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ADVANCED CCTV-BASED LOCKER SECURITY WITH REAL-TIME ALERT MECHANISM

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ABSTRACT: Nowadays, individuals prioritize safety and monitoring. The necessity for effective surveillance has been underscored by a series of recent armed robberies and burglaries. Consequently, we must devise a plan tailored to this specific situation. Currently, many individuals utilize security cameras to monitor their residences and commercial establishments. Nevertheless, due to continuous monitoring of the system, the costs and storage capacities of these cameras are increasing. The Advanced Container Security System, which incorporates an input panel, is founded on this premise. An electronic password is necessary to access this input interface. The locker will unlock upon entering the right password. Upon the entry of an incorrect password into the locker, MATLAB will document the occurrence and alert the owner through a text message.The locker owner can utilize the camera footage stored in the computer's directory to identify anyone who attempted unauthorized access to the locker system. The video owner can utilize this information to trace the source of the issue. This proposed security solution not only diminishes the costs associated with ongoing surveillance but also resolves the data storage issues that can arise with CCTV systems.

Keywords: *Security,Surveillance,GSMtechnology,MATLAB.*

I. INTRODUCTION

The current scenario is perilous, prompting widespread concern for safety and maintaining authority. A comprehensive security tracking and management system is essential for reliable, economical, and cross-platform theft monitoring. The current security protocol employed by electronic locking systems dependent on passwords is profoundly insufficient. Employing cutting-edge digital technologies can enhance the dependability and safety of a process. Numerous methods have been demonstrated to be ineffective, including hand geometry, voice recognition, and visual identification. The rationale for this is that systems with a singular layer of protection are more susceptible to compromise, making it challenging to identify the perpetrator of an incident promptly. As a result, we developed a prototype of a two-tiered security system for our project. In the event of an issue, we will cease attempts to access the container and document it accordingly. We want to develop a MATLAB interface for the security system and employ GSM technology for credential validation.

This project serves as a prototype for closed-circuit television (CCTV) systems capable of anticipating and performing both extensive and minor security operations, including the surveillance of bank vaults and individuals. The microprocessor storage system comprises preconfigured MATLAB software solutions. Each individual has a certain role to fulfill in the event of an invasion. The duty for the security of the storage system and the identification of intruders is with them. The monitoring computer

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records footage in real-time and stores it in a designated location. The locker owner can promptly detect unauthorized users to prevent tampering. A notification is dispatched to the mobile phone number of the locker owner if an erroneous PIN or pattern is detected.

II. RELATEDWORK

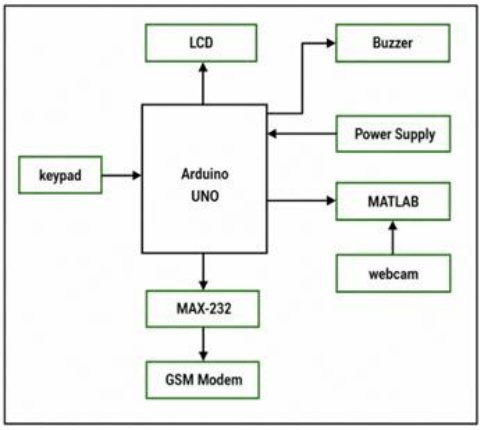
Saurabh Gupta Under the guidance of Professor Subhashish Banerjee (CSE IIT Delhi). Precisely defining routine operations and highlighting non-routine ones with a finite language in a finite state machine (FSM) model necessitates the compilation of all potential actions in this domain, resulting in additional overhead. The system's autonomous learning capability would facilitate the implementation of large-scale monitoring.

Mritunjay Rai, Agha Asim Hussain, Tanmoy Maity and Ravindra Kumar Yadav: November 5, 2018: AIVSS, or Advanced Intelligent Video Surveillance System.The video surveillance cameras enhance our understanding of the local condition. A key advantage is the capacity to record video for detection and preventative purposes. In essence, video surveillance constitutes a form of video processing that enables the recording of footage for subsequent review and modification as necessary.

PROPOSEDMETHOD

The proposed method employs a GSM module to ensure secure networking and two-factor authentication in MATLAB. A brief video recording is promptly generated and stored in a designated folder if a user inputs an incorrect digital password. The GSM module is utilized to transmit a banned message to the locker owner. This facilitates further investigation.

A) BlockDiagram:-



B) HardwareRequirement:

- Arduino Uno
- A GSMSIM800 module
- Liquid Crystal Display
- Computer Keyboard
- Energy Source
- Optocoupler utilizing the 4N35 model
- Direct current electric motor
- Acoustic apparatus and other integral components

C) SoftwareRequirement:

- The MATLAB
- MATLAB provides support packages for Arduino and USB cables.
- Extremely effective PL2303 driver

III. CIRCUITDIAGRAM& COMPONENT

The primary objective was to integrate MATLAB with the functionalities of the Arduino Uno. The util module, located within the MATLAB addor package, was crucial to our success in accomplishing this. Two pins, Pin0 (the RX pin) and Pin1, are utilized to connect the GSM900 module to the 12V power source. For the Arduino UNO, the keyboard modules must be attached to pins 3, 4, and 6. The digital password entered via the keyboard is currently being validation by the system. The information is shown on an LCD panel. Pins 1 and 4 connect the 4N35

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optocoupler to the +VCC power source. Two and three pegs are securely affixed. The D2 interface of the Arduino is connected to the second terminal of the 4N35 optocoupler. Pin 4 is common to both the BC577 transistor and the 1K resistor. The anode of the DC motor must be connected to Pin 4 of the 4N35 optocoupler, while the cathode should be connected to the ground terminal of the Arduino.

This comprehensive post provides all necessary information to connect an LCD to an Arduino UNO. Establish an electrical connection between the ground and the primary electrode (VSS).Connect pin 2, also referred to as VCC, to a 5-volt power source.

A current is transmitted to the base via Pin 3 (VEE).Pin 8, sometimes referred to as "RS," is physically connected to pin 4 on the Arduino board.

Connect Pin 5 (R/W) to ground for the Arduino to function properly.It is advisable to connect pin 6 (E) to pin 9 on the Arduino. Pins 7 (DB0) and 10 (DB3) must not be electrically interconnected.

It is advisable to connect pins 9, 10, and 11 of the Arduino board to pins 11, 12, 13, and 14 sequentially. Two wires connect the Light Emitting Diode (LED) to the 3.3 volt (V) power supply and the ground reference voltage of the Arduino microcontroller.

A highly effective method for connecting RS-232 serial devices to a USB host computer is using the PL-2303 USB-to-Serial driver. The PL-2303 is compatible with all versions of Windows due to its commonly utilized USB interface. To establish a serial connection for communication, simply attach this device to a serial port on your primary computer.

ComponentUsed:-

1.ArduinoUNO(R3): -

The Arduino UNO microcontroller board features sixteen digital pins and six analog pins. The Arduino board is equipped with an 8-bit Atmel AVR microprocessor. You have successfully installed the Arduino programmable board and the Arduino IDE software on your computer. The Arduino UNO board is programmable as a result. The Arduino IDE facilitates the straightforward programming of microcontroller boards using C or C++ code. This development board enables code transmission and reception over USB.

2.Liquid-CrystalDisplay:-

Information is presented on flat panel screens known as liquid crystal displays (LCDs). This two-story building comprises sixteen distinct components. The LCD obtains its +5V power via the VSS and VCC terminals, which also serve as ground connections.Brightness of LCD displays can be modified with VEE.Just pick the RS (Register selection) port from the available alternatives to choose the required register.The R/W input pin facilitates data transmission and reception on the LCD. The E pin, sometimes referred to as the "Enable" pin, serves as the interface for inputting data values for storage or reception. Data may be transmitted and received using the 8-bit data ports D0 to D7 on the LCD.

3.GSMMODULE(SIM800):-

Access to GSM cellular networks is achievable with wireless modems equipped with AGSM modules.The Global System for Mobile Communications (GSM) network depends on the GPS system for its operation. The SIM800 possesses four distinct radio channels for its operation as a GSM module. The gadget is equipped with a UART interface

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and a USB connector designated for software upgrades. AT commands are utilized to manage and administer the SIM800 module. The host microcontroller can interface with the SIM800 module by transmitting AT commands via the UART interface. GSM modules provide both texting and phone calls. The GSM module requires a SIM card from a mobile network provider to function properly.

4.Keypad:-

The keyboard serves as an intermediary between input devices and the central processing unit (CPU). One may effortlessly input a number into the computer by observing the LCD panel and pushing the corresponding numerical key. Modifying the values inputted via a computer keyboard can alter the interpretation of numerical values.

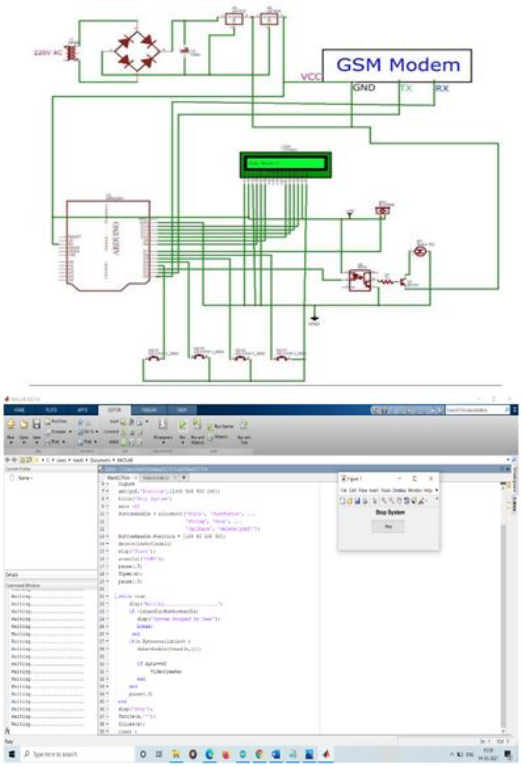
5.4N35optocoupler:-

The surface mount (SMD) and 6-pin variants of the highly adaptable 4N35 optocoupler are frequently utilized. The apparatus comprises an infrared LED and a phototransistor.

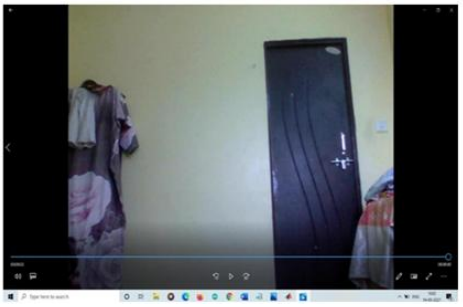
6.DCMotors:-

DC motors are exceptionally flexible and thus essential in motor technology.Direct current (DC) actuators are frequently employed in small to medium-sized applications via microcontrollers.





Currently, MATLAB is operating in the background. The microcontroller validates the user's entered password prior to unlocking the locker. Upon the user's entry of an invalid password, MATLAB archives the current scene to a designated location. A GSM smartphone will notify the locker owner in the event of unwanted access.



Video capture using MATLAB

III. OBJECTIVES

Objectives:

- for the purpose of the store's security.
- Monitor the corridor that leads to a bank or office.
- To safeguard your possessions from

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theft, you must monitor them diligently.

- Any defective procedures are swiftly conveyed to the owner by SMS.
- It is not only functional but also compatible with a diverse range of devices.

Advantages:

- Rigorous safety protocols.
- An electrical device that is very efficient and consumes minimal power during operation.
- Accelerated response times and improved responsiveness.
- This is a straightforward task that requires no additional assistance.
- The corporation has completely automated all its machinery.

IV. CONCLUSION

A CCTV camera with automatic video monitoring has been installed and is currently operating as part of the compartment's security and alarm system. This camera offers excellent value, operates effectively, and meets requirements adequately. No unexpected changes occurred in the project's outcome, as predicted. A systematic method was employed to develop a microcontroller-driven container security solution. This method streamlines the integration of video surveillance with MATLAB and facilitates the swift capture of images during unauthorized access. The technology's capacity to incorporate authentication and monitoring systems renders it effective for attaining various security objectives, such as diminishing the probability of theft. The significance of this issue is illustrated by the potential of OpenCV, in conjunction with AI or image processing, to facilitate dependable monitoring and surveillance. The implementation of artificial intelligence (AI) may bolster safety and security protocols while simultaneously improving monitoring and reporting systems.

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