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CRIMINAL AND MISSING PERSON IDENTIFICATION SYSTEM USING IMAGE PROCESSING

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Abstract: Everyday, thousands of people go missing around the world including children, teenagers, the mentally challenged, the senior with Alzheimer's, and others. utmost of them remain untraced. To this missing case entry is streamlined in police station. By using image processing compare each person with the available database and find these people. This system designed to find the felonious and missing people. If the missing person or felonious set up in the Web videotape streaming also shoot the position of missing person to police station. After missing person set up in the Web videotape streaming, shoot position Dispatch to Police station. In order for our system to fulfill its pivotal part in matters of security and authentication. Every executive function in this system is carried out by the admin then. The director has the capability to view, add, and remove stoner police. The system recognizes the issues and produces affair in line with them. This will grease law enforcement's hunt for a specific existent.

Keywords: Missing Person, Criminal, Identification, Face Recognition, OpenCV, CNN

I. INTRODUCTION

A missing person can be characterized as the one who can be a child or an adult – who is lost, voluntarily or involuntarily. There are several categories of missing cases; of these, only 43% have known explanations; 99% involve juvenile runaways; 2500 involve family issues; and roughly 500 involve strangers (teens and adults). About 52% of missing instances are in women, while 48% are in men. According to an official source, "there are no budgets allocated in India for finding missing people." A missing person encounters several difficulties; few are at risk of abuse, rape, or death (murder). Parents, friends, family, and guardians are among the people concerned about the missing individual who experience stress and worry as a result of not knowing if the missing person is alive or dead. According to our system, the police have the image of the missing individual that was provided by the guardian saved in the database. Among the currently stored images in the database, our application will automatically locate a match for this particular image. This aids the police force in finding the missing individual wherever they may be in India. When an individual of interest is discovered, their photo at that moment is compared using a facial recognition model with the images that the police department had submitted when the person went missing. If a match is discovered, the police will be alerted via email with the location of the person who was discovered. In the event that the uploaded image cannot be located, the image will be added to a new database item. This shortens the time it requires to locate someone's details once they've been located. On occasion, the lost person has vanished for an extended length of time. Because aging alters the structure of the face, including its shape, texture, and other features, the age difference is mirrored in the picture. A person's appearance might vary depending on factors including aging, filters,

positions, lighting, and more. All of these parameters were considered prior to choosing the facial recognition algorithm.

PROBLEM STATEMENT

To develop a system for Criminal and Missing Person Identification which will take an input as a criminal's or missing person's Image and information and generates an output as logs of criminal identification.

II. OBJECTIVES

The objectives of the system are,

• To develop a system by using Image processing techniques that can be used to identify criminals by comparing images or videos obtained from crime scenes with existing criminal databases.

• To develop the system for Criminal Detection and Missing Person.

• To save time and human efforts.

• To utilize image processing algorithms for facial recognition. This involves analyzing facial features such as the eyes, nose, mouth, and face shape to create a unique biometric template for each individual. The goal is to match these templates with images or videos obtained from surveillance cameras, photographs, or video footage in order to identify criminals or missing persons.

• To help police personnel to identify criminals and missing person and provide information about a specific criminal that we are finding.

• To find criminals and missing person from live CCTV cameras.

III. LITERATURE SURVEY

Table 4.1: literature survey

Sr.no	Author and Title	Proposed System	For this paper we referred
1.	AniruddhaDey, "A Contour based Procedure for Face Detection and Tracking from Video " 3rd Intuit Conf. on Recent Advances in Information Technology I RAIT-20161	In this paper primary goal is to recognize location of faces from video. Moreover, finding face motion leads to be a part of face recognition system. Firstly, face edges are detected using Robert edge detector followed by a set of arithmetic operations between an initial frame and the nearest ones. Thereafter, non-desired edges and noise are removed by Gaussian filtering technique. A logical operation is then performed between the previous two output frames and noiseless face contour frame for detecting edges corresponding to face video. Finally, four corner points i.e. top left, top-right, bottom-left, bottom-right is computed to draw rectangle around the face and detect face contour of each frame. To track human face from video, scalar and vector distance between four corner points of two consecutive frames are calculated. Displacement of corner points means position and location of face changes in the next frame.	Referred following technique 1. Face Detection 2.Moving Face Contour Detection 3. Face Tracking
2.	Andreas Ess, Bastian Leibe, Konrad Schindler, Luc Van Gool, "A Mobile Vision System for Robust	Propose a way to closely integrate the vision modules for visual odometer, pedestrian detection, depth estimation, and tracking. The	Object or multi-person tracking-by-detection with

	Multi-Person Tracking " 978-1-4244-2243-2/08/$25.00 ©2008 IEEE	integration naturally leads to several cognitive feedback loops between the modules. Among others, we propose a novel feedback connection from the object detector to visual odometry which utilizes the semantic knowledge of detection to stabilize localization. Feedback loops always carry the danger that erroneous feedback from one module is amplified and causes the entire system to become instable. We therefore incorporate automatic failure detection and recovery, allowing the system to continue when a module becomes unreliable. The approach is experimentally evaluated on several long and difficult video sequences from busy inner-city locations. Our results show that the proposed integration makes it possible to deliver stable tracking performance in scenes of previously infeasible complexity.	additional depth information.
3.	He Guohui ,Wang Wanying, "An algorithm for fatigue driving face detection and location " 2015 8th International Conference on Intelligent Computation Technology and Automation	To detect and locate face region accurately, improve real-time, accuracy, and reliability of face detection in the fatigue driving warning system, according to the theory put forward by Yang, combined with skin color segmentation and edge detection technology, we mixed Gaussian Model and Oval Clustering Model.	Understand following face detection techniques : 1. Skin color segmentation 2. Color Gaussian model 3.Face edge feature extraction
4.	K. V. Arya, Abhinav Adarsh, "An Efficient Face Detection and Recognition Method for Surveillance " 2015 International Conference on Computational Intelligence and Communication Networks	It presented for automatic detection and recognition of human faces for surveillance purpose. The proposed method first detects skin regions in the image using a skin color model using YCbCr and HSV color space. Then apply height to width ratio followed by face region identification. Lastly PCA verification algorithm is used to detect face accurately. Train face images are used to generate feature space (face space). Test images are then projected on sub spaces and distances measured to find out best match from train images. The face space is affine subspace and face images can be represented as weighted sum of these sub spaces.	Process of Skin Detection, Segmentation, Face Detection, Texture And Illumination, Recognition
5.	PrantiDutta, Dr.Nachamai M, Department of Computer Science, Christ	This paper evaluates the performance of detection system on single face from stored videos that	Process of face detection from video file, pattern

	University Bengaluru, India "Detection of Faces from Video Files with Different File Formats "	is stored in different file formats. Stored videos contain raw homemade datasets as well as ready-made datasets. This proposed work concludes detection percentage of face detection system in different video formats. The implementation is done in two phases. The raw homemade dataset is tested on .3gp, .avi,.mov, .mp4 and a ready-made dataset is tested on .wmv, .m4v, .asf, .mpg file formats.	recognition, object recognition, stored video database

V. SYSTEM ARCHITECTURE

Face Recognition is used by the proposed system to identify missing persons. The architecture of our system is presented in figure. Here, the facial features of any reported missing person who is seen on a web cam will be matched to the database and sent to the police via email. Our algorithm extracts the face encodings of the image and compare with that of the face encodings of the previously existing images in the database. If a match is found, an alert message will be sent to the concerned police officer.

Figure 5.1: system architecture

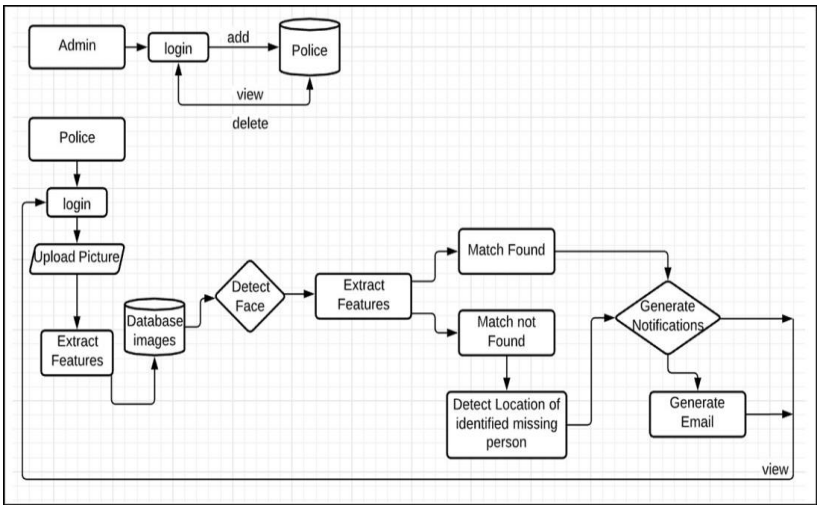


Figure 5.2: system architecture

System Architecture contains main three modules:
1. Admin Module
2. Image Processing Module
3. Alert Module

1. Admin Module:

This module collects and stores information, images and required ID proof of missing person and criminal for analysis. It can include a user interface where authorized personnel can upload data, or it could be integrated with a surveillance system to capture images.

2. Image Processing Module:

This module enhances the quality of the images captured. The module can include filters, resizing functions, and other image manipulation tools to enhance the quality of the images or videos. For image processing and matching we have used CNN algorithm

Input: Raw images or videos captured by the previous module.

Output: Enhanced images or videos that are improved in quality with filters or other image manipulation tools.

Steps for image processing:

1. Feature Extraction: In this step extraction of relevant features from the image provided by the image processing module will take place. The features could include facial features such as eyes, nose, and mouth, skin color, height, and other body features.

2. Image/features Matching: In this step comparison of the extracted features from the missing persons or criminals' database with those extracted from the captured image will take place. The algorithms used in this module identify the best match or likeness between the two sets of features.

3. Alert Module:

This module sends an email alert to notify authorities if a match is found between the captured image and the missing persons or criminals' database. The alert can be sent through email and through a dedicated web portal.

VI. PROPOSED SYSTEM

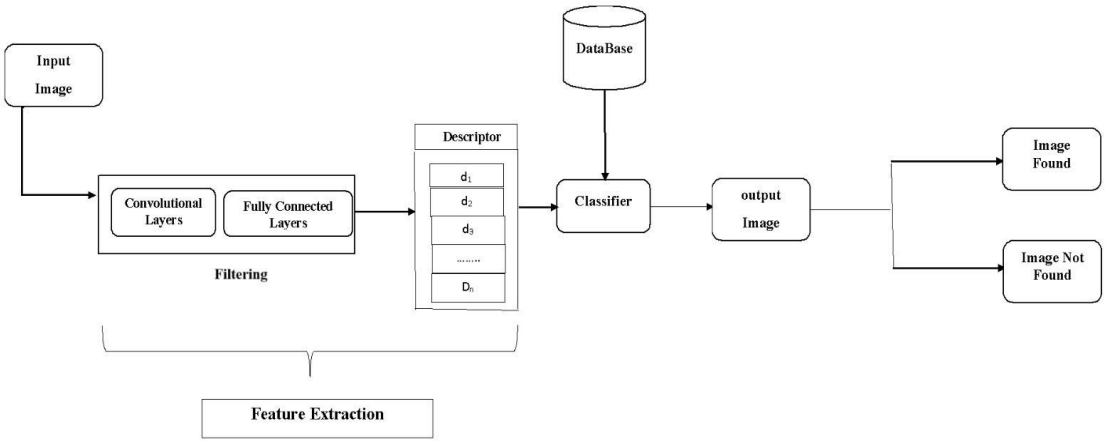


Figure 6.1: proposed system

1. Input Image: Start with an input image or a batch of images. CNNs are capable of processing both grayscale and color images.

2. Convolution: Apply convolutional layers to the input image. Convolution involves sliding small filters (kernels) across the input image to detect patterns and features. Each filter extracts different features by computing dot products at various positions.

3. Activation Function: Apply an activation function, commonly ReLU (Rectified Linear Unit), to introduce non-linearity. This helps the network learn complex features.

4. Pooling (Subsampling): Perform pooling layers to down sample the spatial dimensions. Max-pooling is a popular technique, which selects the maximum value from a local region of the input. This reduces the computational load and makes the network more invariant to small translations.

5. Convolution and Activation (Repeat): Repeat steps 2 and 3 by adding more convolutional layers followed by activation functions. This allows the network to learn increasingly complex features.

6. Flattening: Flatten the output from the convolutional layers into a 1D vector. This prepares the data for the fully connected layers.

7. Fully Connected Layers (Dense Layers): Add one or more fully connected layers. These layers connect every neuron from the previous layer to every neuron in the current layer, allowing the network to learn high-level features and relationships.

8. Activation Function (Repeat): Apply activation functions to the fully connected layers, usually ReLU or softmax (for classification).

9. Output Layer: The final fully connected layer typically contains as many neurons as there are classes in a classification task. For binary classification, one neuron is sufficient. For multi-class problems, use one neuron per class.

Libraries Used in System

1. OpenCV:

The OpenCV library is a powerful open-source computer vision and machine learning software library designed for efficiency and real-time applications. It provides tools for image and video processing, feature detection, object recognition, and more. For a criminal and missing person identification system, the OpenCV library can be used to analyze images or videos captured from surveillance cameras or other sources to identify individuals of interest. This can involve facial recognition techniques, object tracking algorithms, and image processing tools to extract relevant features such as facial landmarks or unique characteristics. By leveraging the capabilities of the OpenCV library in combination with other technologies like deep learning models or database matching algorithms, a criminal and missing person identification system can be developed to aid law enforcement agencies in identifying suspects or locating missing individuals efficiently and accurately.

2. Face Recognition:

A facial recognition library is a software component that utilizes algorithms to analyze and identify unique facial features in an image or video. For a criminal and missing person identification system, the library would be used to compare images of suspects or missing individuals with a database of known individuals to determine potential matches. The library would also have the capability to extract key features from faces, such as the distance between eyes, shape of the face, and other distinguishing characteristics for accurate identification. This technology plays a crucial role in law enforcement efforts by assisting in tracking down criminals and locating missing persons.

VII. RESULT AND DISCUSSION

Figure 7.1: admin login

Figure 7.2: branch login

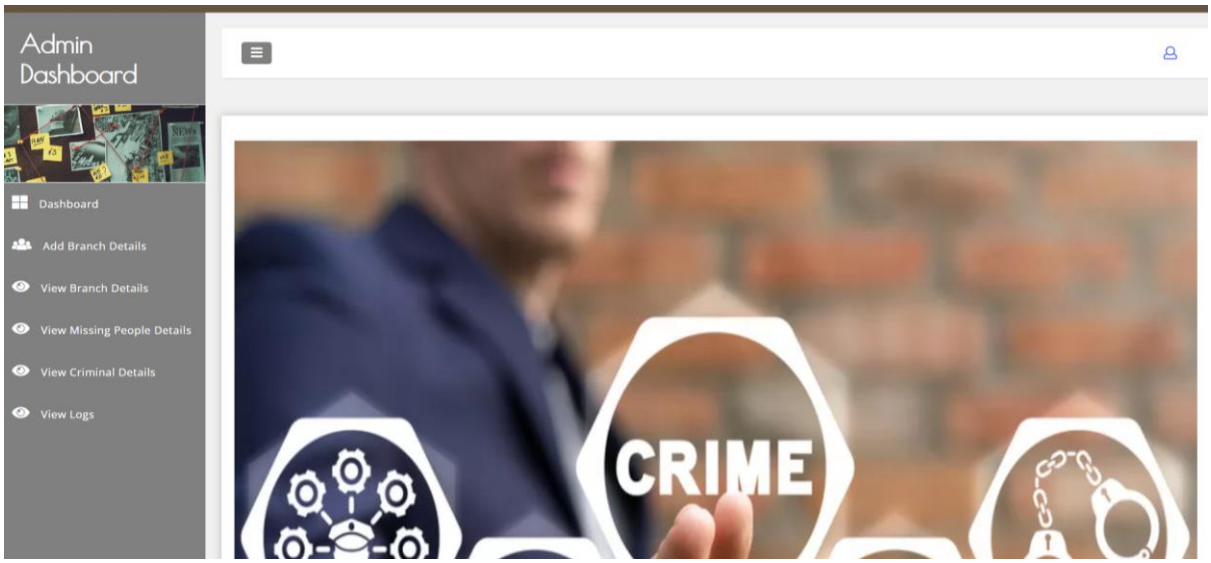


Figure 7.3: admin dashboard

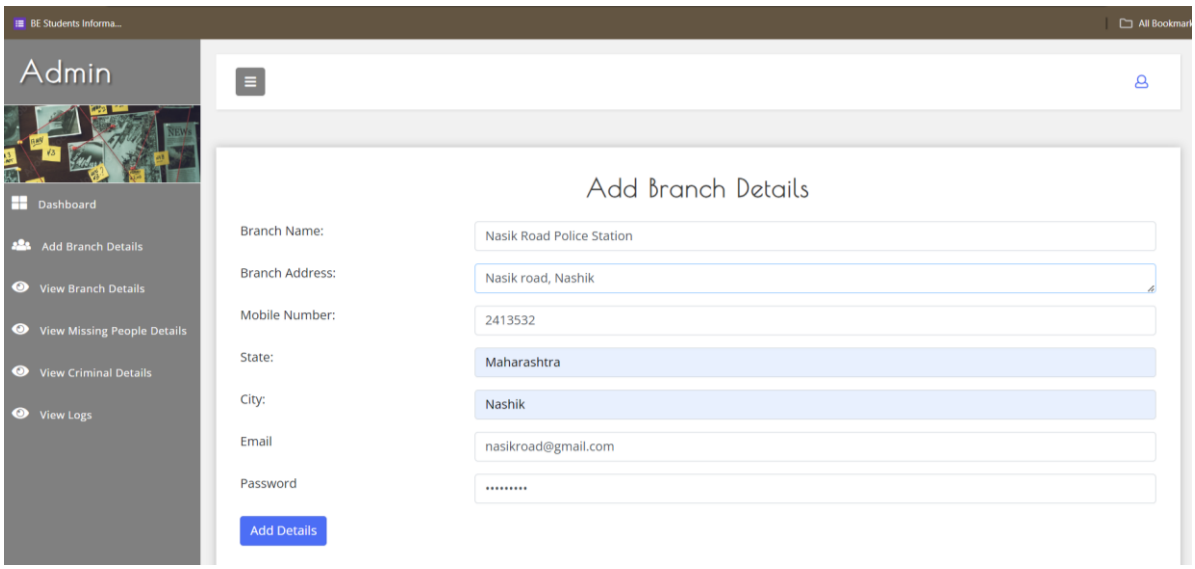


Figure 7.4: add police station branch details

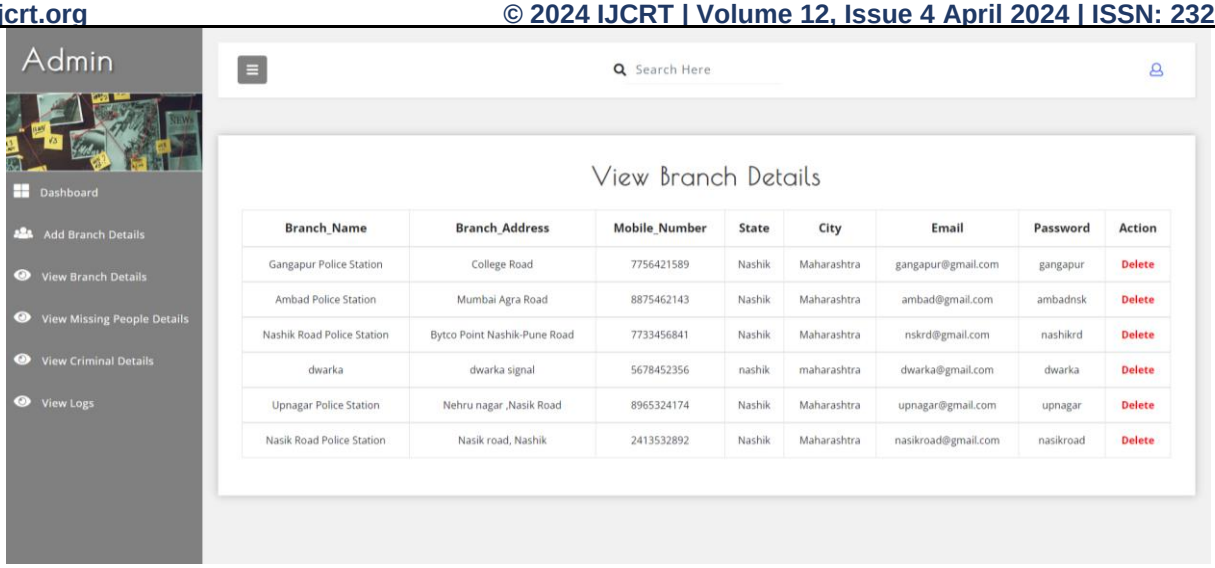


Figure 7.5: view branch details

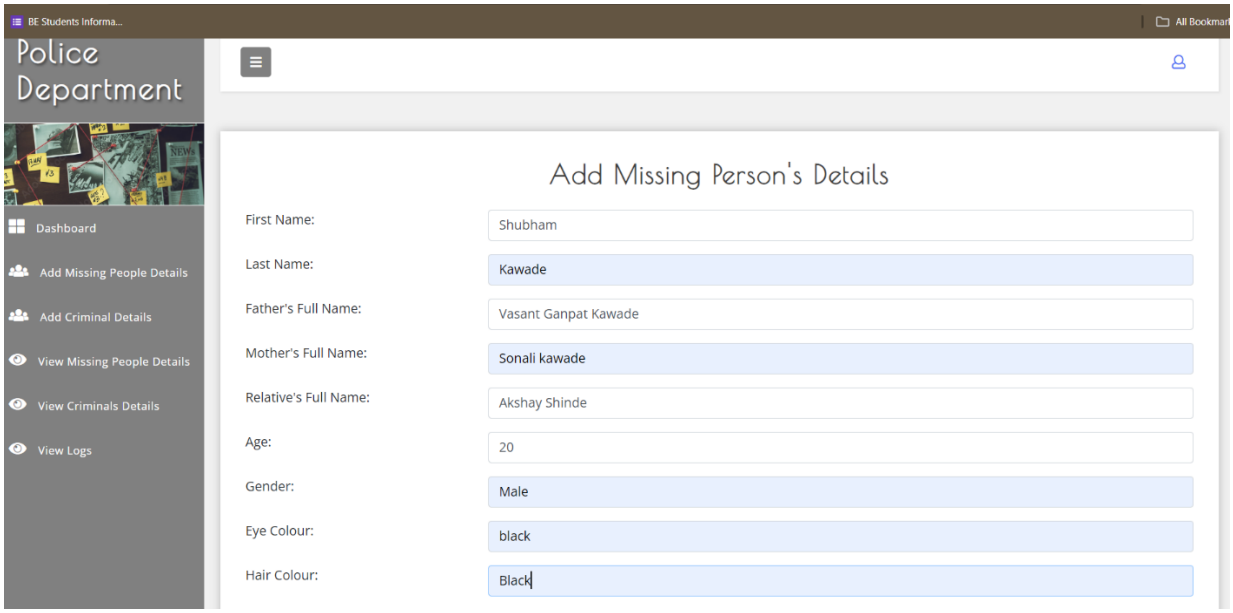


Figure 7.6(a): add missing person's details

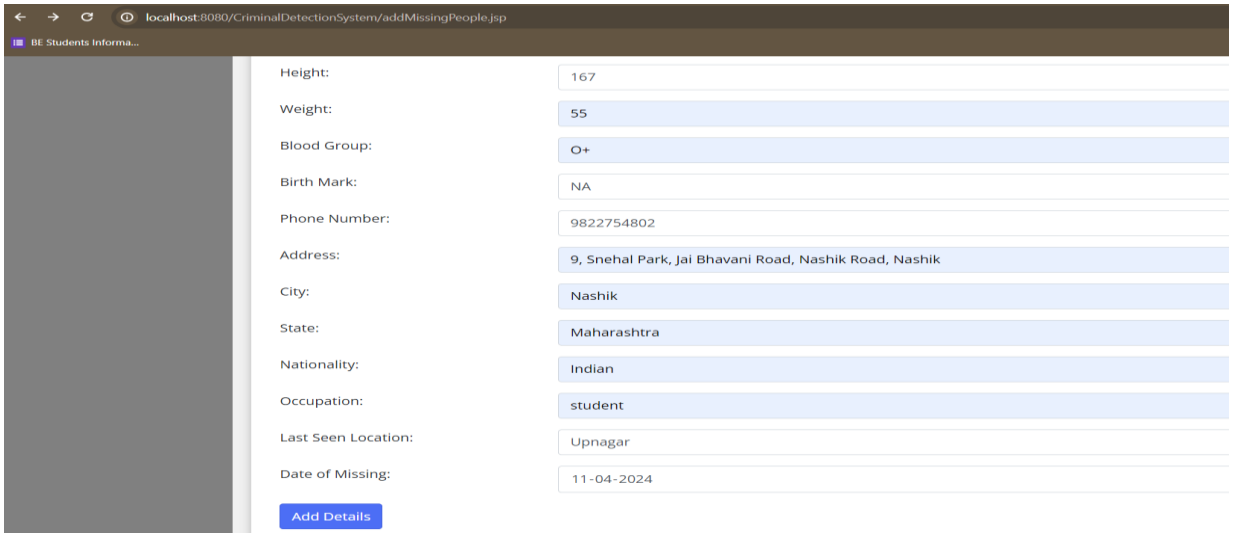


Figure 7.6(b): add missing person's details

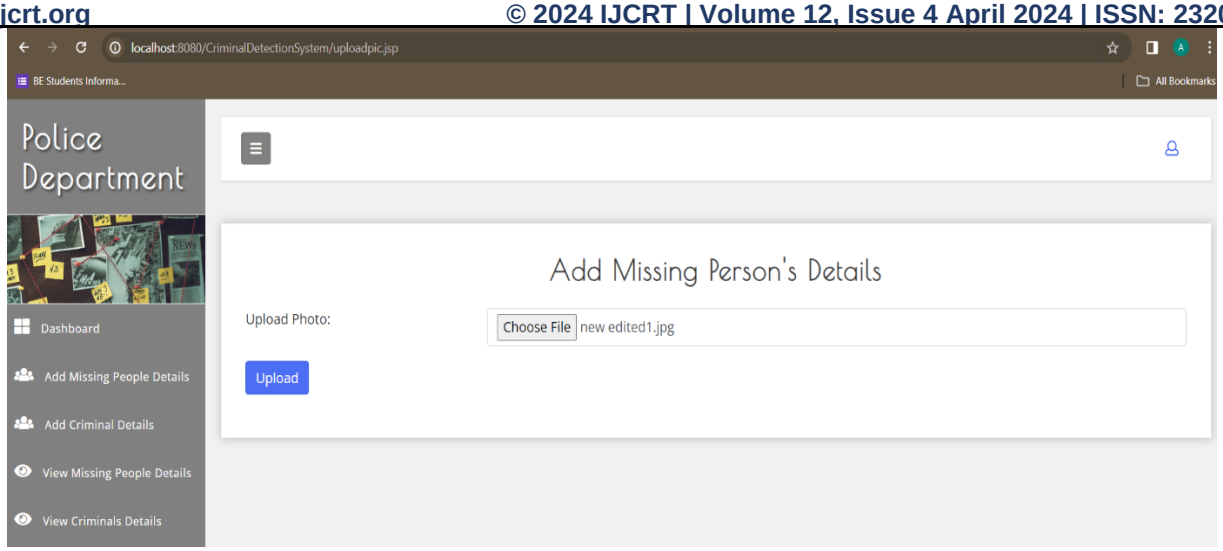


Figure 7.6(a): add missing person's details upload image

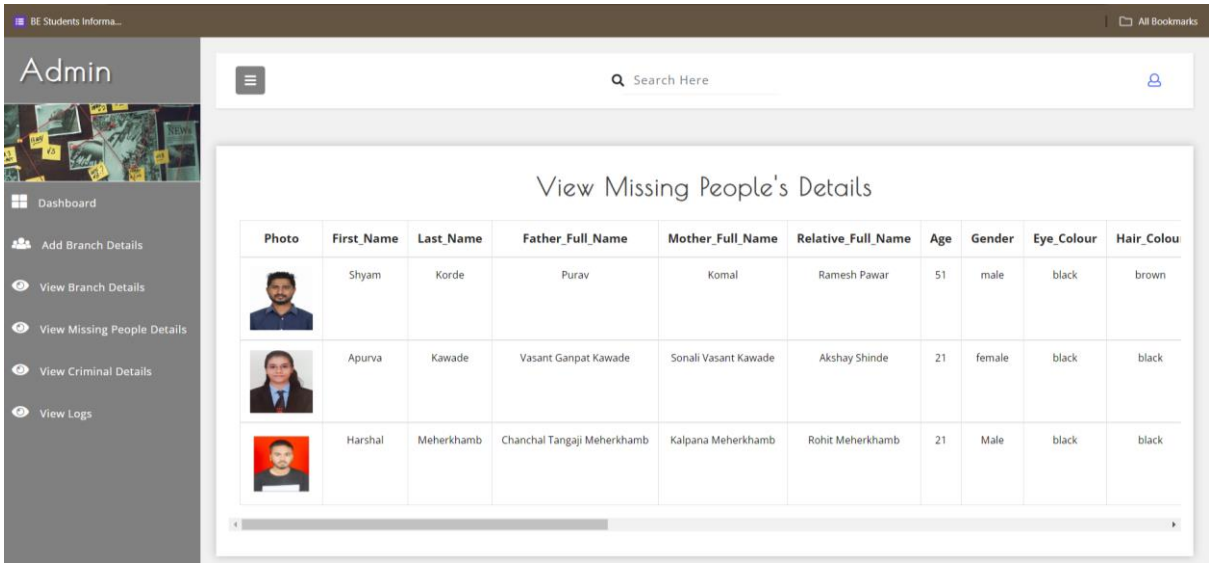


Figure 7.7: view missing people's details

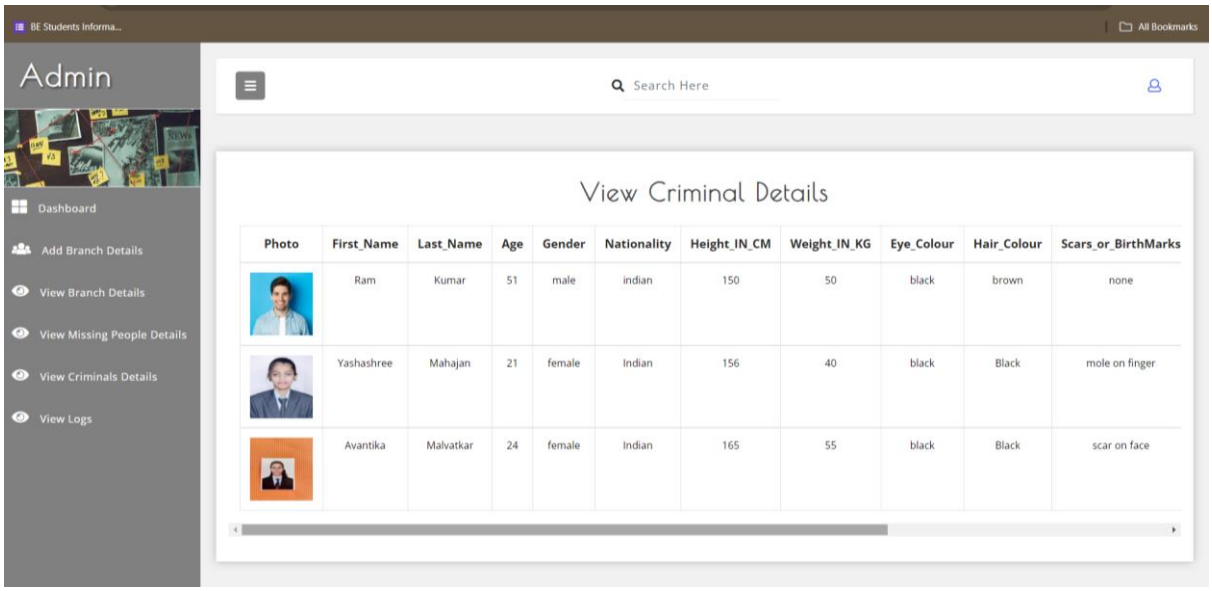


Figure 7.7: view criminal details

Figure 7.8: person detected in camera

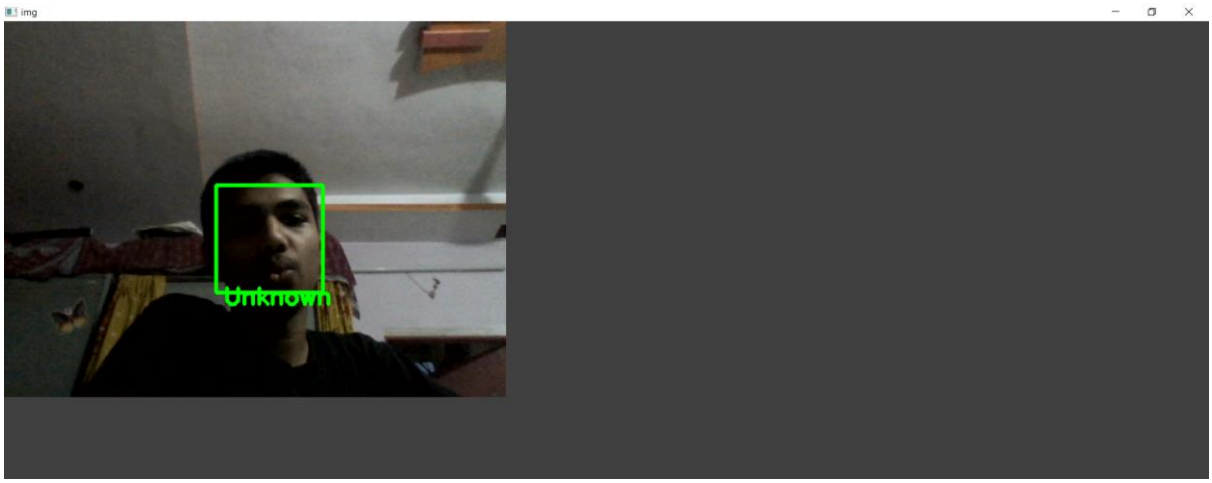
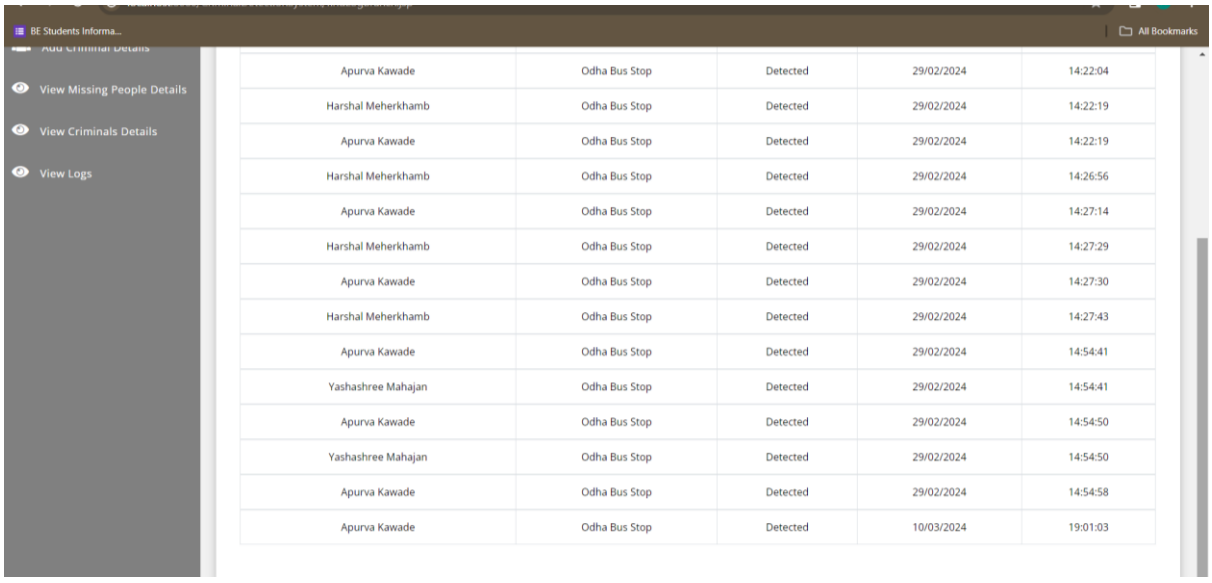


Figure 7.9: unknown person detected in camera



Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:22:04
Harshal Meherkhamb	Odha Bus Stop	Detected	29/02/2024	14:22:19
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:22:19
Harshal Meherkhamb	Odha Bus Stop	Detected	29/02/2024	14:26:56
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:27:14
Harshal Meherkhamb	Odha Bus Stop	Detected	29/02/2024	14:27:29
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:27:30
Harshal Meherkhamb	Odha Bus Stop	Detected	29/02/2024	14:27:43
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:54:41
Yashashree Mahajan	Odha Bus Stop	Detected	29/02/2024	14:54:41
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:54:50
Yashashree Mahajan	Odha Bus Stop	Detected	29/02/2024	14:54:50
Apurva Kawade	Odha Bus Stop	Detected	29/02/2024	14:54:58
Apurva Kawade	Odha Bus Stop	Detected	10/03/2024	19:01:03

Figure 7.10: logs maintained at admin login and branch login after person detected in camera.

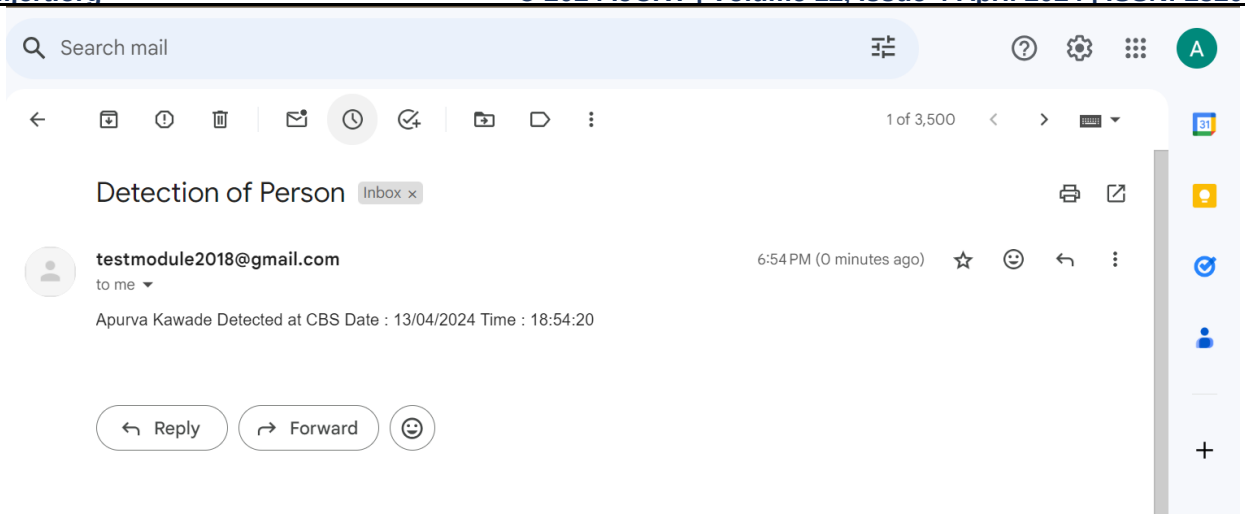


Figure 7.11: email alert sent to authorized person

VIII. CONCLUSION

We have developed criminal and missing person identification system using image processing. It will save your time and effort, especially if you are going somewhere sociable. The goal of the automated criminal and missing person identification approach is to eliminate the flaws in the traditional system. This system exemplifies hoe image processing techniques can be used in public spaces. This technology has the potential to not only assist in criminal investigations, but also to improve the government's reputation.

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