
CRIMINAL IDENTIFICATION SYSTEM USING FACIAL RECOGNITION

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ABSTRACT

The criminal identification system using facial recognition is an innovative technology that employs advanced machine learning algorithms to detect and identify individuals who have a criminal record. The system captures and analyzes facial features from images or video feeds and compares them with the database of known offenders. If a match is found, the system generates an alert to the relevant authorities, allowing them to take necessary actions. The technology offers several advantages, including accuracy, speed, and scalability, making it an ideal solution for law enforcement agencies, airports, and other high-security areas. However, concerns around privacy and civil liberties have arisen, and ethical considerations must be taken into account when implementing this technology.

The technologies of computer vision, which are used for face recognition was worked out. Research of two popular computer vision libraries was conducted. Their features are analyzed and the advantages and disadvantages of each of them are estimated. Examples of building recognition application based on histogram-oriented gradients for face finding, face landmark estimation for face orientation, and deep convolutional neural network to compare with known faces. The article generalizes the concept of face recognition. The scientific basis for facial recognition and the construction of a complete recognition system was described. The basic principles of the programs for face recognition are formulated. A comparative analysis of the productivity of both libraries in relation to the time of execution to the number of iterations of the applied algorithms was presented. Also built two simple applications for face recognition based on these libraries and comparing their performance. Keywords computer vision, face recognition, algorithms, performance, dlib, OpenCV, machine learning. HOG, face landmark estimation, DCNN, SVM The process of identifying and spotting a criminal is slow and difficult. These days, criminals are getting smarter by not leaving any form of biological evidence or fingerprint impressions on the crime scene. A quick and easy solution is to use state-of-the-art face identification systems. With the advancement in security technology, CCTV cameras are being installed at most of the buildings and traffic lights for surveillance purposes. The video footage from the camera can be used to identify suspects, criminals, runaways, missing persons etc. This paper explores a way to develop a criminal identification system using ML. and deep neural networks. The following method can be used as an elegant way to make law.

Keywords: Computer Vision, Face Recognition, Algorithms, Performance, Dlib, Opencv, Machine Learning, HOG, Face Landmark Estimation, DCNN, SVM.

I. INTRODUCTION

Criminal identification has always been a significant challenge for law enforcement agencies worldwide. Traditional identification methods such as fingerprints and DNA samples have limitations in terms of accuracy, speed, and scalability. However, with the advancement of technology, facial recognition has emerged as a promising solution to overcome these challenges.

Facial recognition technology uses sophisticated algorithms and machine learning techniques to detect, analyze, and match facial features of individuals with a database of known offenders. Technology has the potential to revolutionize the way law enforcement agencies identify and apprehend criminals.

In this paper, we will discuss the criminal identification system using facial recognition technology. We will delve into the technical aspects of the system, its advantages, and its limitations. We will also explore the ethical considerations and potential challenges associated with the implementation of this technology.

II. METHODOLOGY

Goals and Objectives

- objective of facial recognition is to identify individuals.
- The number of false positives can vary, depending on the technology used for facial recognition.
- To save time and effort.
- The best face identification algorithm has an error rate of 0.08%.
- Easy maintenance and updating of data.
- To increase data security.

Working:

Using cameras, we are able to identify the correct person who is having a problem by looking at images of the public criminal history database to find.

1. First, we will separate the names that are stored with criminal image storing into another list and discover the face encodings of the criminal database photos.
2. In order to readily identify and apprehend criminals who are present in public places, we are now deploying camera to record public photos.
3. Taking the face-encodings of the collected photos and extracting the features from them.
4. Contrasting the image encoding values of the captured images with those in our database.
5. If the encoded values match those of the taken image, the criminal's image, name, and message about where they were discovered will be shown on the screen.
6. An image of that individual will be saved into a specific desktop folder so that police may quickly identify the offender who stands out from the other persons in the area.

III. MODELING AND ANALYSIS

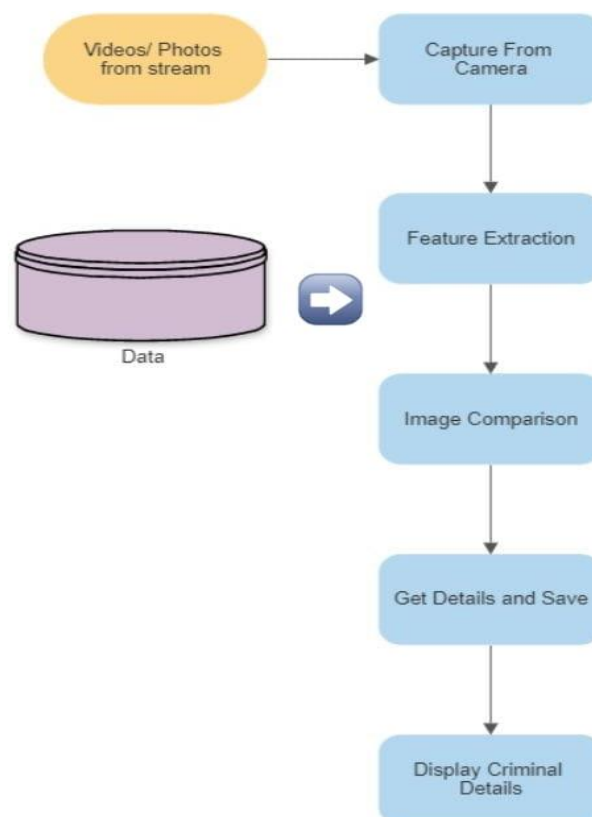


Figure 01: Flow Chart

Applications:

1. Law enforcement agencies can use facial recognition technology to identify suspects in criminal investigations. By comparing images of suspects against a database of known criminals or other sources of images, such as social media platforms or government-issued identification cards, police can quickly identify individuals who may be involved in criminal activity.
2. Facial recognition technology can also be used to monitor individuals who are on watch lists or are suspected of engaging in criminal activity. For example, security personnel at airports, train stations, and other public transportation hubs can use facial recognition technology to quickly identify individuals who are on no-fly lists or are suspected of involvement in terrorism.
3. Facial recognition technology can also be used to prevent identity theft and fraud. For example, banks and financial institutions can use facial recognition technology to verify the identity of customers who are opening new accounts or making large transactions.
4. Criminal identification systems using face recognition can also be used to track and monitor the movements of convicted criminals who have been released on parole or probation. By using facial recognition technology to monitor their movements, law enforcement agencies can quickly identify individuals who violate the terms of their parole or probation.

IV. RESULTS AND DISCUSSION

We put face recognition technology to the test by trying to identify people who had committed a fictitious crime. According to the study, when participants were presented with a photo lineup that featured the suspect's face as collected by a facial recognition technology, they were more likely to correctly identify the culprit.

A promising criminal detection technique for face videos has been put out by us. Cameras are utilized to continuously capture photographs and video; we will get information about which image from the database is matching on our primary screen. The name of the criminal along with criminal's info will be shown on the main screen when the database image matches the taken image.

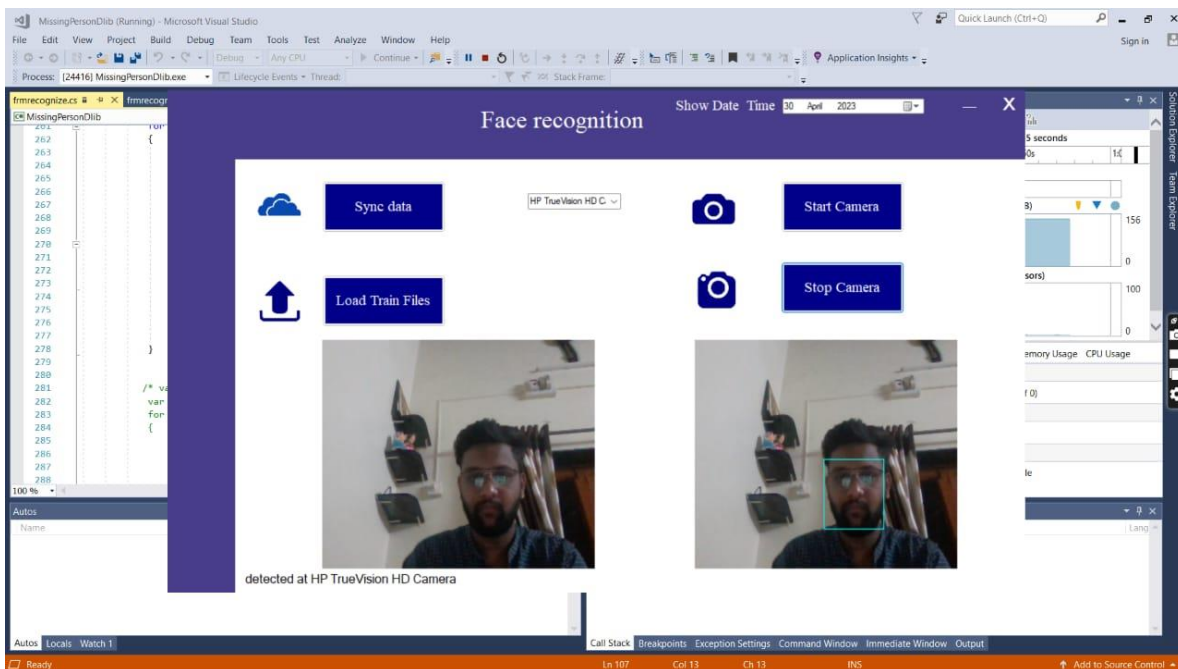


Figure 01: Scanning criminal and using other function like load data and sync data

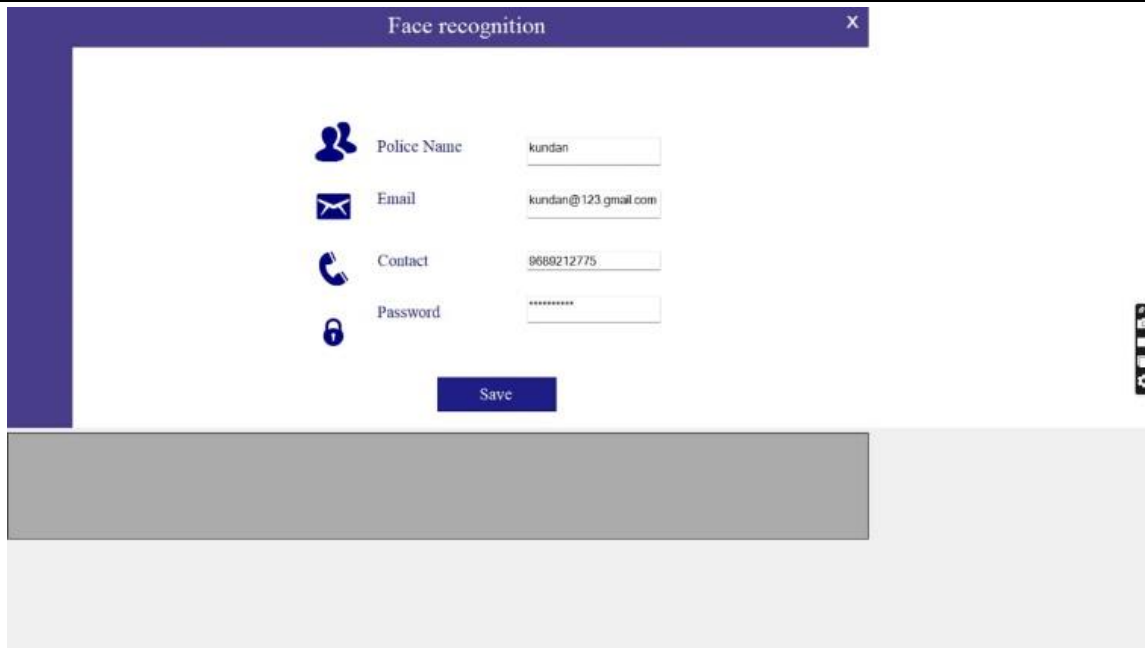


Figure 02: Login for officer

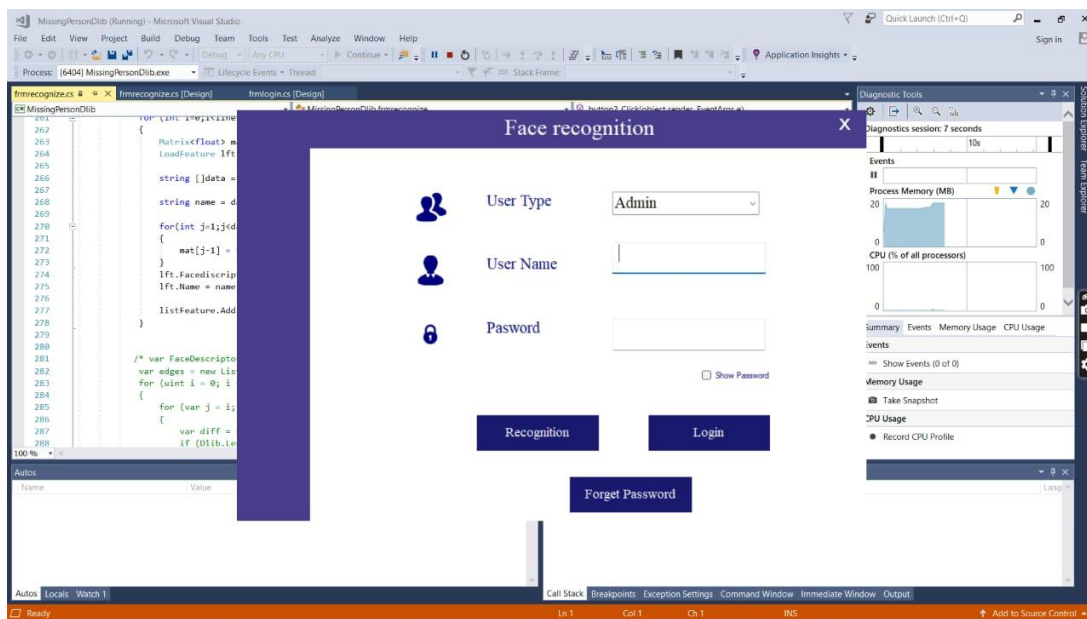


Figure 03: Login for Admin

V. CONCLUSION

In conclusion, the criminal identification system using facial recognition is a powerful tool for law enforcement agencies in identifying criminals and improving public safety. With the increasing availability of facial recognition software and large databases of criminal records, this technology has become more accessible and effective in recent years.

The methodology for this system involves collecting and preprocessing images, extracting features from the facial images, using machine learning algorithms to classify the images, testing the system for accuracy, and deploying it in real-world scenarios. This process requires careful attention to data quality and accuracy, as well as consideration for ethical and privacy concerns.

While facial recognition technology has the potential to improve public safety, it also raises concerns about the ethical use of data and privacy. It is important to establish guidelines for the appropriate use of this technology and ensure that it is used in a responsible and transparent manner.

Overall, the criminal identification system using facial recognition has the potential to significantly improve law enforcement efforts and public safety. However, it is important to balance the benefits of this technology with ethical and privacy considerations to ensure its responsible use.

VI. REFERENCES

- [1] OpenCV: OpenCV Tutorials [Electronic resource] – Access mode:
https://docs.opencv.org/master/d9/df8/tutorial_root.html
- [2] Dlib Python API Tutorials [Electronic resource] – Access mode: <http://dlib.net/python/index.html>
- [3] Z. Rybchak, and O. Basytiuk, “Analysis of computer vision and image analysis technics,” *ECONTECHMOD: an international quarterly journal on economics of technology and modelling processes*, Lublin: Polish Academy of Sciences, vol. 6, no. 2, pp. 79-84, 2017.
- [4] Face Detection Algorithms and Techniques [Electronic resource] – Access mode:
<https://facedetection.com/algorithms/>
- [5] A toolkit for making real world machine learning and data analysis applications [Electronic resource] – Access mode: https://github.com/davisking/dlib/blob/master/python_examples/face_detector.py
- [6] R. Raja, Face Detection Using OpenCV and Python [Electronic resource] - Access mode:
<https://www.superdatascience.com/opencv-face-detection/>.
- [7] R. Raja, Face Recognition Using OpenCV and Python [Electronic resource] - Access mode:
<https://www.superdatascience.com/opencv-face-recognition/>
- [8] A. Rosebrock, Facial landmarks with dlib, OpenCV, and Python [Electronic resource] - Access mode:
<https://www.pyimagesearch.com/2017/04/03/facial-landmarksdlib-opencv-python/>
- [9] Support Vector Machines [Electronic resource] – Access mode:
<http://scikit-learn.org/stable/modules/svm.html>
- [10] F. Schroff, D. Kalenichenko, and J. Philbin, FaceNet: A Unified Embedding for Face Recognition and Clustering [Electronic resource] – Access mode:
https://www.cvfoundation.org/openaccess/content_cvpr_2015/app/1A_089.pdf
- [11] N. Shakhovska, “The method of Big data processing,” *XII International Conference on Computer sciences and information technologies (CSIT)*, Lviv, Ukraine, pp. 122-125, 2017
- [12] Jain, A.K., Ross, A. and Nandakumar, K., 2016. *Introduction to biometrics*. Springer.
- [13] Li, S.Z. and Jain, A.K., 2011. *Handbook of face recognition*. Springer.
- [14] Raghavendra, R., 2019. Criminal identification system using face recognition. *International Journal of Engineering Research and Technology*, 8(10), pp.2495-2501.
- [15] Jaswal, N. and Jindal, M., 2020. Criminal identification using face recognition: A review. In *2020 7th International Conference on Computing for Sustainable Global Development (INDIACom)* (pp. 360-364). IEEE.
- [16] Parkhi, O.M., Vedaldi, A. and Zisserman, A., 2015. Deep face recognition. In *BMVC* (Vol. 1, No. 3, p. 6).
- [17] Jain, A.K. and Ross, A., 2010. *Handbook of biometrics*. Springer Science & Business Media.
- [18] Zhang, X., Yin, L., Cohn, J.F. and Canavan, S., 2016. A high-resolution 3D dynamic facial expression database. In *2016 11th IEEE International Conference on Automatic Face & Gesture Recognition (FG)* (pp. 1-6). IEEE.