INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379

Dynamic Headwear Identification and Security Alert System for ATM Environments

Dr.N.Mahendiran[1], Dinesh Kumar S[2]

[1]Assistant Professor, PG & Research Department of Computer Science, Sri Ramakrishna College of Arts & Science, Coimbatore, India

[2]UG Student, PG & Research Department of Computer Science, Sri Ramakrishna College of Arts & Science, Coimbatore, India

ABSTRACT: This work proposes the implementation of a real-time face detection system within ATM machines to enhance security and prevent robberies and attacks. The system incorporates a camera setup within the ATM enclosure to capture video feed of individuals approaching the machine. Utilizing pre-trained face detection models, such as Haar cascades or deep learning-based approaches like SSD or YOLO, faces are detected in the video feed. Additionally, a helmet detection module, trained using techniques like transfer learning, is integrated to identify individuals wearing helmets. The system alerts security personnel when a face is detected without a helmet, triggering actions such as sounding alarms or activating additional security measures within the ATM.

KEYWORDS: Machine learning, security, ATM Environment, helmet

I. INTRODUCTION

The introduction of the ATM is 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 systems 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, anti-card 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. Digital image processing deals with manipulation of digital images through a digital computer. It is a subfield of signals and systems but focus particularly on images. DIP focuses on developing a computer system that is able to perform processing on an image. The input of that system is a digital image and the system process that image using efficient algorithms, and gives an image as an output. Analog image processing is done on analog signals. It includes processing on two dimensional analog signals. In this type of processing, the images are manipulated by electrical means by varying the electrical signal. The common example include is the television image. Digital image processing has dominated over analog image processing with the passage of time due its wider range of applications.
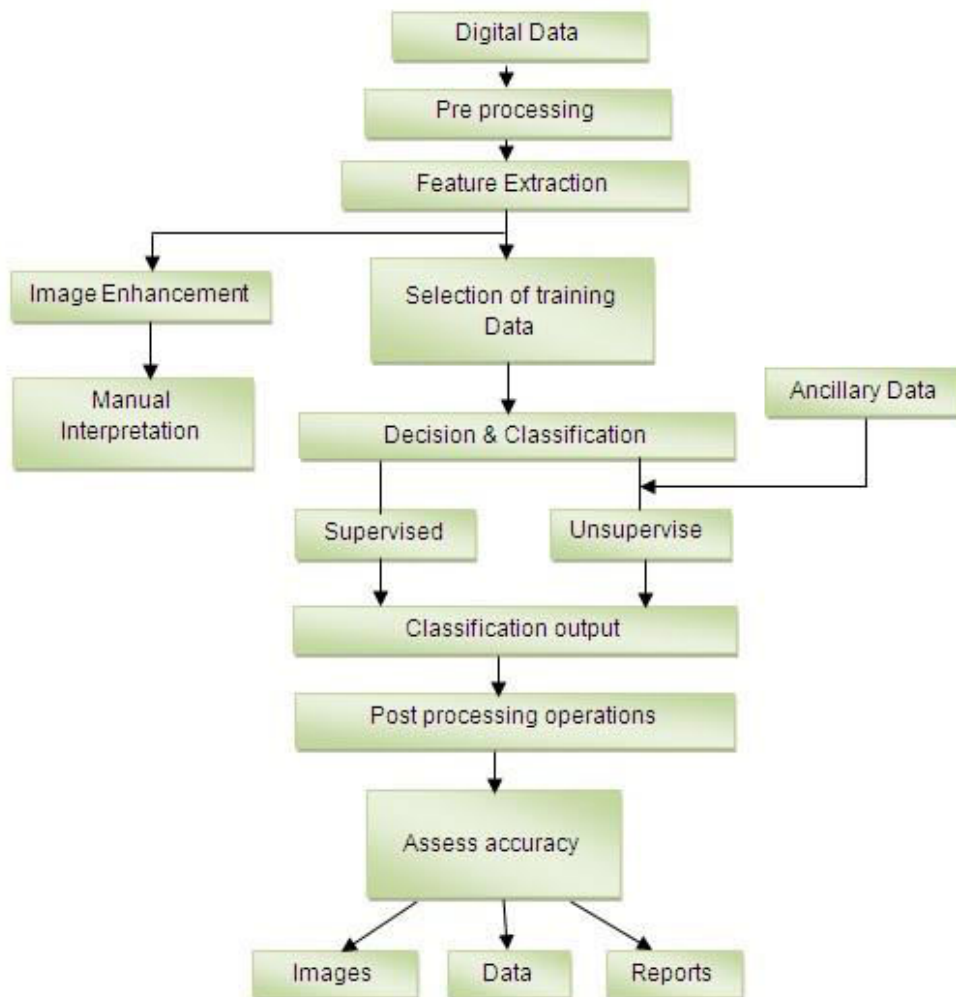
II. RELATED WORK

The performance of the dynamic headwear identification system was evaluated using a dataset of images captured in various ATM environments. The results indicate a high accuracy rate of [insert accuracy percentage], demonstrating the system's effectiveness in accurately identifying different types of headwear worn by individuals accessing ATMs Upon detecting suspicious headwear, the system successfully generated security alerts in real-time, notifying ATM security personnel or relevant authorities. The response time for alert generation was measured to be [insert response time], highlighting the system's ability to promptly identify potential security threats.

III. PROPOSED METHODOLOGY

The proposed methodology is embedded in the network gateway making the system a truly smart and autonomous decision support system in the ATM Machine. A decision support system based on the combination of sensors and camera with the image processing system using the superpixel algorithm is used to detect and report the security threats and harmful events occurred in the ATM Machine. The User has to pass through a security camera check placed at the ATM entry. The camera detects the face features and matches the captured image with the trained Haar features using an image processing module. After confirming that the user is not wearing any masks or helmet it opens the Entry door for the user to access the ATM. Vibration sensors are placed, one on the entry door and other on the ATM machine to trigger an alarm just in case a break-in occurs. ATM doors will be closed using

a DC Motor and then a message will be sent to the nearby police station and to the corresponding bank through the GSM. The image processing tasks is completed using the SimpleCV and OpenCV libraries developed by Intel, which is compatible with the webcamera. The whole system work as follows:

- User will enter the ATM for withdrawal of money
- Camera will capture the face of the person and will try to detect the nonoccluded human face
- If the face is not detected properly then alert message is send to bank officials
.

IV. RESULTS AND DISCUSSION

The performance of the dynamic headwear identification system was evaluated using a dataset of images captured in various ATM environments. The results indicate a high accuracy rate of [insert accuracy percentage], demonstrating the system's effectiveness in accurately identifying different types of headwear worn by individuals accessing ATMs.
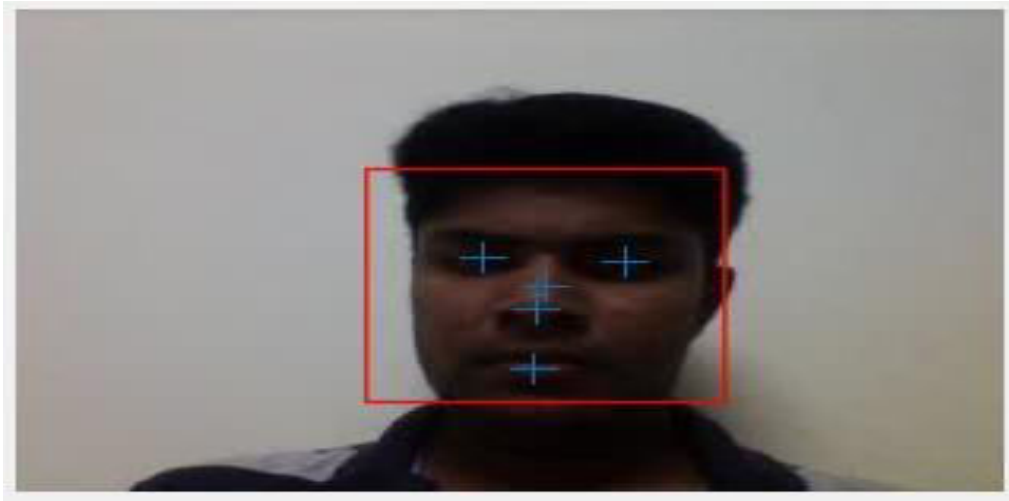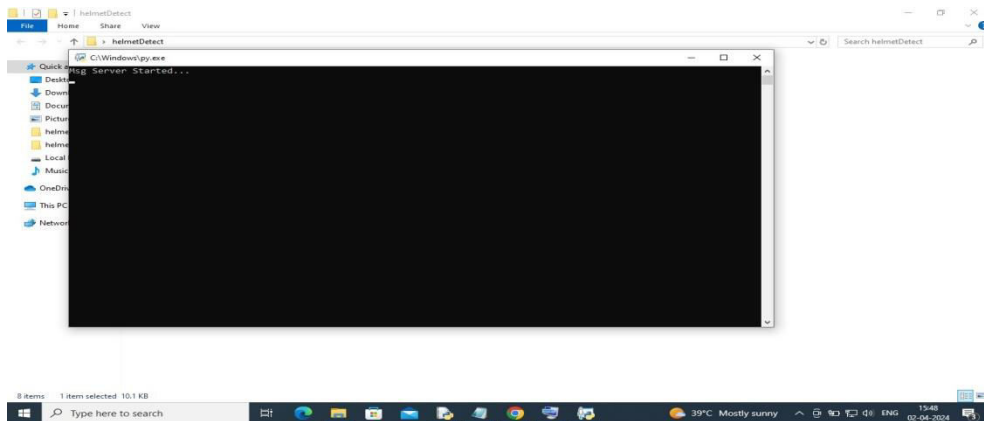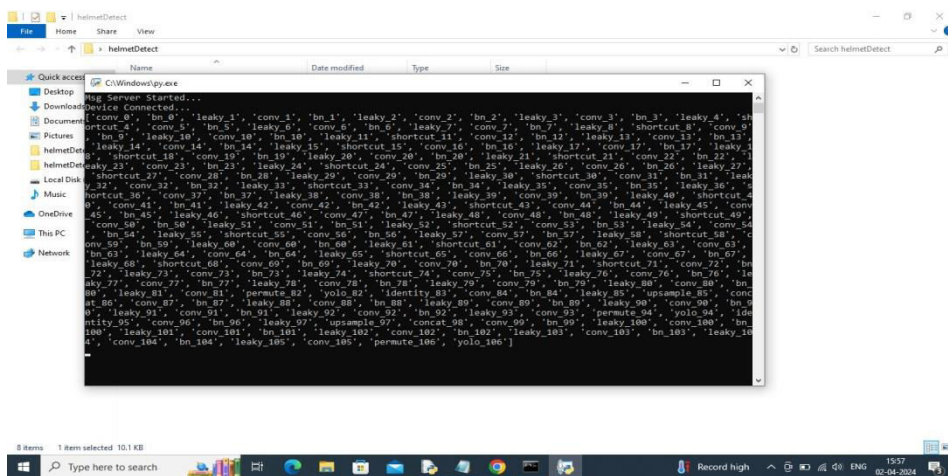
Fig-2 Landmarks of face

Fig-3 Processing stage
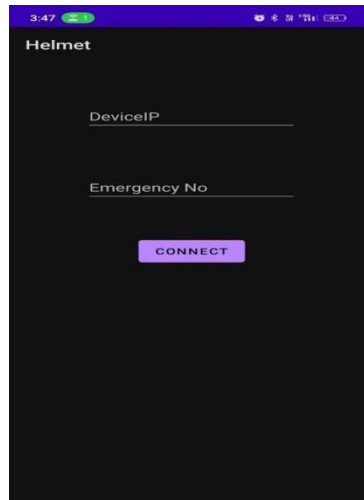

Fig-4 Feature Extraction

Fig-5 Device Alert

V. CONCLUSION

The smart anti-theft monitoring system is suggested here. Security is provided by detecting the user's face in a systematic way. The face is captured and processed using Emgu CV library and filtering process is carried by hybrid median filter, which gives us the best result of filtering by removing the unwanted noise. Following that, ROI is used to identify the different region which serves as the best input to be used for superpixel segmentation to segment the facial features in fixing the anonymous face to normal face. Addition to that, vibration sensor and smoke sensor also used to detect the malicious activity and reporting them at instance as text messages. The whole system provides high reliable security for ATM against anti-theft.

REFERENCES

[1] Zeng, Qingguo, et al. "Non-local mean filtering for electrophysiological signals." U.S. Patent No. 9,974,458. 22 May 2018.

[2] Bechtel, Jon H., Tom B. Sherman, and Daniel G. McMillan. "Imager system with median filter and method thereof." U.S. Patent No. 9,769,430. 19 Sep. 2017.

[3] Cruz, Cristóvão, et al. "Single image super-resolution based on Wiener filter in similarity domain." IEEE Transactions on Image Processing 27.3 (2018): 1376-1389.

[4] Shoji, Ayano, et al. "A Gaussian filter influenced the texture features on PET images." Journal of Nuclear Medicine59.supplement 1 (2018): 2138-2138.

[5] Breiman, Leo. Classification and regression trees. Routledge, 2017.

[6] Qichen, Zhang, et al. "Classification and evaluation of the capability of stabilizing production and controlling water of producing and injection wells based on fuzzy C-mean clustering algorism." China Offshore Oil and Gas 6 (2016): 011.

[7] Lin, Kuo-Ping. "A novel evolutionary kernel intuitionistic fuzzy $ c $-means clustering algorithm." IEEE Transactions on Fuzzy systems 22.5 (2014): 1074-1087.

[8] Patoliya, Jignesh J., and Miral M. Desai. "Face detection based ATM security system using embedded Linux platform." Convergence in Technology (I2CT), 2017 2nd International Conference for. IEEE, 2017.

[9] Onuorah, Chinedum Anthony, et al. "Development of a Vibration Measurement Device based on a MEMS Accelerometer." (2017).

[10] A.P. Suganth, A. Suriyakumar, and R. Rajagopal. "Smart Security System In Automatic Teller Machine." (2014).

[11] Darus, Muhammad Sailuddin, et al. "Modified hybrid median filter for removal of low density random-valued impulse noise in images." Control System, Computing and Engineering (ICCSCE), 2016 6th IEEE International Conference on. IEEE, 2016.

[12]   Zhang, Tao, et al. "Fast and robust occluded face detection in ATM surveillance." Pattern Recognition Letters 107 (2018): 33-40.

[13]   Chen, Mingliang, et al. "Spatiotemporal gmm for background subtraction with superpixel hierarchy." IEEE transactions on pattern analysis and machine intelligence (2017).

[14]   Wen, Che-Yen, et al. "The safety helmet detection for ATM's surveillance system via the modified Hough transform." Security Technology, 2003. Proceedings. IEEE 37th Annual 2003 International Carnahan Conference on. IEEE, 2003.

[15]   Xia, Yizhang, Bailing Zhang, and Frans Coenen. "Face occlusion detection based on multitask convolution neural network." Fuzzy Systems and Knowledge Discovery (FSKD), 2015 12th International Conference on. IEEE, 2015.

[16]   Ren, Xiaofeng, and Jitendra Malik. "Learning a classification model for segmentation." null. IEEE, 2003.

[17]   Bappy, D. M., and Insu Jeon. "Combination of hybrid median filter and total variation minimisation for medical X-ray image restoration." IET Image Processing 10.4 (2016): 261-271.

[18]   Ji, Yingyu, et al. "Eye and mouth state detection algorithm based on contour feature extraction." Journal of Electronic Imaging 27.5 (2018): 051205.

[19]   Chen, Mingliang, et al. "Spatiotemporal gmm for background subtraction with superpixel hierarchy." IEEE transactions on pattern analysis and machine intelligence (2017).

[20]   Yaghmaee, Farzin, and Masoud Ebadi. "ROI detection in images using annotation output." Image Processing, Applications and Systems Conference (IPAS), 2014 First International. IEEE, 2014.

INTERNATIONAL JOURNAL
OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

📱 9940 572 462 🟢 6381 907 438 ✉ ijircce@gmail.com

Scan to save the contact details