

## A NOVEL ENHANCEMENT FOR ATM SECURITY SYSTEMS

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**Abstract-** ATMs are the major mode for money transactions and it is a great help for the society. But the safety of ATM centers is now at risk. Burglary and theft often occurs at ATMs frequently. Even though the technologies are advanced there are no adequate measures taken by the authorities to ensure security in ATMs. Our system helps to avoid armed burglary with the help of image processing and embedded technologies. During an ongoing transaction, another person forcefully enters the ATM counter then the system will alert the public and authorities. When a person carries weapon into the ATM counter the system alerts the authorities using GSM technologies and block the person from escaping.

**Keywords-** Haar Cascade Algorithm, Weapon Detection.

### I. INTRODUCTION

Recently, the demand for using automatic video surveillance systems has been increasing. Video surveillance pays a great attention in the field of robbery detection. ATM crime is not limited to the theft of cash in the ATM but also harming the customer.

The Automated Teller Machine (ATM) was first commercially introduced in the 1960s. By 2005, there were over 1.5 million ATMs installed worldwide. The introduction of the ATM proved to be an important technological development that enabled financial institutions to provide services to their customers in a 24X7 environment. The ATM has enhanced the convenience of customers by enabling them to access their cash wherever required from the nearest ATM. Financial institutions have implemented many strategies to upgrade the security at their ATMs and reduce scope for fraud. These include choosing a safe location for installing the ATM, installation of surveillance video cameras, remote monitoring, anticard skimming solutions, and increasing consumer awareness by informing them of various methods of safeguarding their personal information while transacting at the ATM or on the Internet.

In today's technically advanced world, autonomous systems are gaining rapid popularity. As the social computerization and automation has increased, credit and debit cards have become popular with wider use of ATMs. They simplify financial and banking activity. However the theft and attacks occurring in ATMs has been rising in proportion to the ratio of spread out of automation devices.

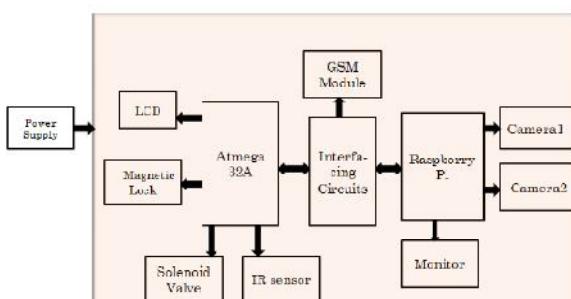
The Proposed System here implement a real time face detection system in ATMs to avoid robbery and attacks occurring inside the ATM. Our system helps to avoid armed burglary and intruders during carrying out transactions with the help of image processing and embedded & GSM technologies. When someone carries weapon into the ATM centre the system will alert the authorities and will block the intruder from

escaping with the help of GSM technologies and sensors. Also the same occurs when someone enters forcefully into an ATM centre while carrying out the transaction and blocks the transaction.

At the same time this system also deals with the safety of the customer by alerting the surrounding people whenever the customer is in dangerous situation.

### A. Proposed System

The block diagram (fig 1) gives a general idea to design our project. The overview of our project for designing purpose is given in the block diagram. The main part of our system is the controller units. It consists of ATmega32A and Raspberry Pi. ATmega32A is used for controlling all the activities of the system and Raspberry Pi is used for image processing. All hardware components are connected to ATmega32A. Raspberry Pi and GSM module is connected to controller by using interfacing circuits. Interfacing circuits used are MAX232N and IC 4066.



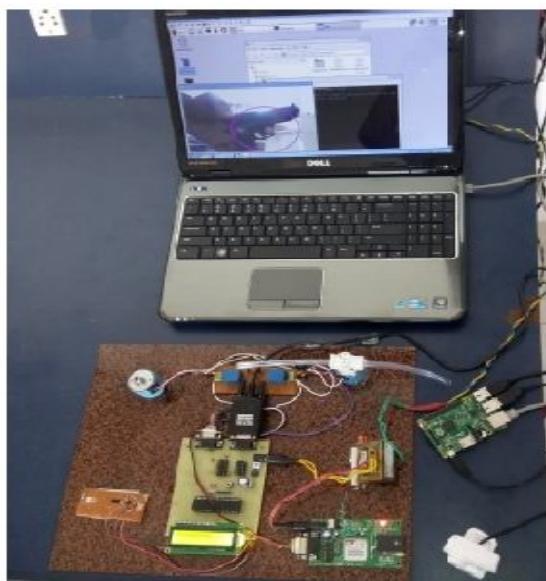
**Fig. 1. Block diagram of the ATM security system**

Cameras are used to capture images and it is interfaced to Raspberry Pi board. It compares and analyses the images with previously stored images using Haar cascade algorithm. and if weapon is detected, then corresponding data is sent to the ATmega controller. For monitoring these activities, display units are connected to the Raspberry Pi board. ATmega controller initializes other hardware units if

a weapon is detected. LCD displays the information. IR sensor placed are used for counting the persons entering the ATM. By using this we can switch between the two approach used in the ATM security. If the case is without customer the controller will relay information to buzzer, solenoid valve, magnetic lock and GSM module. GSM module send intruder alert to the police and authorities. Solenoid valve release the gas to make intruder unconscious and magnetic lock locks the door. If the case is with customer then controller will only initialize the buzzer and GSM module and transaction will be blocked.

### B. Summary Of Results

This system introduces an advanced security system for ATM counters using Raspberry Pi. A 24/7 camera surveillance with weapon detection is introduced. This system can detect intruders who carry gun, knife or hammer. Gun and hammer detection has maximum accuracy because object resembling guns are very rare in day to day life, so there is minimum error. But any pointed elongated objects similar to knife are very common, this cause less accuracy for detection of knife. The fig 2 shows the hardware implementation of the proposed system.



**Fig. 2. Hardware implementation of the proposed system with gun detection.**

### CONCLUSION AND FUTURE WORK

ATMs are the major mode of money transaction but attack on ATM counters are increasing day by day. To reduce such attacks it is necessary to provide good security systems in the ATM counters. Therefore this system can avoid such theft attempts even when a customer is present or not. The weapon detection is done by Raspberry Pi using the Haar cascade algorithm.

The security actions are monitored and controlled by ATmega32A. Since ATmega32A can execute 131 instruction in one machine cycle and Haar cascade algorithm has advances over other algorithms in calculation speed, the system is much more integrated and faster. With little modification in the project several new features could be added. By training more weapons database in Raspberry Pi, system can detect more intruders. Using MMW cameras, system can be integrated to detect concealed weapons and artificial intelligence system can be introduced to improve the performance of the system.

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