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Realtime Unusual Event Detection for Enhancing the ATM security using Arduino

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ABSTRACT: Nowadays providing security to the ATM Machine is the most challenging task for banks. The existing methods are difficult to identify each bizarre situation that occurs in the ATM Machine. This occurs in ATMs. The existing CCTV system will identify any abnormal event through video clips and it will not send any alert messages to the concerned bank offices and police department officials. The proposed method will provide much security to ATMs when any unusual event happens and it is easy to detect the unusual event using modern technologies like the Internet of things (IoT) and Machine learning (ML).

KEYWORDS: Arduino Uno, ATM Model, CNN, Yolo, Servo motor, HaarCascade, Yolo Weights.

I. INTRODUCTION

Automated Teller Machines (ATMs) enable customers to conduct banking transactions without the need for a human teller. With a debit or ATM card, people can withdraw funds from current or savings accounts, deposit funds, and transfermoney between accounts at ATMs.

Due to a lack of security in some way or another, unauthorized users or hackers, or criminals take an opportunity to tamper with automated teller machines and steal money by physical attacks on the machines, cutting the safes, bombing, shoulder surfing, and ramming the machines by fraudsters. Hold-ups, forceful removal of Automated teller machines from their premises, or explosive attacks on Automated teller machines are the most common criminal activities against Automated teller machines.

Access to and secure storage of money have been problems for humans for several decades. A solution was then found to that problem. Withdrawing money from our bank accounts is possible with ATM cards provided by our banks. An account withdrawal is punched, making the card unusable. The cards didn't last long because they had to go to the bank every time they ran out to get a new set. Modern ATM cards have had magnetic strips on their backs since then. An ATM card with a magnetic strip that has a unique code will be provided. Cryptography is used to encrypt the codes.

II. RELATED WORK

To deal with low-resolution video,SudhirGoswami et.al [1] propose only close morphological operations with a disk-like structuring element. A rolling average background subtraction technique is further used to detect foreground objects from dynamic backgrounds. Using statistical properties, and standard deviations of moving objects, the proposed algorithm can identify unusual events in the low-resolution video, such as overcrowding or fighting using the ARM 7 LPC 2148, [2] proposes an enhanced ATM security system that detects unusual events even in low-resolution videos. ATMs have a low-resolution camera that can be used. A prototype is designed using the inbuilt web camera of a computer or laptop. Most laptops have an inbuilt web camera with a low resolution. We, therefore, use the same. Using the discussed algorithm, we can detect unusual activities. Using the Raspberry Pi board as a platform for the image processing operation, [3] shows how the system uses open-source Computer Vision software (Open CV) from the Open CV project. To provide a high level of security, a series of sequential actions take place, such as the initial capturing of the human face and checking whether that face is detected appropriately. An alert is displayed if the user is not adjusting him/herself properly to detect the face properly. For security reasons, the system will lock the ATM cabin door if the face is not detected properly. In the event of the door being locked, an automatic e-mail will be generated. By using the SMTP module connected to the model, the Email code will be sent to the manager and the police station registered email address. Only the manager and the policeman will be receiving the notification. The door will be unlockedwhen the manager presses the button.

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III. PROPOSED ALGORITHM

ATMs will be more secure with the proposed system. Every movement of the person in the ATM will be captured by the camera, and this information will be helpful in the detection ofunusual events in the ATM. The proposed architecture contains hardware components like an Arduino Uno board, Servo Motor, and Power supply. These components are connected through a cable to a PC/Laptop. The Arduino Uno is a controller and it helps to control other components. The servo motor will help to close or open the ATM. If any unusual event occurs, automatically ATM door will be closed with the help of the Servo-Motor and each event will be captured from the live video and converted into an image.

The unusual events images will be sent to the particular area police station officials through E-Mail and also alert messages will be sent to particular bank officials through SMS or E-Mail. In the proposed system, unauthorized persons cannot escape easily from the ATM if any unusual event occurs in the ATM with the help of an E-Mail. Whenever an unusual event occurs, such as identification of gun, any sharp object ,presence of more than two people, or mask detection, the ATM door will close.

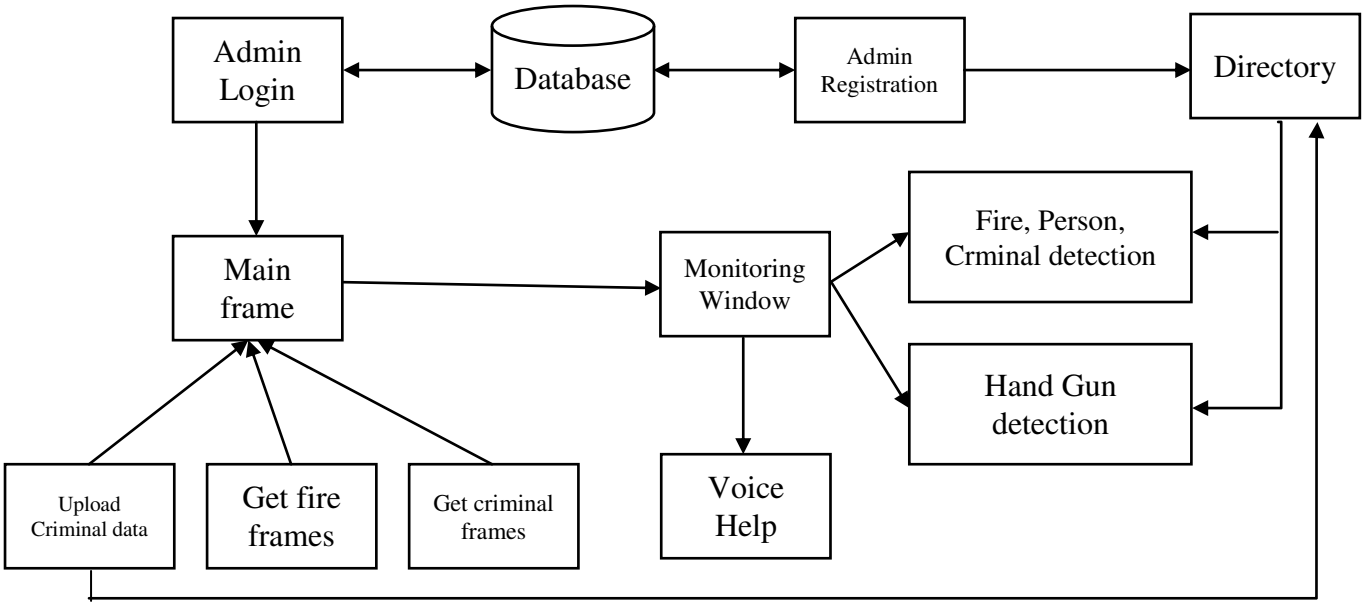

Fig 1: Module diagram

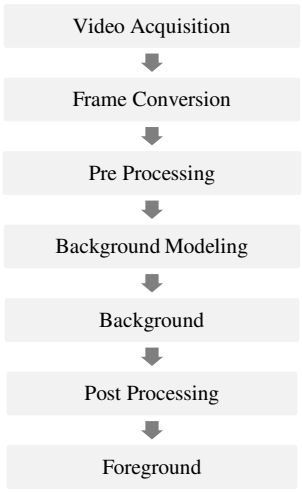

Fig 2: System architecture diagram

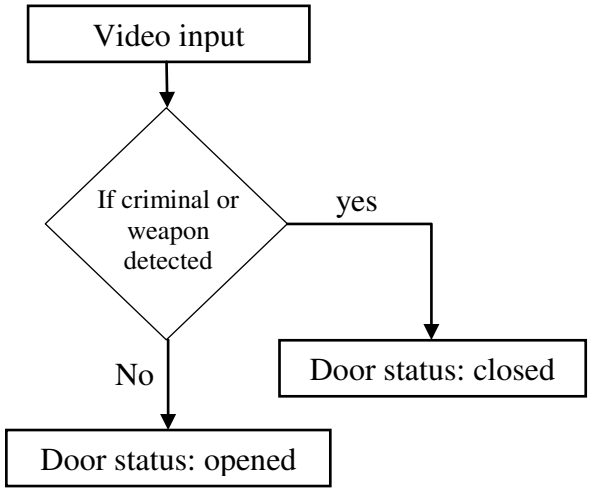

Fig 3: Flow chart of ATM room model operation

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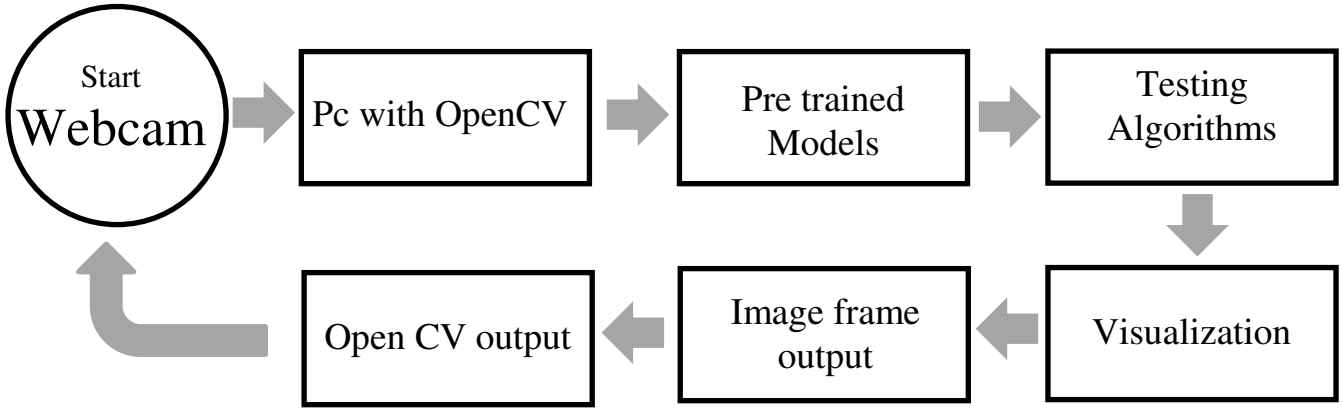

Fig 4: Module diagram

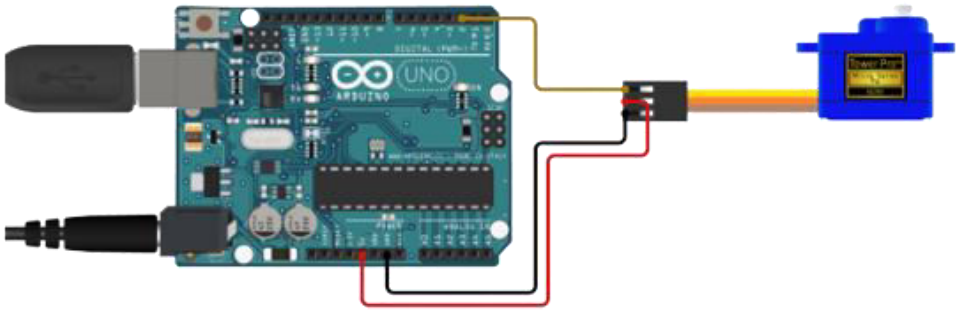

Fig 5: Circuit diagram of Arduino Uno and servo motor connection

IV. PSEUDO CODE

Pseudo code 1: Motion detection inside the ATM.

Input: ATM Room live feed.

Output: Motion detection and status.

Step 1:live video stream of the ATM zone.

Step 2: Process the video.

Step 3: Motion detection Algorithms detect the motion of any objects.

Step 4: Video converted into frame scale image.

Step 5: Detection of humans or any other object by HaarCascade files.

Pseudo code 2: Fire detection inside the ATM.

Input: ATM Room live feed.

Output: Detect fire and update.

Step 1:live video stream of the ATM room.

Step 2: Process the video.

Step 3: Fire detection Algorithms detect the fire of any objects.

Step 4: Video converted into an inverted image.

Step 5: Detects the fire by HaarCascade file.

Pseudo code 1: Haarcascade Algorithm is been used for the detection of objects movementIt will work with the Yolo zone. For object detection, each edge feature, line feature, and four-rectangle feature are used to detect the objects.

Pseudo code 2: Haarcascade algorithm is used to detect the fire disaster inside the ATM. It will work with the color gradients in the frames which are captured.Based on the images captured it identifies the unusual events.

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V. SIMULATION RESULTS

Python packages, PyCharm IDE, Arduino IDE, and QtDesigner are used to implement the proposed system.Arduino Uno, Servo Motor, Jumper wires, Solenoid lock, and webcam are the hardware component used to implement this system.

Figure 6 display the frame consisting of a few options which can redirect to the perspective functions. Figures 7 and 8 show the structure of the ATM.Figure 9 displays the screen that verifies the identification for logging intothe system. Figure10 has the glimpse of previously detected frame of a fire. Figure 11 shows the image of the criminal which has been previously detected. Figure 12 has the criminal image that been used for training. Figure 13displays the processed output video frame which under go through the functions like fire, room status, criminal and weapon detection. Figures 14 and 15 shows that alert message received after each unusual events.

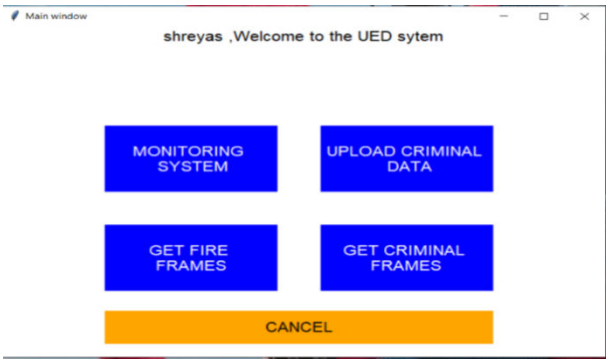

Fig 6: Mainframe

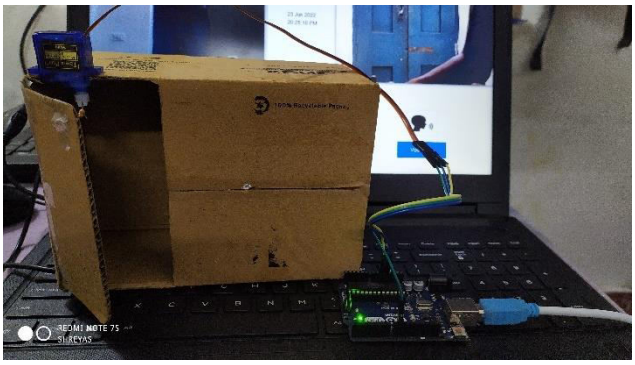

Fig 7: ATM room model

Fig 8: Arduino Uno and servo motor

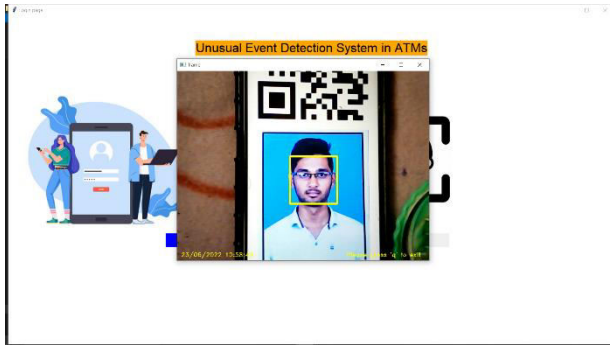

Fig 9: ID card detection

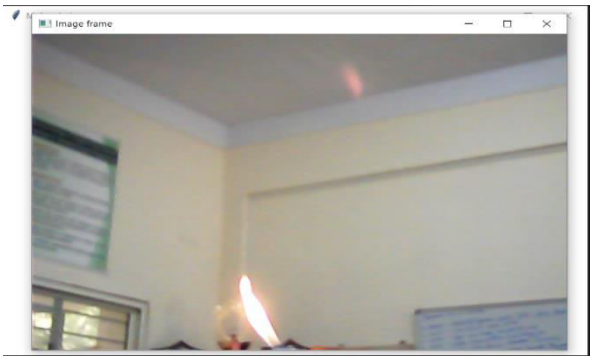

Fig 10: Displaying previous fire detected frame

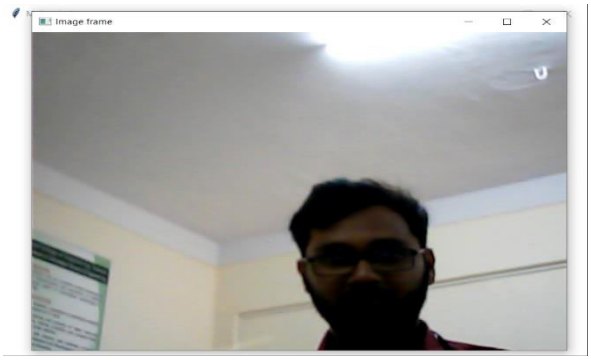

Fig 11: Displaying previous criminal detected frame

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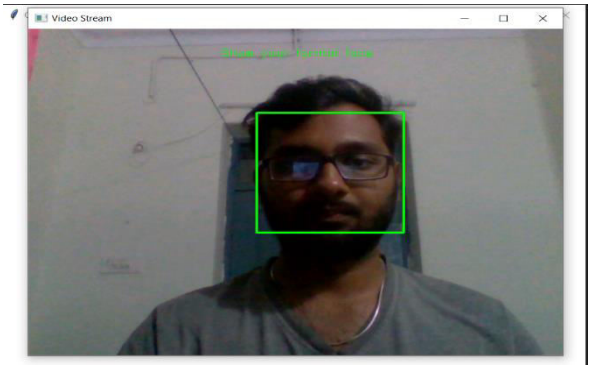

Fig 12: Training model for criminal datasets

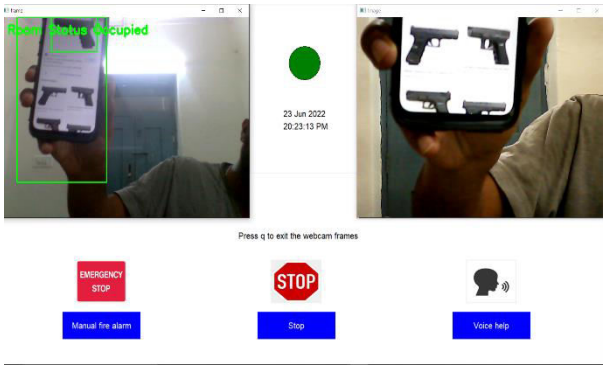

Fig 13: Monitoring window

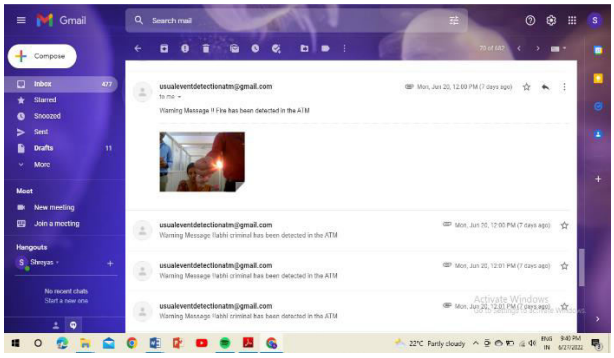

Fig 14: Alert E-Mail message for fire detection

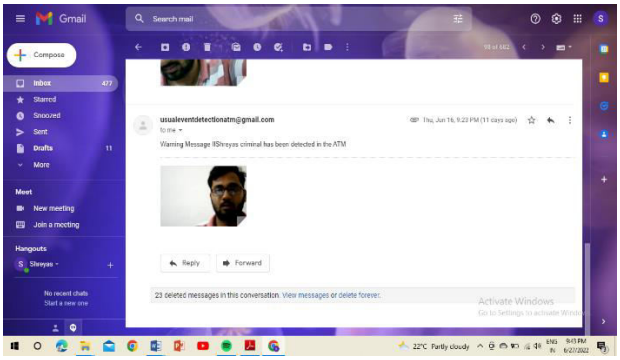

Fig 15: Alert E-Mail message for criminal detection

VI CONCLUSION AND FUTURE WORK

The proposed framework could detect unusual experiences such as overcrowding and fights at bank ATMs. Increasing numbers of suspicious actions at ATM booths call for the development of such a security system. ATM security could be enhanced by this proposed framework. Still, there is a need for a method to improvise weapon detection or to identify different types of weapons. In the future metal sensors on ATM doors may be used, which will prevent abnormal events from occurring and may eliminate the need for security guards.

REFERENCES

1. SudhirGoswami, JyothiGoswami, Nagresh Kumar, "Unusual Event Detection in Low-Resolution Video for enhancing ATM security", 2nd International Conference on Signal Processing and Integrated Networks (SPIN), 2015.
2. Saleem Ulla Shariff, MaheboobHussain, Mohammed FarhaanShariff , "Smart unusual event detection using the low-resolution camera for enhanced security", International Conference on Innovations in Information, Embedded, and Communication Systems (ICIIECS), 2017.
3. SharayuSadashivPhute,Sharad D. Sawant, "Abnormal activities detection for security purpose unattained bag and crowding detection by using image processing", International Conference on Intelligent Computing and Control Systems (ICICCS), 2017.
4. Unusual Event Detection for Enhancing ATM Security | YouTube video.
5. Introduction to Arduino Uno | Arduino/en/software.
6. HaarCascade files | github.com/opencv/opencv/tree/master/data/haarcascade.

BIOGRAPHY

Ms Vinutha M.R., currently working as an Assistant Professor at Information Science and Engineering, Malnad College of Engineering, Hassan and has a total teaching experience of 19 years and one year of industry experience. Her research areas of interest are Data Mining and Machine Learning. Currently pursuing PhD in Applications of Machine Learning in the medical domain.

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