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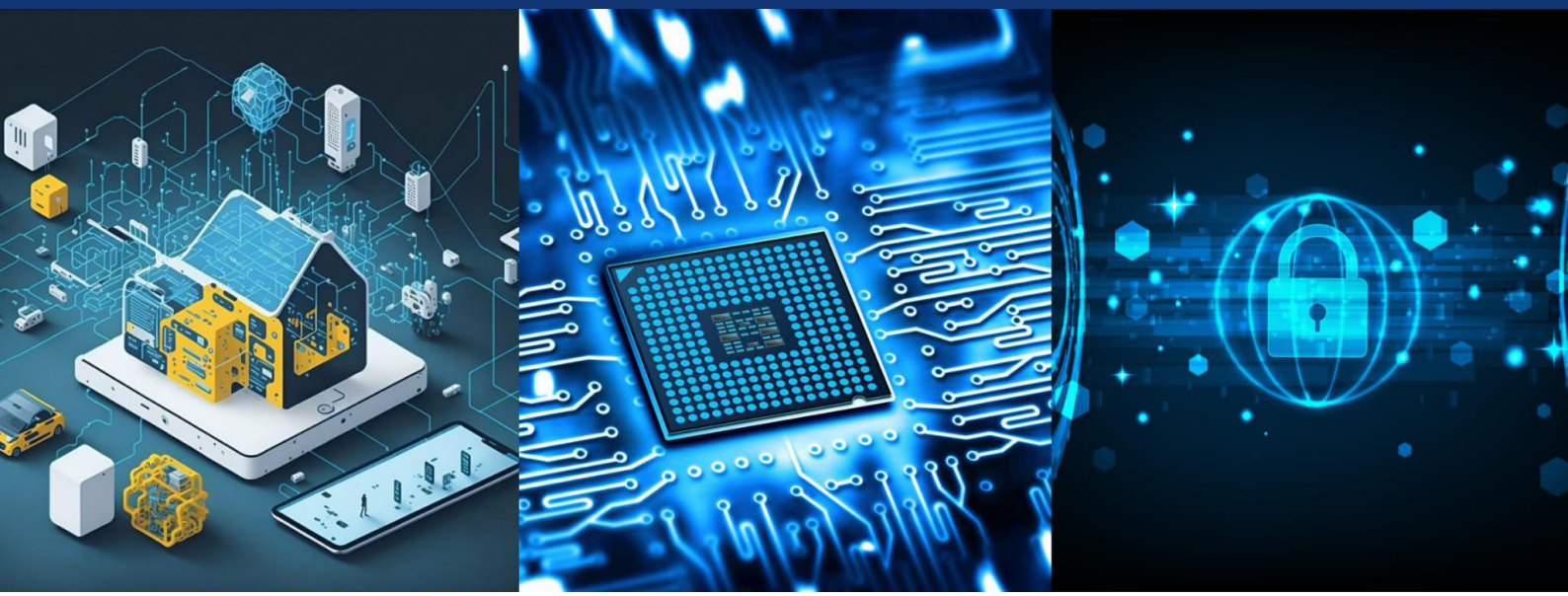

International Journal of Innovative Research in Computer and Communication Engineering

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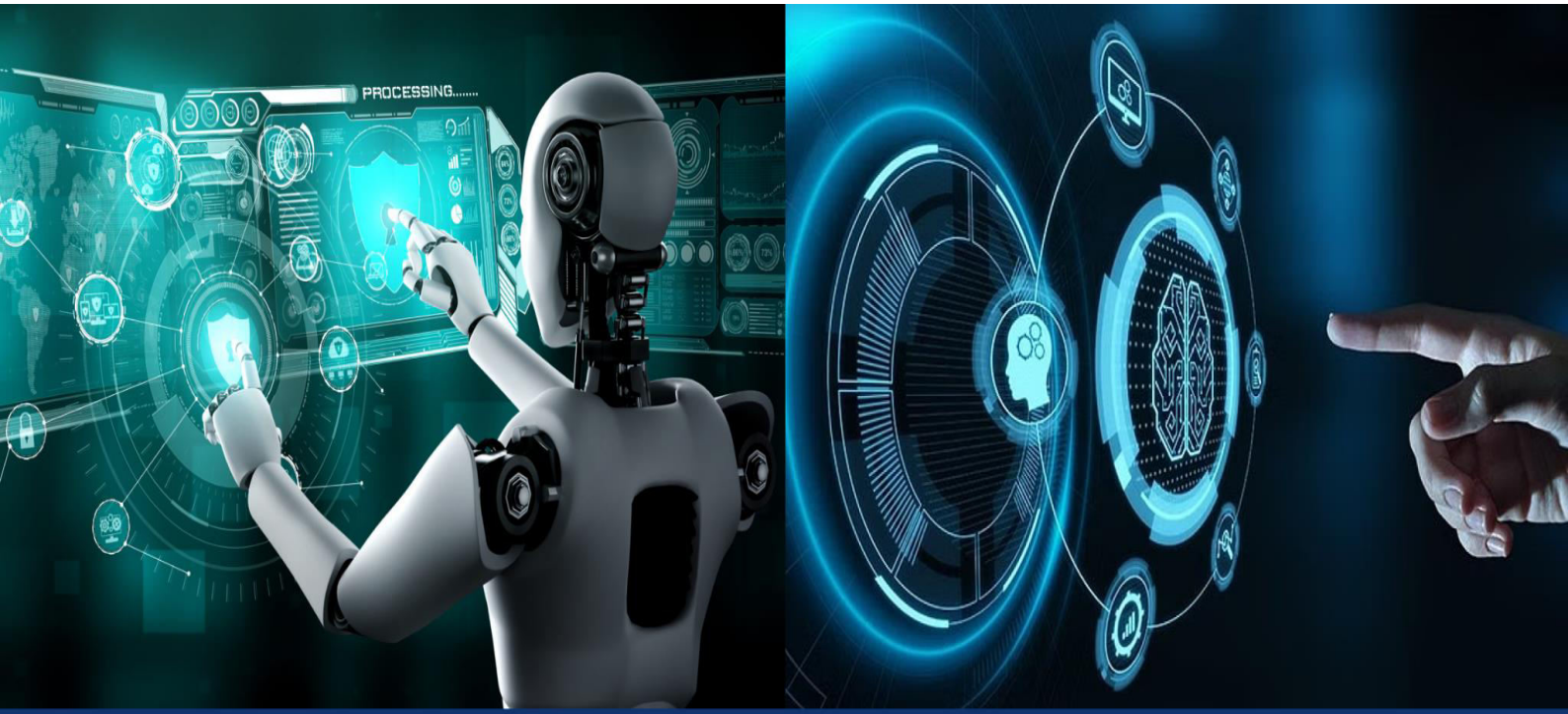

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International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

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Feature Compensation Network for Person Re-Identification Criminal Identification

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ABSTRACT: Face recognition is an interesting and challenging problem and impacts important applications in authentication and personal identification among others. Extraction of these important elements from a picture, their useable representation, and classifications are the core concepts of automatic face recognition. Face recognition based on the geometric features of a face is probably the most instinctive approach for Human identification. The entire process may be broken down into three main parts, with the first step being the search for a reliable database of faces that includes numerous photographs for each person. The next phase is to find faces in the database photos so that the face recognizer can be trained on them. The last step is to test the face recognizer to see if it can still find the faces that it was trained on. Here implement an application for criminal detection, it helps forensic department for the accurate identification of criminal using his face image. The training face images are initially collected and stored on server. This system provides essential security to apartments and other control applications. During face capturing the face image will be match with registered images. An efficient classifier uses to classify the face images accurately. Criminal images are collected and stored by forensic department. During capturing process, face image will be classified with the criminal image database. If a match is made, we will be able to identify the offender and quickly make an arrest.

I. INTRODUCTION

Video surveillance has evolved from simple analogue CCTV systems to advanced digital and intelligent monitoring solutions, becoming a vital tool for security and activity analysis in various settings. Traditional surveillance systems are limited to capturing, storing, and distributing video, relying heavily on human operators for threat detection, which is laborintensive and prone to errors, especially in real-time scenarios. This limitation has driven the development of intelligent video surveillance systems that leverage analytics software to automatically detect and analyze objects, events, and activities of interest for enhanced security. These systems play a critical role in monitoring public places, shopping centres, banks, corporate environments, homes, and ATMs, addressing the growing concerns of security and crime prevention amidst global instability. The advent of smart surveillance systems has enabled real-time data capture, transmission, processing, and interpretation, making them indispensable for proactive monitoring and forensic investigations. By ensuring a high level of security in public spaces, these systems address the complexities of modern security challenges. Affordable video cameras and advancements in image processing have further popularized their use in applicationssuch astraffic monitoring, human activityanalysis, and real-time alert generation. This project introduces an intelligent video surveillance system that analyzes activities within monitored spaces in real time, generating actionable alerts and enabling content-based searching, thus demonstrating the potential of video surveillance to revolutionize safety and security practices. Intelligent video surveillance systems represent a significant leap forward in the field of security and monitoring by integrating artificial intelligence (AI) and machine learning (ML) technologies

II. SYSTEM ANALYSIS

Existing System:

As violent criminals, such as child sex offenders, tend to have high recidivism rates in modern society, there is a need to prevent such offenders from approaching socially disadvantaged and crime prone areas, such as schools or childcare centres.

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Accordingly, national governments and related institutions have installed surveillance cameras and provided additional personnel to manage and monitor them via video surveillance equipment. However, naked-eye monitoring by guards and manual image processing cannot properly evaluate the video captured by surveillance cameras. To address the various problems of conventional systems that simply store and retrieve image data, a system is needed that can actively classify captured images in real-time, in addition to assisting surveillance personnel. Therefore, this paper proposes a video surveillance system based on a composable deep face recognition method. The proposed system detects the faces of criminals in real time from videos captured by a surveillance camera and notifies relevant institutions of the appearance of criminals.

For real-time face detection, a down-sampled image forked from the original is used to localize unspecified faces. To improve accuracy and confidence in the recognition task, a scoring method based on face tracking is proposed. The final score combines the recognition confidence and the standard score to determine the embedding distance from the criminal face embedding data. The blind spots of surveillance personnel can be effectively addressed through early detection of criminals approaching crime-prone areas. The contributions of the paper are as follows. The proposed system can process images from surveillance cameras in real-time by using down-sampling. It can effectively identify the identity of criminals by using a face tracking ID unit and minimizes prediction reversal by solving the congested embedding problem in the feature space that may occur when performing identification matching on a large amount of face embedding DBs. Additionally, the reliability of the identification results is complemented by an identification score accumulation method.

Limitations:

When the resolution increases, the depth of the feature extractor and latency also increases. In face identification process, the number of targets has little impact on the latency. Extremely high labor cost is required for data labeling Unable to define the answer label when multiple persons are caught in the sampled individual video.

Proposed System:

Face detection is the first stage of a face recognition system. A lot of research has been done in this area, most of which is efficient and effective for still images only & could not be applied to video sequences directly. Face recognition in videos is an active topic in the field of image processing, computer vision and biometrics over many years.

Compared with still face recognition videos contain more abundant information than a single image so video contain spatio-temporal information. To improve the accuracy of face recognition in videos to get more robust and stable recognition can be achieved by fusing information of multi frames and temporal information and multi poses of faces in videos make it possible to explore shape information of face and combined into the framework of face recognition. In proposed system develop a system that can be used by police or investigation department to recognize criminal from their faces. The face detection algorithm looks for specific Haar features. When one of these features is found, the algorithm allows the face candidate to pass to the next stage of detection. The features are classified with dataset using cascade features. It is further compared with the images stored in database to identify if the person is criminal/suspect. If he is criminal/suspect the time for which he was under the surveillance of the camera is noted and provide notification.

Expected Merits:

The method of face recognition used is fast, robust, reasonably simple and accurate with a relatively simple and easy to understand algorithms and technique. This method works very efficiently because face image of a person will not change. The proposed system can successfully recognize more than one face which is useful for quickly searching suspected persons as the computation time is very low.

III. SYSTEM REQUIREMENTS

Hardware Requirements:

- Processors: Intel® Core™ i5 processor 4300M at 2.60 GHz or 2.59 GHz (1 socket, 2 cores, 2 threadsper core), 8 GB of DRAM
- Disk space: 320 GB
- Operating systems: Windows® 10, macOS*, and Linux*

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Software Requirements:

- Server Side : Python 3.7.4(64-bit) or (32-bit)
- Client Side : HTML, CSS, Bootstrap
- IDE : Flask 1.1.1
- Back end : MySQL 5.
- Server : WampServer 2i
- OS : Windows 10 64 –bit or Ubuntu 18.04 LTS "Bionic Beaver"

Software Description:

Python:

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

Tensor Flow:

Tensor Flow is an end-to-end open-source platform for machine learning. It has comprehensive,flexible ecosystem of tools, libraries, and community resourcesthat lets researchers push the state-of-the-art in ML, and gives developers the ability to easily build and deploy ML-poweredapplications.

Pandas:

Pandas is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language. pandas is a Python package that providesfast, flexible, and expressive data structures designed to make working with "relational" or "labeled" data both easy and intuitive

IV. LITRETURE SURVEY

TITLE : Detection of violent behaviour using neural networks and pose estimation
AUTHOR : Kwan-Loo, Kevin B., José C. Ortíz-Bayliss, and P. Rad
CONCEPT : Focuses on pedestrian detection, tracking, pose estimation, and neural networks to predict pedestrian behavior in video frames
LIMITATION : If the action occurs in a different environment, this modelcannot classify it correctly
REFERENCE : Kwan-Loo, Kevin B., José C. Ortíz-Bayliss, Santiago E. Conant-Pablos, Hugo Terashima-Marín, and P. Rad. "Detection of violent behavior using neural networks and pose estimation." IEEE Access 10 (2022): 86339-86352.

TITLE : Multi scale-adaptive super-resolution person re- identification using GAN
AUTHOR : Adil, Muhammad, Saqib Mamoon, and Zhichao Lian.
CONCEPT : An enhanced super-resolution generative adversarial network is utilized for effective image re-generation. It uses the Residual-in-Residual Dense Block to generate more realistic and natural images.
LIMITATION : Person images are of similar or sufficiently high resolutions, which might not be practical for real-world
REFERENCE: Adil, Muhammad, Saqib Mamoon, Ali Zakir, Muhammad Arslan Manzoor, and Zhichao Lian. "Multi scale- adaptive super-resolution person re-identification using GAN." Ieee Access 8 (2020): 177351-177362.

TITLE : GhostFaceNets: Lightweight Face Recognition Model From Cheap Operations
AUTHOR : Alansari, Mohamad, Oussama Abdul Hay, and Naoufel Werghi.
CONCEPT : Introduced GhostFaceNets, highly accurate and effective facial recognition models
LIMITATION: The variation in performance on different testing datasetsmay be challenge for this approach.
REFERENCE: Alansari, Mohamad, Oussama Abdul Hay, Sajid Javed, Abdulhaid Shoufan, Yahya Zweiri, and Naoufel Werghi. "GhostFaceNets: Lightweight Face Recognition Model From Cheap Operations." IEEE Access (2023).

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TITLE : Retinaface: Single-shot multi-level face localisation in the wild
AUTHOR : Deng, Jiankang, Jia Guo, and Stefanos Zafeiriou.
CONCEPT : Innovatively unify multi-level face localization tasks under one common target: point regression on the imageplane.
LIMITATION : Even tiny variations in the predicted 3DMM parameters can significantly affect the reconstruction results.
REFERENCE : Deng, Jiankang, Jia Guo, Evangelos Ververas, Irene Kotsia, and Stefanos Zafeiriou. "Retinaface: Single-shot multi-level face localisation in the wild." In Proceedings of the IEEE/CVF conference on computer vision and pattern recognition, pp. 5203-5212. 2020

TITLE : Arcface: Additive angular margin loss for deep face recognition
AUTHOR : Jiankang Deng
CONCEPT : The proposed ArcFace has a clear geometric interpretation due to its exact correspondence to geodesicdistance on a hypersphere
LIMITATION : ArcFace only adds negligible computational complexity during training.
REFERENCES : Deng, Jiankang, Jia Guo, Niannan Xue, and Stefanos Zafeiriou. "Arcface: Additive angular margin loss for deep face recognition." In Proceedings of the IEEE/CVF conference on computer vision and pattern recognition,

V. CONCLUSION

The expected outcome of this project is the development of an intelligent video surveillance system capable of real-time activity monitoring, automated threat detection, and content-based searching. The system will leverage advanced analytics to detect and analyze objects, events, and activities of interest, ensuring enhanced security and reducing reliance on manual monitoring. By enabling real-time data capture, processing, and alert generation, the system aims to provide proactive surveillance capabilities that address modern security challenges effectively. This project is anticipated to contribute significantly to public safety by enabling efficient monitoring of public spaces, shopping centers, banks, corporate environments, homes, and ATMs, thereby preventing potential threats and aiding forensic investigations. The integration of cutting-edge image processing techniques and affordable video cameras will make the system accessible and scalable for a wide range of applications, including traffic monitoring and human activity analysis. Ultimately, the intelligent video surveillance system will serve as a reliable, efficient, and cost-effective solution for ensuring safety and security in various domains.

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