alert message is sent to the patrol.

STEP 6: Sound sensor input is monitored. When noise increases the threshold cops are alerted else continuous monitoring is done.

STEP 7: MEMS placed on the machine detects mishandling emergency message sent to police else continuous monitoring done.

5. PROPOSED SYSTEM DESIGN AND IMPLEMENTATION

Our proposed system comprises of three main techniques namely mask-detection, MEMS and biometrics. In figure: 5 a flowchart of the proposed system is provided, by usage of this system which can affectively suppress the crime rate prevalent in ATM related theft. Since decades the prevailing method utilized by thief is to cover the face with a mask to conceal their identity. To prevent the access of the ATM for such criminals, CCTV camera is employed to do mask detection. The

software used for the automated face recognition is MATLAB since it offers more efficient and accurate results. A CCTV camera placed at the doorstep which senses the facial structures by using haar-like features. When any emergency situation prevails, the alert messages are sent to both bank and the patrol. Once when the bank receives this alert, the authorities by utilizing IP surveillance camera in the centre inquires about the situation. If it confirms to the alert, bank provides a rescue message to the cops. So they can rush to the place without delay else the alert is ignored. In case of any of the features are not recognized, the person will be inhibited from entering the ATM.

The second level of security is provided by MEMS placed at the door step and in ATM machine. When there is rough handling or try to open by a criminal the MEMS senses it. When the vibration exceeds the predefined value, a message is sent to the bank sector and police station through GSM.

An additional security feature is the provision of panic button which facilitated the victim to alert the surrounding during emergency. Sound sensors are also incorporated which senses higher decibel sound caused by person or noise. This value when exceed the preset decibel value the message will be sent to alert the police station. Criminals can take advantage over physically challenged people; sound sensor and panic button lend a hand to them.

The most promising biometric system is the fingerprint method shows in figure: 6. this facilitates high level of security in money transaction^[19]. When the user is in need of accessing the account, the card holder can place the finger against the biometric device. This fingerprint is verified with the impression in the database. In case the impressions do not match, a buzzer sound is produced to alert them.

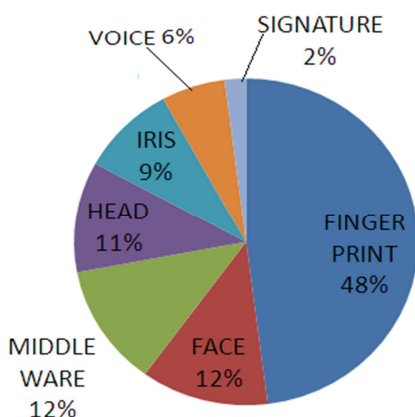


Figure: 6 Degree Of Security Among Various Biometrics

Under all these circumstances, alert message is sent to the nearby police station and bank via GSM. In case of suspicious activities, the public is alerted outside the ATM centre using loudspeaker.

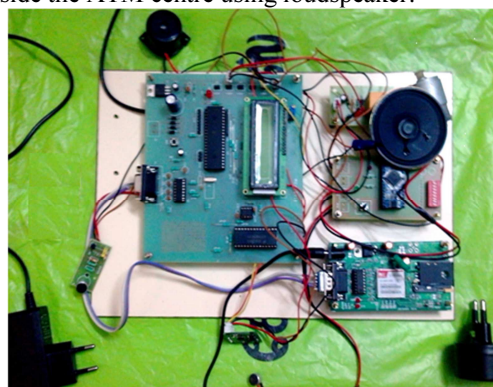


Figure 7: Inured Prototype

6. RESULT AND INFRENCES

The CCTV camera takes a snap of the customer requesting permission for entering and analyzes using MATLAB software to find whether the face is uncovered. The process is discussed with four different cases.

CASE1:

A person with helmet requesting entry is considered. In the first step the actual snap of the person is taken as input then it is converted to negative. Then the sketch of actual image is prepared. By using edge detection method scaling is done.

With the usage of classifier technique facial features are recognized. Since the face is closed no objects will be detected and the entry will be restricted and a voice board to remove helmet will be indicated.

CASE2:

In the next case a person covering face with mask is requesting permission. The same series of steps are followed. First input taken is converted to negative and then to sketch. Then the image is scaled. Here also the facial features will not be detected and the entry is prohibited.

CASE3:

A person with his face painted is considered. The very same sequence of steps followed. The facial parts will not be detected and so they access is constrained.








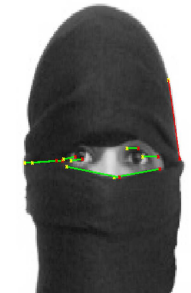



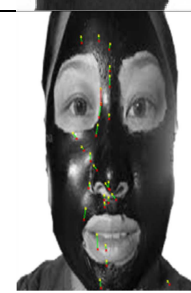
CASE4:

When a normal person snap is taken as the input. It will also be processed in similar way. Once the scaling is done, all the inputs from the face will be detected with a value so now permission will be granted.

For the analysis all possible forms of face covering practice are considered and the result clearly confirms how much proposed systems is accurate in recognizing the facial identification for

current authentication and future reference. Classifier techniques read only the exposed portion of the face and only if it is sufficient to recognize the individuals it authenticate the entry else it dines the individual. In the first three cases indentifying the individual is highly impossible, which encourages the misbehavior inside ATM centers.

Table: 2simulation Result

	INPUT	NEGATIVE IMAGE	SKETCH IMAGE	SCALING IMAGE	OUTPUT
HELMET					Scale : 6.631 objects detected : 0 Scale : 5.5258 objects detected : 0 Scale : 4.6048 objects detected : 0 Scale : 3.8374 objects detected : 0 Scale : 3.1978 objects detected : 0 Scale : 2.6648 objects detected : 0 Scale : 2.2207 objects detected : 0 Scale : 1.8506 objects detected : 0 Scale : 1.5422 objects detected : 0 Scale : 1.2851 objects detected : 0 Scale : 1.0709 objects detected : 0 70.7743
MASK					Scale : 6.15 objects detected : 0 Scale : 5.125 objects detected : 0 Scale : 4.2708 objects detected : 0 Scale : 3.559 objects detected : 0 Scale : 2.9659 objects detected : 0 Scale : 2.4715 objects detected : 0 Scale : 2.0596 objects detected : 0 Scale : 1.7164 objects detected : 0 Scale : 1.4303 objects detected : 0 Scale : 1.1919 objects detected : 0 39.8121
PAINT					Scale : 6.377 objects detected : 0 Scale : 5.3142 objects detected : 0 Scale : 4.4285 objects detected : 0 Scale : 3.6904 objects detected : 0 Scale : 3.0753 objects detected : 0 Scale : 2.5628 objects detected : 0 Scale : 2.1356 objects detected : 0 Scale : 1.7797 objects detected : 0 Scale : 1.4831 objects detected : 0 Scale : 1.2359 objects detected : 0 Scale : 1.0299 objects detected : 0 26.0192



7. CONCLUSION

Rapid increase in ATM crimes has made the security system the need of the hour. The conventional security system, which is very much concern over electronic transaction and not concentrating on ATM centers safety which in turn triggered the ATM center to host many fraudulent activities. This system shortens the problems faced in the conventional security system as it emphasize the need of strictly enforcing the dos and don'ts of ATM centers and it priorities physical safety of the costumer and ATM machine, by providing 24*7 surveillance and immediate rescue alter. As it is very particular about facial identification to authenticate the entry it provide sufficient data in the event of any discrepancies there by illegal activities can be avoided inside the ATM. It ensures more authenticated usage of an account as per the RBI rules. The mind set of people to do mischievous activities inside the ATM centre is flatten. This system provides complete information regarding an unethical event and helps to track the intruder. This also provides necessary evidence for the legal prosecution.

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