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Securing Automated Teller Machines (ATMs) with AI-powered IoT-based Security Systems

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Abstract

Because to its accessibility and all-around user friendliness, ATMs have grown quite popular with the general people. ATMs may now be located in a lot of places with frequent or heavy customer activity. As an illustration, ATMs are generally located in a variety of settings, including restaurants, supermarkets, convenience shops, malls, schools, petrol stations, hotels, work sites, banking centers, airports, entertainment venues, and transit facilities. Consumers often have access to ATMs on a continuous basis, allowing them to conduct banking operations and/or financial transactions at any hour of the day or any day of the week. This proposal relies on face recognition technology as well as a tiered security mechanism to execute the overall concept

Keywords— *Automatic Teller Machine, fingerprint, processing power, GSM.*

INTRODUCTION

It's an established truth that several innovations and technical developments led to the creation of digital India. These days, ATM facilities only have recording-only surveillance cameras. If any stolen actions take place, only human information will be able to determine it. Police will then begin their investigation with the aid of Surveillance footage. The camera may occasionally be covered or damaged by "thieves" so that it cannot record. In order to improve safety and security for people and infrastructure, automated video surveillance systems are widely used in today's world and play a crucial part in our daily lives.

A crucial part of several traffic monitoring systems, biometrics and security infrastructures, safety monitoring, different online applications, and object identification for mobile devices, among others, is the tracking and detection of objects. The detection of robberies is one of the process's main application areas. The main focus of this system will be on the detection of criminal activity or suspicious activity in an Automatic Teller Machine (ATM), which is essentially a lucrative bank service that allows for financial transactions in public places where the machines are a replica of the bank clerks and tellers.

Although there are several studies being conducted in the area of ATM crime detection, the usage of the crime detection system is seldom ever noticed since the present crime detection systems lack processing power and efficiency. Hence, after considering relative observations of the actual events taking place globally, the concept to develop such an automated system was born.

The suggested solution would address the issue of the growing prevalence of ATM frauds, which include actions like camera covering, money snatching within ATM CENTERS, stealing the ATM machine, and risky voice, in order to enable safe financial transactions at any time. An ATM is an electronic device that allows users to access their bank accounts from any location without the assistance of bank employees. With the aid of an ATM, the user may carry out several financial tasks including cash withdrawals and money transfers. Earlier research focused on using biometric techniques to increase the security of ATM transactions, while GSM-based techniques are also employed for this purpose. For ATM transactions, the biometric technique uses a fingerprint and facial recognition technology. Each customer's fingerprint is unique, hence the ATM transaction uses a fingerprint recognition mechanism. Hence, this technology offers transactions that are more secure than GSM. A face is identified from three angles using the facial recognition approach, which is also UTILIZED for security. Remaining paper is organized as Literature Survey in Section II, Section III consists of proposed system, Section IV concludes.

LITERATURE SURVEY

The System transformed the way that transactions are done, according to PAPER [1]. For a straightforward money withdrawal, there were no lengthy queues of people waiting in front of the bank.

Nonetheless, even with CCTV cameras installed in ATM facilities, there have been several ATM thefts recorded in India. In order to safeguard the ATM machine from these risks, it is crucial to use an automated surveillance SYSTEM [2].

The PAPER [3] suggests UTILIZING a Raspberry Pi as the image foundation for additional ATM machine security to prevent UNAUTHORIZED use of ATM cards by anybody other than the owner.

According to the PAPER [4], an ATM (Automatic Teller Machine) enables customers to do transactions such as cash withdrawals, deposits, and reserve transfers anytime they want to without involving bank employees.

The public's hard-earned money was taken in the ATM heist, and as a result, the public is indirectly affected since less money in the banking system means less money in the hands of the general population. After multiple successful thefts, ATM thieves have improved in intelligence and AUDACITY [5].

EXISTING SYSTEM

This current setup Most people find ATMs to be convenient and simple to use. After reading the instructions on the display screen, a user can use and operate the ATM by entering data and information on a keypad. The disadvantage of the current approach is that the user must always carry their ATM card. The hardware of the aforementioned sections consists mostly of universal IT equipment and components. The efficiency of these components has been a subject of extensive study, with several mature breakthroughs that may be included into a video surveillance system. Cons of this method include High processing times and improper operation of the surveillance camera.

PROPOSED SYSTEM

A biometric system called face recognition is used to recognize or authenticate a person from a digital picture. The usage of face recognition systems in security is very common. A biometric system called face recognition is used to recognize or authenticate a person from a digital picture. The usage of face recognition systems in security is common. A face in a picture should be automatically recognized by a face recognition system. With the use of a novel computer vision framework, our work aims to accomplish facial identification using an integrated ATM camera. With automated teller machines (ATMs), PIN-based total verification is typically used for customer authentication.

ADVANTAGES AND APPLICATION

THE SUGGESTED SYSTEM HAS THE ADVANTAGES OF HIGH ACCURACY, ADAPTABILITY TO ANY PROCESSOR WITH ITS DEPENDENCIES, AND AFFORDABILITY. APPLICATIONS INCLUDE PERSON IDENTIFICATION, INDUSTRIAL MONITORING, SECURITY SYSTEMS, AND INDOOR/OUTDOOR MONITORING.

BLOCK DIAGRAM

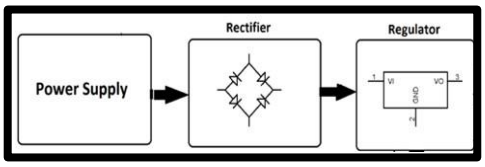

Figure 1: Block diagram

TRANING

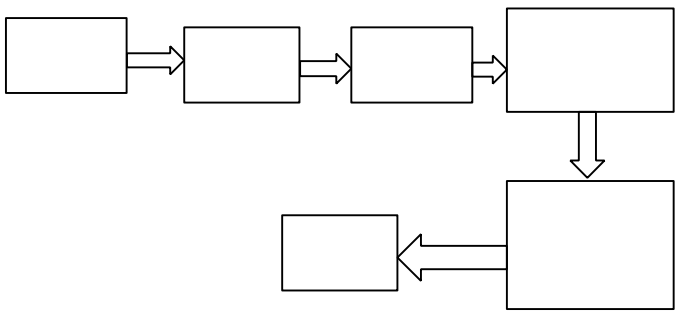

Figure 2: Block diagram of training

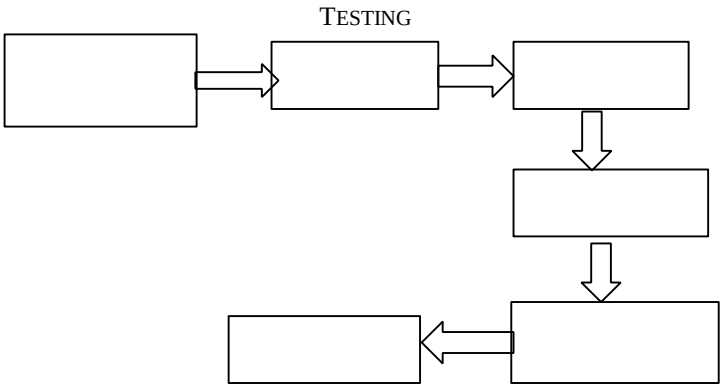

Figure 3: Block diagram of testing

SOFTWARE AND HARDWARE REQUIREMENTS

The programming language used is embedded C.

ARDUINO IDE

THE COMPILER IS ARDUINO IDE 1.8.3 IS SHOWN IN FIG 4.

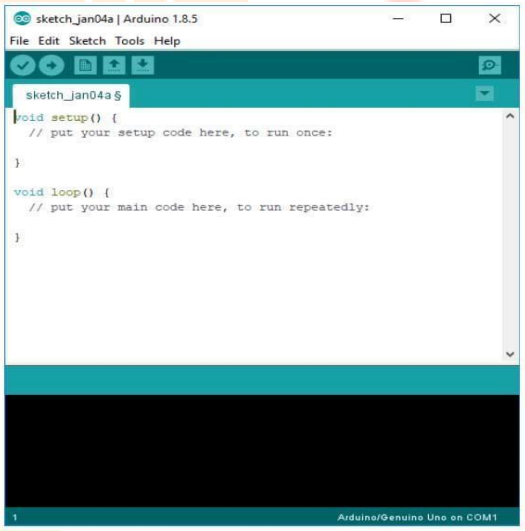

Figure 4: IDLE of Arduino

It is used to write and upload programs to an Arduino board. Arduino is an open-source electronics platform with straightforward hardware and software. An LED may be switched on, a motor can be turned on, You can control your board's operations by giving its microcontroller a set of instructions.

PYTHON IDLE

Python is an interpreted, general-purpose programming language. Python has dynamic typing and garbage collection. The procedural, object-oriented, and functional programming paradigms are all supported. Python is commonly referred to as a "batteries included" language because of its substantial standard library.

PROTEUS

Simulation tool used is Proteus before being implemented into a real-time application.

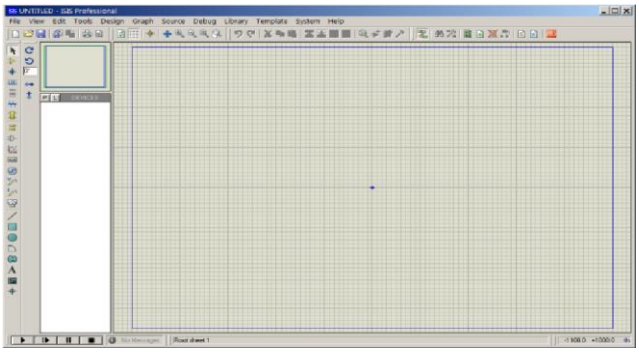

Figure 5: Proteus Application

Proteus is a simulation and design tool for electrical and electronic circuit design that was produced by Labcenter Electronics. The Proteus simulation feature. Several components of Proteus can be realistically replicated. Two techniques exist for simulating: Run the simulator or examine each frame one by one.

The circuit is simulated at ordinary speed using the "Run simulator" option (If the circuit is not heavy). The "Advance frame by frame" option waits until you click this button once more before moving on to the next frame. This is useful for debugging digital circuits. Figure 5 depicts the proteus at rest.

ARDUINO UNO

A platform for hardware and software prototyping, Arduino is free and open-source. An Arduino board may be used to take inputs like light on a sensor, a finger on a button, or a tweet, and then be used to start a motor, switch on an LED, or post anything online. Your board will be given instructions on what to perform by sending a set of commands to its microcontroller. You do this by utilizing the Processing-based Arduino Software (IDE) and the Wiring-based Arduino Programming Language.

Figure 6: Arduino Uno Board

WEB CAM

A webcam is a video camera that broadcasts or sends its picture live to or over a network of computers. The term "webcam" can also be used in its original sense of a video camera that is permanently linked to the Web and provides a view to everyone who visits its web page through the Internet, rather than only for a specific session.

Figure 7: Cam module

LCD DISPLAY

An electronic display module called an LCD (Liquid Crystal Display) screen has several uses. A 16x2 LCD display is a very fundamental module that is frequently included into many different devices and circuits. These modules are preferable over multi-segment LEDs with seven segments and additional segments. The explanations are that LCDs are inexpensive, easily programable, and have no restrictions on showing unusual and even customized characters, animations, and other content.

On a 16x2 LCD, there are 2 lines that can each display 16 characters. Each character on this LCD is presented using a 5x7 pixel matrix. The Command and Data registers on this LCD are its two registers.

Figure 8: LCD (16X2)

BRIDGE RECTIFIER

Four individual diodes can be used to create a bridge rectifier, however the four diodes needed can also be found in specific packages.

As it makes use of the complete AC wave, it is known as a full-wave rectifier (both positive and negative sections). Each diode needs 0.7V while conducting, and there are always two diodes conducting, hence 1.4V is consumed in the bridge rectifier.

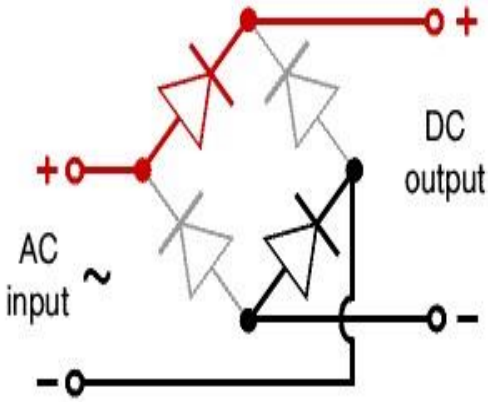

Figure 9: Bridge Rectifier

CONCLUSION

User identification system using face recognition and SMS alert The majority of bank clients choose to utilize automated teller machines (ATMS) and internet websites for their banking activities due to technological advancements in financial infrastructure. A more effective algorithm can be created since facial identification looks more difficult than other biometrics. To date, a number of factors have been researched to improve ATM customer authentication security. In this safe system that uses machine learning and face recognition.

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