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RESEARCHARTICLE OPENACCESS

Criminal Identification Using Face Detection and Recognition

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The integration of facial recognition technology into real-time camera surveillance systems has become a powerful tool for enhancing public security. This approach uses advanced image processing techniques to analyze footage from public cameras. The system, employing Inception V3 algorithms, accurately detectsand matches facial features to identify individuals with known criminal records swiftly.

By monitoring live feeds or archived footage, law enforcement can track suspects in crowded are as and share images via email with police stations, improving their response to potential threats. This technology significantly advances criminal identification, offering an efficient way to protect public spaces. However, it's crucial to address ethical and privacy concerns to balance security enhancement with protecting individual rights.

Keywords—First Information Reports, Principal Compound Analysis.

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I. INTRODUCTION

The integration of cutting-edge technologies in law enforcement has revolutionized the field of criminal identification, particularly through the fusion of face recognition and real-time camera surveillance. In response to the imperative of enhancing public security, the convergence of these technologies facilitates the rapid identification of criminals captured in video footage or images within public spaces. This transformative approach utilizes sophisticated image processing techniques, with a explicit focus on the inceptionv3algorithm,to discern and equal facial features of individuals in real time, the suspected face image shared on themail in police station. As a pivotal component of criminal investigations, this system enables law enforcement agencies to seamlessly identify suspects documented in First Information Reports (FIRs) lodged at police stations. The application extends beyond static images, allowing for dynamic Monitoring of public spaces where the criminal may be present. The utilization of the inceptionv3 algorithm ensures a high degree of accuracy in facial recognition, marking assign if I cant stride in the convergence of artificial intelligence, image processing, and law enforcement for the proactive identification of criminals in the public domain. However, as with any technological advancement, ethical considerations and confidentiality safeguards must be essential to the implementation of such systems to strike an optimal balance between security enhancement and individual rights security.

1.1INCEPTION V3ALGORITHM

The Inception V3 algorithm stands as a pinnacle in the realm of deep learning, specifically designed to address the complexities of image recognition and classification tasks. Developed by Google, Inception V3 represents the third iteration of the Inception architecture, integrating innovative

features to enhance accuracy and efficiency. Recognized for its prowess in image analysis, this algorithm is particularly well-suited for applications ranging from object recognition to facial identification. Its distinctive architectureincorporates multiple parallel convolutional layers, enabling the network to capture intricate patternsand features at various scales. Inception V3 has demonstrated exceptional performance in competitions such as the ImageNet Large Scale Visual Recognition Challenge, underscoring its significance in the advancement of computer vision technologies. This introduction sets the stage for understandingthepivotalroleofInceptionV3in the proposed Crime Tracking System, where its robust capabilities are harnessed for precise facial recognitionandsegmentationintheidentification of criminal activities.

II. LITERATURESURVEY

TITLE: Real-Time Criminal Face IdentificationBasedonHaar-CascadeandLbph,with Automatic Message Delivery to Whatsapp
AUTHOR: M Saravanan; K. Kowsalya
YEAR:2022
DESCRIPTION: Using a machine learning approach,anumberofalgorithmsforautomatic face identification of offenders depending on specified goals have recently been developed. Various algorithm has been proposed for face detection such as Eigenface using PCA (Principal Compound Analysis), Fisherface using Linear Discriminative method, Local Binary Pattern, active appearance, 3D shape models. For face recognition, the Local Binary Pattern Histogram technique is employed in this research. The data augmentation is also done, which provides the better performance in training. Haar cascade is used for extracting the features like eyes, nose length, cheek, lips, etc. Initially using the web camera, the individualpersons cropped grayscale images are collected as database. Then the classifier trains the images, the data augmentation is used when datasets of the personisnotenough.Usingthewebcamera,the images are detected and recognized the person and that information a message will be sent toWhatsApp.

TITLE: Face Detection and Recognition for Criminal Identification System
AUTHOR: Sanika Tanmay Ratnaparkhi; Aamani Tandasi
YEAR:2021
DESCRIPTION: The process of identifying and spotting a criminal is slow and difficult. Criminals, these days are getting smarter by not leaving any form of biological evidence or fingerprint impressions on the crime scene. A quick and easy solution is using 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 personsetc.This paper exploresa 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 enforcement hassle-free.

TITLE: FaceRecognitionfromVideousing DeepLearning
AUTHOR: SaibalManna;SushilGhildiyal
YEAR:2020
DESCRIPTION: Face recognition (FR) and verification is the immeasurable technology to encounter any criminal activities nowadays. Withtheremarkableapplicationsextendingfrom criminalID,security,andobservationto amusement sites. This system (recognition of faces)is exceptionally helpful in banks, air terminals, and different associations for screening customers. In deeplearning,convolutionalneuralnetworks (CNN) havegained attention for facerecognitionbut to train CNN requires more data, which is very difficult in case of applications like criminalactivities (robbery, murder, etc). Therefore, thispaperproposedafacerecognitionsystemthat makes searching for criminals easy and quick with lesstimeandhenceefficientlyhelpspoliceand

administration.Inthispaper,apretrai r edmodeli1.InceptionV3AlgorithmModul :Processes FaceNet(FN)isusedforfacerecognitionfro l capturedvideodatafordetailedsegmentationof video.FNmodifiesthefaceimages intoaclos (individualsinvolvedincriminalactivities. packedEuclideanspacewhereseparationsexte2.FacialRecognitionModule:Furtheranalyzes thefacenearness. segmented data to accurately identify and differentiate individuals.

III. PROPOSEDMETHODOLOGY

The proposed Crime Tracking Syste integratesstate-of-the-arttechnology,specificall leveraging the Inception V3 algorithm, to progress the identification and tracking of criminal actions. The system places a paramount emphasis on the securestorageandmeticulousmanagementof sensitivedata,ensuringtheintegrityofevidence throughouttheinvestigativeprocess.The foundation of the system lies in the comprehensive database populated by First Information Reports (FIR) and criminal face also. In real-time, surveillance cameras capture footage, which is seamlesslyfedintotheInceptionV3algorithmfor classycriminalsegmentation.Thissegmentation process enables the precise identification of persons involved in criminal activities. Upon identification, the system facilitates robust facial recognition, a pivotal feature that adds in addition layer ofaccuracy to the identification process. The culmination of these functionalities results in the automatic generation of notifications, promptly emailedtopolicestationsforinstantresponseand action.Bycombiningdeeplearningtechnology, FIRreportsdata,andreal-timesurveillance,the proposedCrimeTrackingSystemrepresentsa cutting-edge approach to criminal identification and tracking, promising a more efficient and proactive responseintherealmoflawenforcementand public safety.

TheCrimeTrackingSystemcomprisesseveralkey modulesthatensurecomprehensivefuctionality.

Data Management Module: Acts as the system's backbone, securely storing and managing sensitive information from First Information Reports (FIRs), ensuring data integrity and confidentiality throughout investigations.

Surveillance Module: Interfaces with real-time cameras, capturing footage for analysis.

3.Announcement Module: Automates communication by generating and dispatching real-time alerts via emailtorelevantpolicestations.

Together, these modules create a cohesive system that leverages advanced technology and real-time surveillance to enhance criminal identification and tracking, thereby contributing to a more efficient lawenforcementframework.

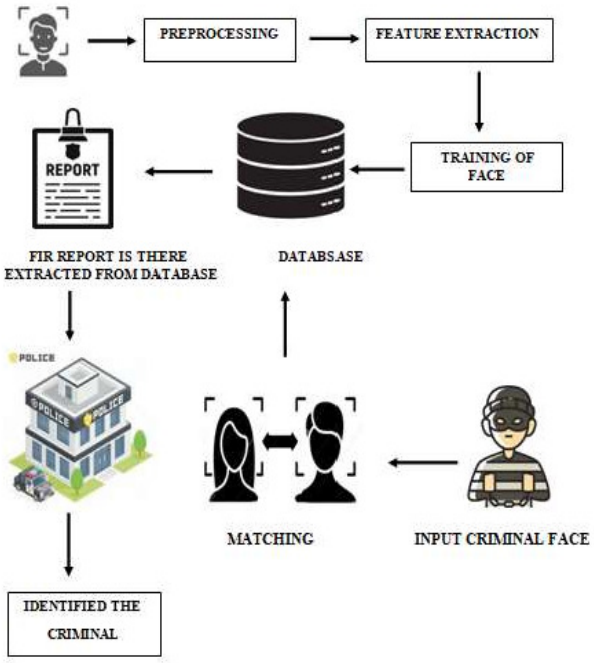

Fig.1Block Diagram

IV. SYSTEMIMPLEMENTATION

A. *SystemModule*

1. Imageorvideocapture
2. Facedetection
3. Facialrecognition
4. Suspectidentification
5. Legalconsiderations
6. Datamanagement

1. ImageorVideoCaptureModule

This involves the acquisition of visual data through surveillance cameras or other imaging devices.Itfocusesonefficientlycapturingimages or video footage in real-time, which serves as input for subsequent analysis.

2. FaceDetectionModule

The Face Detection Module is responsiblefor identifying andlocalizing human faces withinthe captured images or video frames. It employs computer vision techniques to detect facial features, marking the regions of interest for furtherprocessing.

3. FacialRecognitionModule

To building on the detected faces, the Facial Recognition Module utilizes advanced algorithms, possibly based on Inception V3, to match andidentify individuals against a pre-existing database. This module enhances the system's ability touniquely identify and authenticate persons ofinterest.

4. SuspectIdentificationModule

TheSuspectIdentificationModule integrates the results from face detection and facial recognition to pinpoint and label potential suspects.It combines biometric information with otherrelevant data, aiding in the accurate identificationand tracking of individuals involved in criminal activities.

5. LegalConsiderationsModule

This addresses the legal and ethical aspectsof the Crime Tracking System. It may encompass features such as compliance with privacy laws, data protection measures, and adherence to established strategy governing the use of facial recognition technologyinlawenforcement.Ensuringthe system aligns with legal considerations is essential for its ethical deployment.

6. DataManagementModule

The Data Management Module serves as the backbone for securely storing, organizing, and controling sensitive information. It includes functionalities for maintaining a comprehensive databaseofFIRreports,criminalrecords,andother relevant data. This module ensures data integrity, confidentiality, and accessibility for authorizedusers.

7. IdentificationModule

This outputs of the various components to provide a comprehensive identification process. It may involve generating reports, updating databases, and communicating identified individuals to law enforcement agencies for further action in public place. To identified the criminal in the camera toalert the mail in police station.

V. CONCLUSIONS

The In conclusion, the Crime Tracking System, integrating cutting-edge technologies and advanced modules, presents a sophisticated and proactiveapproachtotheidentificationand tracking of criminal activities. The systematicprocess begins with the capture of real-time imagesor video, followed by precise face detection and intricate facial recognition, facilitated by modules such as Inception V3. The Suspect Identification module streamlines the identification process, potentially leading to swift law enforcement responses. Crucially, the inclusion of a Legal Considerations module underscores the systems commitment to ethicaland lawful practices,ensuring compliance with privacy regulations and ethical guidelines. The robust Data Management module safeguardsthe integrityof evidence,offeringasecurerepositoryforsensitive information extracted from First InformationReports(FIR).Inunison,thesemodulescon verge to form a comprehensive Identification Module, capable of generating timely reports and communicating crucial information to law enforcement agencies. The Crime Tracking System, by embracing technological innovation while prioritizing legal and ethical considerations, stands poised as a formidable tool in advancing publicsafety and law enforcement capabilities. Its multifaceted approach not only enhances the efficiency of criminal identification but also reflectsacommitmenttoresponsibleandaccountableuse of technology in the pursuit of justice.

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