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A Review on Identification of Missing Persons and Criminals using Image Processing

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***Abstract*— Every day, thousands of individuals go missing around the world, including children, teenagers, the mentally challenged, the elderly with Alzheimer's, and so on. The vast majority of them go unnoticed. The police station's missing person's file has been updated. Using web camera technology, locate these individuals by comparing each person to the database. This technique was created in order to locate those who have gone missing. If a missing person is discovered on a Web Video Stream, the location of the missing person should be reported to the authorities. Send a location email to the police station if a missing individual is found in a Web Video Stream. As a result, our technology is capable of playing a critical role in matters of security and authentication. All administrative functions in this system are performed by the admin. Administrators have the ability to make changes.**

Keywords*— *Missing people, finding, Face recognition, Web camera, Web Video Stream

I. INTRODUCTION

A missing person can be defined as a kid or an adult who has gone missing, either voluntarily or involuntarily. Only 43% of missing cases have a recognized cause, 99 percent are juvenile runaway, 2500 cases are due to family troubles, and roughly 500 cases are kidnapped by strangers (which include both teens and adults). Women account for 52 percent of all missing persons instances, while men account for 48 percent. A government source asserted, "There are no finances assigned to recovering missing people in India. A missing individual has numerous difficulties, yet only a few are murdered, raped, or abused. The unknown whether the missing person is alive or dead causes tension and worry for the missing person's parents, friends, relatives, and guardians. The police in our system store the image of the person given by the guardian at the time of disappearance in a database. Our application will automatically find a match for this image among the currently existing photographs in the database. This aids the authorities in locating the missing person wherever in India. When a suspicious person is discovered, the photograph taken at the moment is matched to images supplied by the police department at the time of the missing person's disappearance using a facial recognition model. If a match is found, the police will be contacted via email with the person's whereabouts. If the uploaded picture is not found, a new record in the database will be created. As a result, the time it takes to find a person's information after he has been found is reduced. The person has gone absent for an extended period of time in certain cases. The image reflects the age difference since ageing changes the structure of the face, such as form, texture, and so on. Age, filters, poses, lightings, and other factors can alter a person's appearance. Before deciding on a face recognition algorithm, all of these considerations were made.

II. EASE OF USE

A. *Need of system*

Manual verification of information is always required. With the use of our People-Finding Application, Image Processing, and Face Recognition. The face of the person will be recognised by the system. Once we have the facial information in our system, this aids us in locating the culprit.

B. Statement of scope

Using image analysis, we can locate missing people in public settings such as bus terminals, temples, train stations, and airports.

C. Objectives

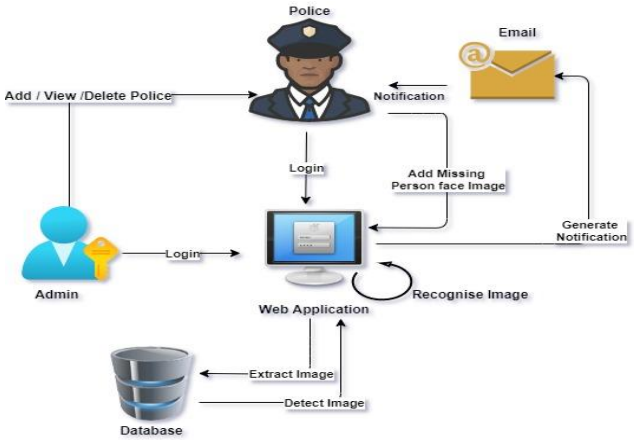
The system's purpose is to save time and human effort. Every bus stop, temple, mall, and railway station has a large crowd, making it impossible to spot someone in the throng with the naked sight. However, because all of the above locations have CCTV surveillance, we can use technology to find the desired person faster and more reliably than humans. This will significantly reduce the amount of time and effort required by humans.

III. LITERATURE SURVEY

The major purpose of the paper presented by AniruddhaDey, is to recognise the position of faces in video. Furthermore, detecting face motion qualifies a person for inclusion in a face recognition system. Face edges are first discovered using the Robert edge detector, then a set of arithmetic operations are performed between an initial frame and the closest ones. After that, the Gaussian filtering technique is used to remove unwanted edges and noise. For recognising edges matching between the previous two output frames and the noiseless face contour frame. Finally, four corner points are computed, namely topleft, topright, bottomleft, and bottomright, to build a rectangle around the face and detect the facial contour of each frame. The scalar and vector distance between four corner points of two consecutive frames are calculated to track a human face from video. Corner point displacement indicates that the position and positioning of the face will vary in the next frame.[1]

The paper presented by Andreas Ess, Bastian Leibe, Konrad Schindler, Luc Van Gool,is a method for integrating the visual odometer, pedestrian detection, depth estimation, and tracking modules. As a result of the integration, there are multiple cognitive feedback loops connecting the modules. We propose an unique feedback connection between the object detector and visual odometry, which uses the semantic information of detection to stabilise localization, among other things. When using feedback loops, the risk of erroneous feedback from one module being magnified and causing the entire system to become unstable is always there. As a result, we provide automatic failure detection and recovery, allowing the system to continue even if a module fails. Several long and demanding film sequences from bustling inner-city locales are used to test the method. Our findings show that the suggested integration allows for stable tracking performance in scenarios that were previously infeasible.[2]

In the paper presented by Rolf H. Baxter, Michael J. V. Leach, Sankha S. Mukherjee, and Neil M. Robertson, it shows how to track people in low-resolution utilising instantaneous priors mediated by head-pose in a unique way. The Kalman Filter is extended to adaptively integrate motion data with an instantaneous prior opinion about where the person will travel depending on where they are currently gazing. Using automatically produced head position estimations, we apply this new method to pedestrian surveillance, while the theory is not limited to head-pose priors.[3]



In this paper presented by He Guohui ,Wang Wanying, according to Yang's theory, he integrated Gaussian Model and Oval Clustering Model with skin colour segmentation and edge detection technology to recognise and locate face region effectively, increase real-time, accuracy, and reliability of face detection in the fatigue driving warning system..[4]

The paper presented by K. V. Arya, AbhinavAdarsh, the aim of surveillance and automatic detection and recognition of human faces. The suggested technique uses the askincolor model in YCbCr and HSV colour space to recognise skin patches in the image. Then apply the height-to-width ratio before identifying the facial region. Finally, the PCA verification technique is employed to reliably detect faces. To generate feature space, train face photos are used (face space). The best match from train images is then found by projecting test images on subspaces and measuring distances. Face pictures can be represented as a weighted sum of various sub spaces because the face space is an affine subspace.[5]

In the paper presented by PrantiDutta, Dr.Nachamai M, performance of a face detection system on a single face from stored videos in various file formats Raw homemade datasets as well as ready-made datasets can be found in stored videos. The suggested work calculates the face detection system's detection percentage in various video formats. There are two stages to the implementation. A ready-made dataset is tested on.wmv,.m4v,.asf, and.mpg file formats, while a raw handmade dataset is tested on.3gp,.avi,.mov,.mp4.[6]

In the paper presented by Lihe Zhang, Huchuan Lu, Dandan Du, and Luning Liu,this propose a new tracking system based on sparse and discriminative hashing. Unlike earlier research, we approach object tracking as an approximate nearest neighbour search in a binary space. The target templates and candidates can be projected into the Hamming space using hash functions, making distance calculation and tracking more efficient. First, we leverage both inter-class and intra-class information to train multiple hash functions for better classification, whereas most previous tracking approaches

ignore interclass correlation, which might lead to inaccuracy.[7]

IV. PROPOSED SYSTEM

Face Recognition is used in the proposed method to identify missing people. Our framework's architecture is depicted in the diagram. The suggested Person Identification System's architecture. Any reported missing person who is observed on a web cam will have their facial features matched to the database and emailed to the police. Our system extracts the image's facial encodings and compares them to the encodings of previously stored photos in the database. An alert message will be sent to the concerned police officer if a match is identified.

In this software with the use of face recognition software, we will be able to detect the individual in this software. We can also use this programme to look for missing people, terrorists, and other things. These programmes have their own database where the missing person's information is stored. As soon as the person is identified by the software, an alert message is sent to the nearest station. This software operates in three stages:

A. Upload Information

Upload images of missing or questionable people, together with their information, to the app, which uses its algorithm to extract the feature office and put it in the database.

B. Face Recognition

When a face is identified in a camera or a cctv, it is compared to a database face feature. To recognise faces, we utilise the line edge map algorithm. In these cases, we employ a Face detection and identification library that can be simply integrated into the applica- tion. It has an application programming interface (API) for detecting and tracking faces. It comes with a tracker API that allows you to track and recognise faces in real time. The SDK includes coordinates for 66 facial feature points (including eyes, eyebrows, mouth, and no se and face contours) and employs multiple CPU cores to speed up recognition. The library also supports direct show-compatible web cameras and IP cameras with a jpeg interface.

C. Send Alert Message

If system identifies the person who is missing or suspicious it will send to the nearest department To further process.

D. Algorithm

1. Haar Cascade Algorithm

- Haar Feature Selection

Objects are categorised based on extremely simple criteria in order to encode ad-hoc domain knowledge and run considerably faster than a pixel system. The name 'Haar' comes from the feature's resemblance to haar filters. A 2-rectangle feature, for example, is defined as the difference between the sum of pixels of area inside the rectangle, which can be at any scale and position within the source image. There are additional 3-rectangle and 4-rectangle features here.

Step 1: Firstly, collect positive and negative images.

Step 2: Collect Haar features from these images using sliding windows of simple rectangular blocks

Step 3: calculated by subtracting the sum of a pixel intensities

- Cascade Classifier Architecture

A cascade classifier is made up of many classifiers that are connected in a logical order. It makes a lot of little judgements about whether or not it's the object. The cascade classifier has a degenerate decision tree structure.

Step 1: Collecting Image Database

Step 2: Arranging Negative Images

Step 3: Crop Mark Positive Images

Step 4: Creating a vector of positive images

Step 5: Haar-Training

Step 6: Creating the XML File

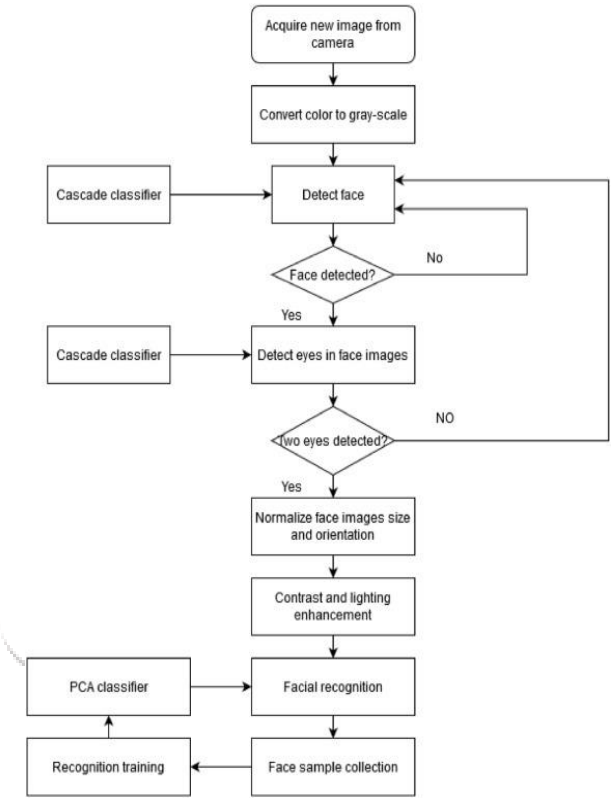


Fig. Haar-Cascade Algorithm

2. CNN Algorithm

This algorithm proposed a face recognition system to extract unique and invariant features from face images of newborns, toddlers, and pre-school children with deep learning approach This method was proposed to achieve a rank-1 identification accuracy of 62.7 percent in the first dataset for single gallery newborn face recognition and 85.1 percent in the second datasets for single gallery newborn face recognition, establishing state-of-the-result for both datasets using the convolutional neural network (CNN) algorithm.The face images in both datasets are identified using the Viola Jones face detector, and matched with the inter-eye distance set as 100 pixels using affine transformation.

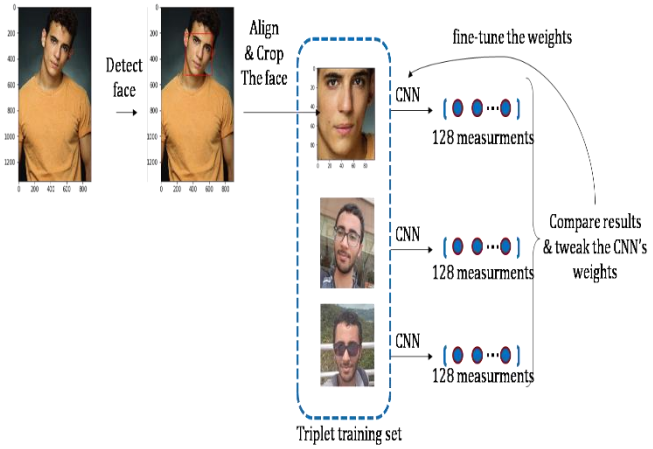


Fig. CNN Algorithm

V. SOFTWARE & HARDWARE REQUIREMENTS

1. Hardware Requirements:

- System: Pentium Dual Core
- Hard Disk: 120 GB.
- Monitor: 15" LED
- Input Devices: Keyboard, Mouse
- RAM: 1GB.

2. Software Requirements:

- Operating System: Windows 7
- Coding Language: Python or JAVA
- Algorithm: Haar cascade, CNN
- Library: OpenCV
- Database: MySQL/MSSQL

3. Development Environment:

We are developing application in .net framework. Web cam will be used for video capturing frames from video taken for face detection and recognition, if missing face matched then we will generate notification to police.

4. Testing Environment:

- OS: Windows 7,8
- RAM: 2 GB

VI. FUTURE SCOPE

The future work on which we are currently concentrating is to develop and evaluate the performance of our proposed system so that we can demonstrate that it is superior to all previous proposed systems in terms of locating missing persons. In the future, we plan to add the following features to increase the functionality of our system. Reports are generated automatically on a regular basis, and data is backed up automatically.

VII. CONCLUSION

Every day, the number of persons who go missing increases around the world, with more than half of them being untraced and falling prey to numerous harmful occupations or slavery. A country with such a large population cannot afford to lose its valued inhabitants to criminals' treachery and malice. On the other hand, losing a large number of children, adults, and even the elderly on a daily basis is a major loss for our developing nation, as it reduces production and has a negative influence on the country as a whole. And, in the case of India, when our young and adults go missing and are never recovered because they are either left or abandoned, the future of our country is severely harmed. It is extremely possible for ordinary citizens to intervene in unlawful operations and try to stop them using Searchious and the proposed method. They can speed up the process of locating missing individuals and lead to a variety of head starts in the overall system of locating missing persons while doing so. The time it takes to file an official missing person complaint is cut in half with Searchious, as is the stress of laborious paper work, field visits, and the physical process of recognition. Also, because to Searchious, a person who has been missing for years can be quickly identified, located, and transported to a secure area. The time spent by the police and those associated with the person is greatly reduced as a result.

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