ADVANCED ATM SECURITY USING IMAGE PROCESSING

Chetan M Parashar*1, Krishna*2, Likitha D R*3, Raghunandan G R*4, Ramgopal Segu*5

*1,2,3,4Student, ECE, Dayananda Sagar College of Engineering, Bengaluru, Karnataka, India
*5Assistant Professor, Department of Electronics and Communication Engineering, Dayananda Sagar College of Engineering, Bengaluru, Karnataka, India

ABSTRACT

The basic idea behind the project is to develop a system which is automated and provides the most advanced security features in places like ATM. The use of advanced image processing techniques using softwares like OpenCV lead to us naming the project as “Advanced ATM security using Image processing”. The project aims to give access to ATM’s for only those who follow the rules of the ATM usage that is preventing access to ATM for those wearing masks and helmet. The webcam captures these images and Raspberry Pi processes the images or video feeds and controls the door control i.e, the stepper motor controls the opening and closing of the ATM door. In addition to this features like buzzer and SMS notification to relevant security personnel is provided to enhance the security. In addition to this, security to the machine is provided using a vibration sensor that is used to detect the movement of the machine in case machine theft. Weapon detection using TensorFlow increases the security of the customers of the ATM and also increases the security to the machine itself.

Keywords: OpenCV, DC motor, Webcam, Door Control, Raspberry Pi, Weapon detection

I. INTRODUCTION

The idea and motivation to design of the proposed project was inspired by the events happening in our day to day life such as ATM robbery. The customers using the ATM machines are prone to attacks with dangerous weapons and hence it is essential to implement a system that not only provides more safety to the customers but also helps nab the intruder easily. The buzzer alert system as well as SMS notification is intended to do exactly the same.

This project also makes it mandatory to follow the ATM usage rules that is preventing access to the ATM resources while wearing a helmet or a mask. The entire process being an automated one, does not involve a lot of human involvement in enforcing these rules and security measures.

The choice of image processing over other biometrics is because of the nature of image processing. Image processing is a passive technology which means it does not require the user to provide input which is not the case with other biometrics like fingerprint technology.

II. METHODOLOGY

ATM machine theft detection:

The flow of operations is as shown in the fig.1:

The flow of working is as follows,

1. The Vibration sensor is a digital sensor which produces Logic 1 or 5v in idle condition and Logic 0 under stress.
2. This idea is used in the code to control the DC motor and also to alert the security.
3. The vibration sensor on producing a logic 0 sends this signal to the raspberry pi where the signal is processed and appropriate action is taken by the H-bridge which receives control signal from raspberry pi.

![Fig 1. ATM machine theft detection](image-url)
III. MODELING AND ANALYSIS

Proposed Block Diagram:

1. **The Buzzer block** acts as an output device which gives the option for various alert sounds that are required for the security mechanism implementation.
2. **The Camera block** captures visual information from the surroundings and provides this information to Raspberry pi for processing.
3. **User input block** implements the functionality of the keyboard to accept various user information.
4. **GSM block** (Implemented as Twilio for simplicity) to send and receive various alert messages to the concerned members.
5. **Door control block** for open and closing of doors automatically.
6. **Display block** for visualization to the operators of the machine and the room.
7. **Vibration sensor** mounted on top of the ATM machines detects the motion of the ATM in case of banging of the ATM machine and sends the signal to Raspberry pi which takes applicable action.
8. **Raspberry Pi** acts as the brain to the project and performs various computational and decision making process.

IV. RESULTS AND DISCUSSION

4.1 Mask Detection:

Fig.3 shows mask detection. It consists of the live feed in the extreme left, the detected feed in the center and the threshold feed in the extreme right. The threshold feed provides the extreme values for black (1) and white (0).
4.2 Helmet Detection:

![Helmet Detection Image]

Fig.4: Helmet Detection

4.3 Weapons Detection and SMS alert:

![Weapon Detection and SMS Alert Image]

Fig 5. Weapon detection and SMS alert

V. CONCLUSION

The project successfully helps in implementing the no helmet and mask rule inside the ATM. The use of vibration sensor and image processing technology to a larger extent helps nab the culprit in case of ATM machine theft as well as preventing access to the machine to those not following the rules of ATM usage.

In addition to this the security of customers using the ATM is addressed in the project with weapon detection and SMS alert to the authorized personnel.

ACKNOWLEDGEMENTS

In this section, a brief acknowledgment has to be presented as a thanks giving to all the people who have directly or indirectly helped in the successful completion of the project.

Thanks to the members in this order:

1. Chairman – Dr. Hemachandra Sagar
2. Vice Chairman – Dr. Premachandra Sagar
3. Secretary – Galiswamy
4. Principal – Dr. C.P.S. Prakash
5. HOD – Dr. T.C.Manjunath
6. Project Guide – Prof Ramgopal Segu
7. Project Convener – Dr. K.N. Pushpalatha
8. Dept. Project Coordinators – Dr. P.Vimala, A. Dr. Rajagopal, Sapna P J, Deepa N P
9. Dept. Staff members – teaching & non-teaching
10. Industry personal / R & D organization / Company / External guide

www.irjmets.com @International Research Journal of Modernization in Engineering, Technology and Science
11. Family members & relatives
12. Friends
13. God

VI. REFERENCES

[10] https://docs.opencv.org/master/d0/de3/tutorial_py_intro.html
[16] https://www.tensorflow.org/tutorials/images/classification
[18] https://www.youtube.com/watch?v=F5rysk51txQ