IMAGE PROCESSING FOR MISSING PERSON AND CRIMINAL IDENTIFICATION

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ABSTRACT

Every day, enormous numbers of people go missing from the globe; these include children, teenagers, persons with mental disabilities, elderly people suffering from Alzheimer's, and so on. The majority are yet unidentified. An update has been made to the police station's missing case entry. These persons can be located by employing webcam technology to compare each individual with the database that is accessible. This technique was made to locate those who had gone missing. Send the missing person's location to the police station if they are discovered while watching a web video.Once the missing person has been located via live web video, email the police station with their whereabouts. Thus, our system is capable of carrying out a crucial function in matters pertaining to security and authentication. Every administrative function in this system is carried out by the admin here. The administrator has the ability to view, add, and remove user police. The system recognizes the outcomes and produces output in line with them.

Keyword: - *Missing people, finding, face recognition, web camera.*

1. INTRODUCTION

A person who is lost, whether intentionally or unintentionally, can be classified as missing. This individual can be a child or an adult. There are many different types of missing cases; only 43% of the causes of missing cases are known; 99% of cases include juvenile runaways; 2500 instances involve family issues; and approximately 500 cases involve strangers kidnapping victims (including adults and teens). About 52% of missing instances are in women and 48% are in men. According to an official source, "there are no budgets allocated in India for finding missing people." While many challenges confront a missing individual, very few experience abuse, rape, or death (murder). The uncertainty about the missing person's whereabouts causes tension and anxiety for those who care about them, including parents, friends, relatives, and guardians. The police have a database in our system that has the photo of the missing person that was provided by the guardian. Our application will automatically identify a match for this image from the pre-existing photographs in the database. This makes it easier for the authorities to find the missing person wherever in India. When a suspicious person is discovered, the facial recognition model compares their photo at that moment with the ones the police department submitted when the person went missing. An email message containing the location of the person located will be sent to the police if a match is discovered.

2. LITERATURE REVIEW

Using edge detection and Gaussian filtering techniques, AniruddhaDey focuses on contour-based face detection and tracking from video. Face tracking, moving face contour detection, and face detection are important methods[1].Andreas Ess et al.: By combining different vision modules for pedestrian identification, depth estimation, and tracking, together with automatic failure detection and recovery, they propose a mobile vision system for reliable multi-person tracking[2].In order to improve tracking performance in low-resolution circumstances, Rolf H. Baxter et al. provide an adaptive motion model for person tracking with instantaneous head-pose features[3]. He Guohui and Wang Wanying: Present an algorithm that combines edge detection and skin color segmentation approaches to drive face detection and localization when tired[4].K. V. Arya and Abhinav Adarsh: Using skin detection, segmentation, face detection, and PCA verification methods, they describe an effective face detection and recognition method for surveillance[5].Pranti Dutta and Dr. Nachamai M.: Concentrating on single-facial detection, they assess how well a face detection system performs on videos saved in various file formats[6]. A sparse hashing tracking framework for object tracking is proposed by Lihe Zhang et al. They use discriminative hashing techniques to get the estimated nearest neighbor[7].

3. PROBLEM STATEMENT

Since it can be challenging to locate a person in a crowd, we are using CCTV cameras to implement the Haar Cascade algorithm. with the aid of facial recognition and image processing. The person will be recognized by the system when his face matches. Once we enter the criminal's face information into our system, this aids in their location.

4. PURPOSE

Saving time and human efforts - The system goal is Saving time and human efforts, Every bus stop, temple, mall, railway stations have the much more people crowd, if we think to find the someone in the crowd it’s difficult observe to the human eye, but as we know the all above place have the CCTV coverage, this will help us to find the wanted person by using the technology which is faster and reliable as compare humans. This will directly help to save time and human effort

6. MOTIVATION OF THE PROJECT

The goal is to use computer vision and facial recognition technology to speed up the hunt for missing people. This can improve public safety, speed up reunions, and give law enforcement much-needed assistance. In general, the creation of such a system can significantly ease the difficulties posed by cases involving missing persons and enhance societal well-being.

7. OBJECTIVES

Saving time and human efforts - The system goal is Saving time and human efforts, Every bus stop, temple, mall, railway stations have the much more people crowd, if we think to find the someone in the crowd it’s difficult observe to the human eye, but as we know the all above place have the CCTV coverage, this will help us to find the wanted person by using the technology which is faster and reliable as compare humans. This will directly help to save time and human effort.

8. METHODOLOGIES OF PROBLEM SOLVING AND EFFICIENCY ISSUES

Technology to be including the plan	**How it will be used**	**Material that need to be created**
1.Web Application	It is used in Web camera, IP camera	Web camera IP camera
2.Net Application	To detect person	Visual studio Code
3.Mobile Application	To used handle application manual and store data	Android and Mobile

4.Cloud storing	Storing all information in cloud.	Cloud account

9. SYSTEM ARCHITECTURE

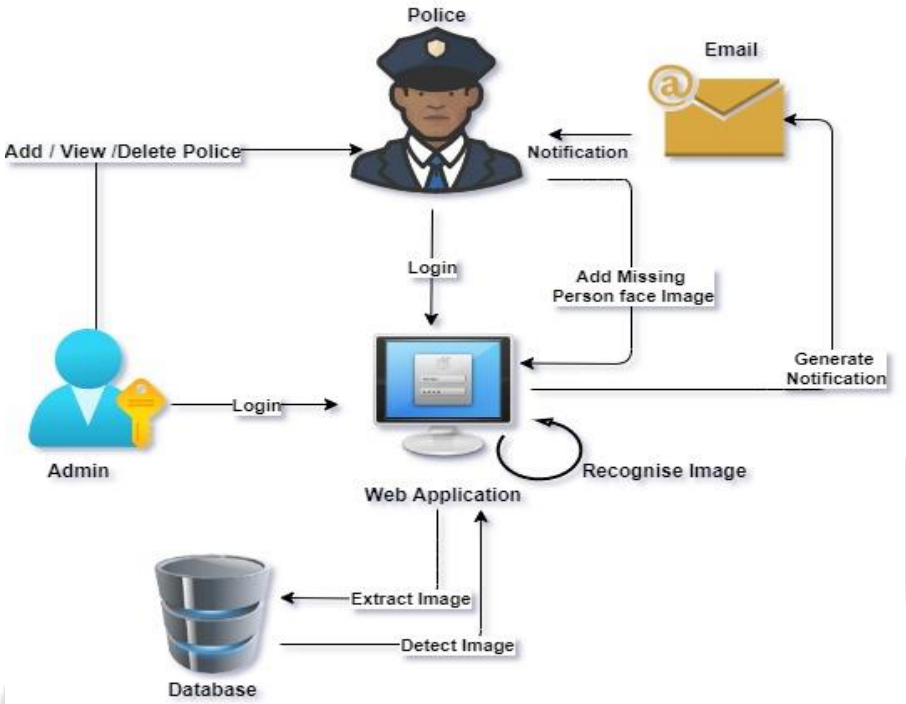


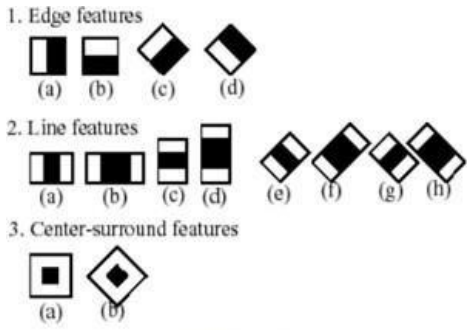
Fig 1: System Architecture

9. ALGORITHM

9.1 Haar Feature Selection

As a feature to encode ad-hoc domain knowledge and function considerably faster than pixel system, objects are sorted based on extremely basic features. The name "Haar" comes from the feature's resemblance to haar filters. A 2-rectangle feature, which can have any position and size inside the original image, is an example of these features. It is defined as the difference of the sum of pixels of area inside the rectangle. This also makes use of the 3-rectangle and 4-rectangle features.

Step 1: Gather both good and negative pictures first.
Step 2: Utilizing sliding windows made of straightforward rectangular blocks, extract Haar features from these pictures.
Step 3: Calculated by subtracting each pixel's overall intensity.

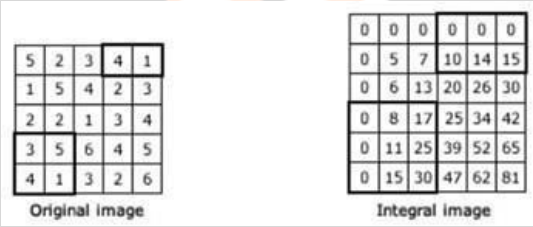


Haar Features

9.2 Integral Image Representation

Any point in an integral image has value equal to the sum of the pixels to its left and above. It is possible to compute an integral image effectively in a single pass over the picture.

Step1: Start
Step2: Set the weights to zero.
Step3: Adjust the weights to their normal.
Step4: Choose the most effective weak classifier by considering the weighted error.
Step 5: Adjust the weights in accordance with the selected classifiers' error
Step 6: T times, where T is the desired number of weak classifiers, repeat steps 2-4
Step 7: Come to an end.



9.3 Adaboost Training

It would be exceedingly costly to assess all 162,336 potential attributes for a 24 × 24 pixel frame. In order to train the classifier using only the best features, the AdaBoost method is applied.

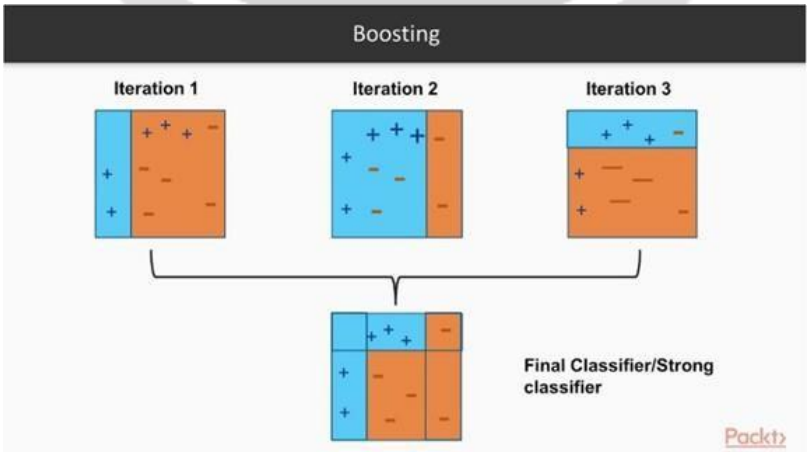
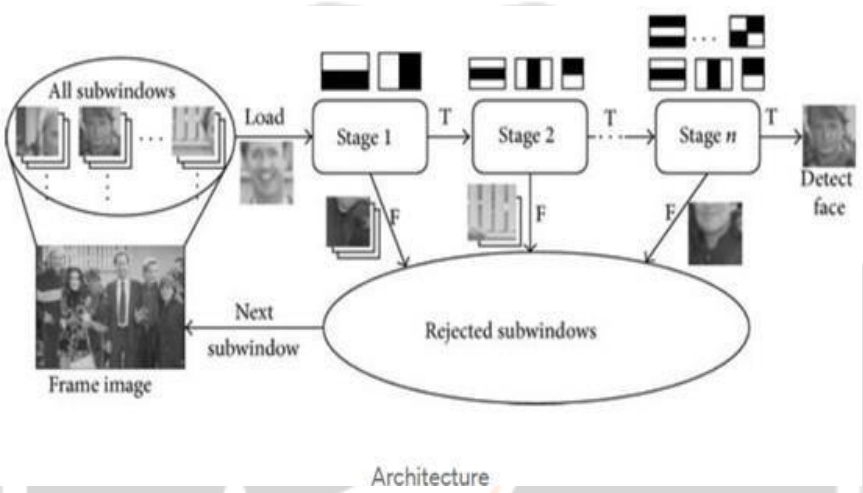


Image by Packt

Step1: First, set the weight in accordance with the observation.
Step2: Do the normalized weight calculation.
Step3:Use normalized weights to call the weak learner, which is the Naive Bayes Classifier.
Step 4: The weight wi that the weak classifier is trained on is used to compute the error.
Step5: Using this inaccuracy, the weight of each classifier is calculated. Update the weight for iteration t
Step6: Calculate the final classifier for the newly discovered information or theory.

9.4 Cascade Classifier Architecture

A cascade classifier is created by concatenating many classifiers in a sequential order. It makes a great deal of tiny decisions about whether or not it is the object. The cascade classifier has a degenerate decision tree structure.



Architecture

Step 1: Gathering Data for Image Database
Step 2: Setting Up Negative Pictures
Step 3: Positive Crop Mark Images
Step 4: Making a vector of optimistic pictures
Step 5 : Training Haar
Step 6: Creating the XML File

9.5 Modified Algorithm

There are two primary actions to take:
1. Identify the mouth and face of a human in every input video frame.
2. Determine if the person is wearing a mask.

Step 1: Face and Mouth Identification To predict a face using Dot Net and OpenCV, follow these steps:
1. Use the "Cascade Classifier" method and "haarcascade frontalface default.xml" to create a HAAR Cascade object.
2. Use the "imread" (or "read" for video/camera input) function to read an image.
3. Use the "cvtColor" method to convert in grayscale.
4. Use the "detectMultiScale" function to find a face.
Step 2: Determine if the person is wearing a mask.
1. Rectangle image of a gray face
2. The rectangle facial image of "Black White"
3. Mouth rectangle in the "Gray" image We can develop a rule to identify masks based on the quantity of rectangles and the locations of the mouth and facial rectangles.

The truth table that follows will show the proper state of having a mask or not.

Face Detected (Gray)	Face Detected (Black & White)	Mouth Detected	Output
len(faces) == 0	len(faces_bw) == 0	NA	No Face Found
len(faces) == 0	len(faces_bw) == 1	NA	Mask Found (White)
len(faces) > 0	len(faces_bw) == 0 OR len(faces_bw) > 1	len(mouth_rects) == 0	Mask Found
len(faces) > 0	len(faces_bw) == 0 OR len(faces_bw) > 1	len(mouth_rects) > 0 AND y < my < y + h	No Mask Found

Conditions for with mask/ without mask

10. HARDWARE AND SOFTWARE REQUIREMENTS

10.1 Hardware

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

10.2 Software

1. Operating System: Windows 7
2. Coding Language: Python or .NET/JAVA
3. Algorithm: Haar cascade, frontal face
4. Database: MySQL/MSSQL
5. Library: OpenCV

11. FUTURE SCOPE

1. Improved Machine Learning Algorithms: * Create increasingly complex facial recognition algorithms to increase accuracy, particularly under changing circumstances.
2. Real-Time Processing: To expedite the identification process, strive for real-time image analysis.
3. Multimodal Biometrics: For more reliable identification, combine many biometric identifiers (speech, gait, etc.).
4. Integration with Surveillance Systems: Work with law enforcement to integrate this technology for broader coverage into current surveillance systems.
5. Enhance database infrastructure for more effective data comparison and retrieval through database and networking improvements.
6. Focus on Privacy and Ethics: When managing sensitive data, give top priority to strict privacy regulations and moral considerations.
7. Mobile App Integration: Provide a user-friendly app that allows people to report and upload pictures of people who go missing or who seem suspicious.

12. APPLICATIONS

12.1 Android Applications

A software program called an Android App is made to operate on an Android device or emulator. Additionally, an APK file—which stands for Android package—is referred to by the name. Android apps are executed within a virtual machine and can be developed in Kotlin, Java, or C++. Android Studio is the official developer environment.

12.2 .Net Applications

NET is an open source, cross-platform, free development framework that allows developers to create a wide range of applications. You may build for the web, mobile, desktop, games, and Internet of Things (IoT) with.NET by using a variety of languages, editors, and frameworks.

12.3 Web Application

An application on a web server is referred to as a "web app" or web application. Online programs require a web browser to be accessed, in contrast to traditional desktop applications, which are started by your operating system. When compared to desktop programs, web apps provide a number of advantages. It is not necessary for developers to create web apps for different platforms because they operate inside web browsers. For instance, a single Chrome application can be used with both OS X and Windows. Users do not require software updates from developers when a web application is updated. Every user has access to the most recent version of the application when it is updated on the server. Because a web application's appearance depends more on the browser than the operating system, it may offer a more consistent user interface for users across a variety of platforms. A web application also processes and saves the data you enter remotely. Instead of moving files across computers, this enables you to access the same data from several devices.

13. ADVANAGES AND DISADVANTAGES

13.1 Advantages

1. Enhanced Recognition: By sharpening features or enhancing image quality, image processing algorithms can improve photos and make it simpler to identify certain people.

2. Automated Analysis: Image processing makes it possible to analyze huge datasets automatically and compare photos to databases of people who are known to you quickly.

3. Cross-referencing: To cross-reference and confirm identities, image processing can be connected with other databases, such as criminal histories or social media profiles.

4. Facial Recognition: Advanced facial recognition algorithms can match faces with databases already in place, which helps identify criminals and missing people.

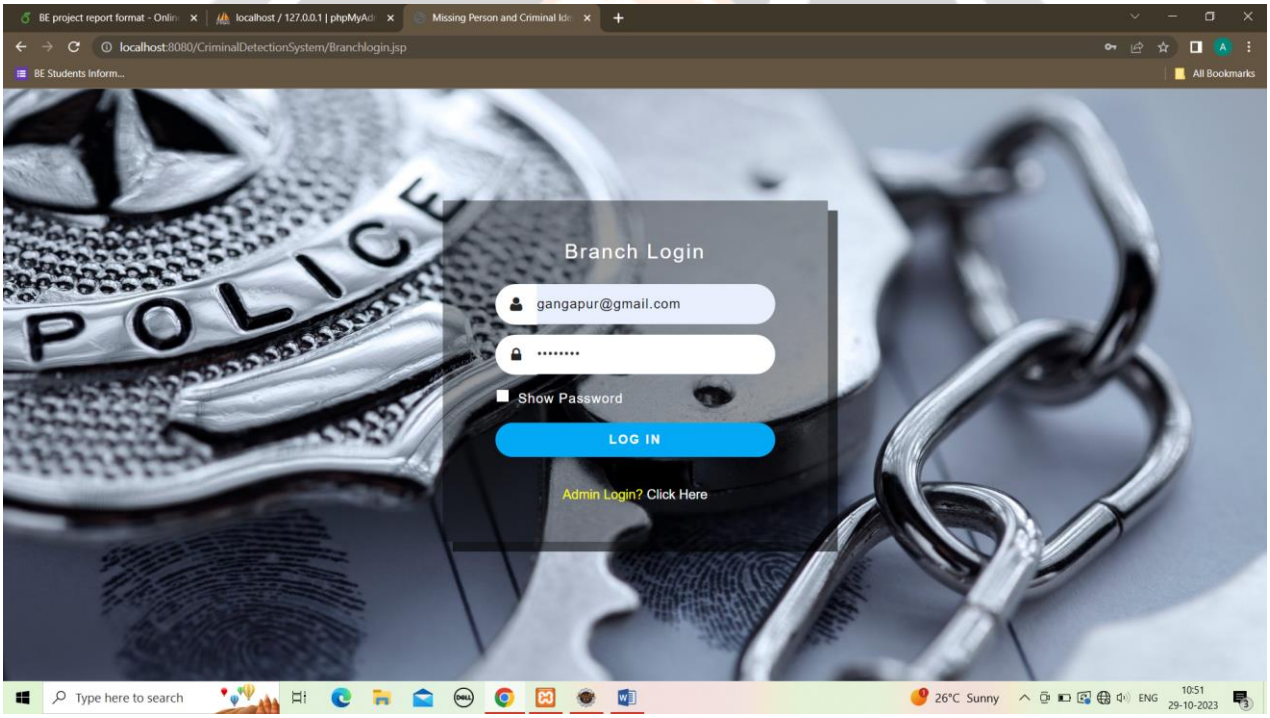
13.2 Disadvantages

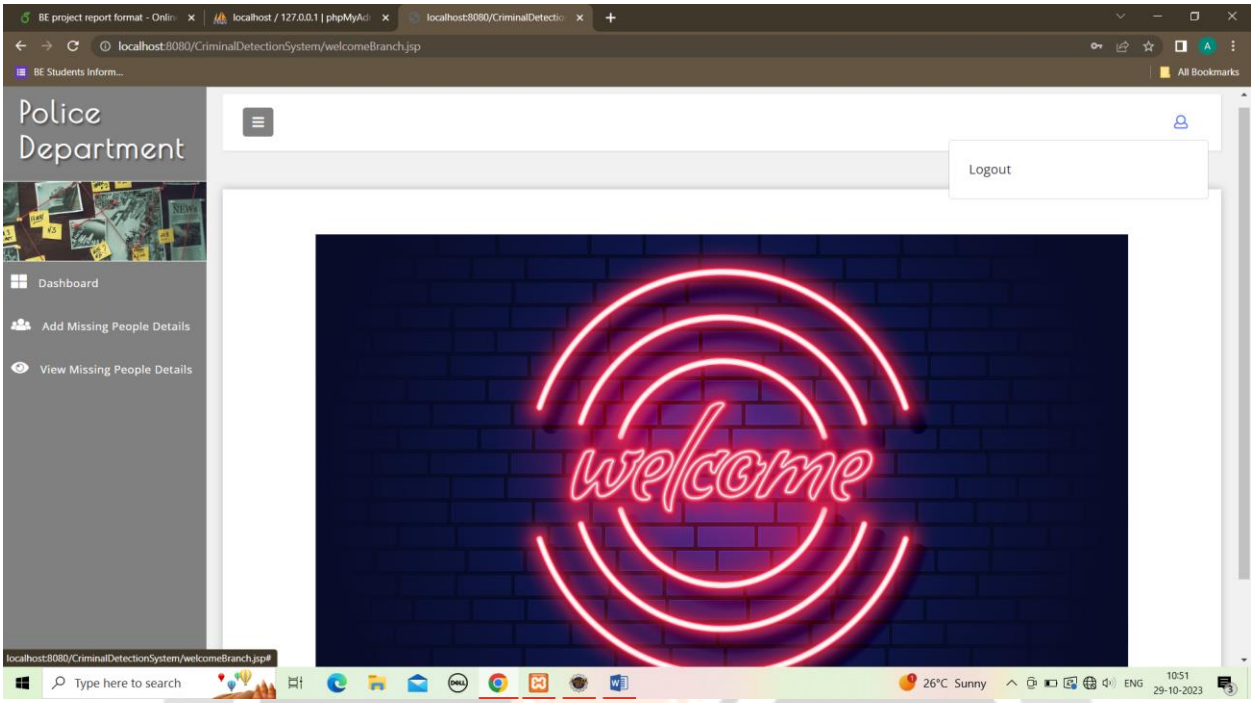
1. Dependency on Image Quality: The quality of the supplied images has a significant impact on how accurate image processing systems are. The identification procedure can be made far less successful by dim lighting, low resolution, or hidden face features.

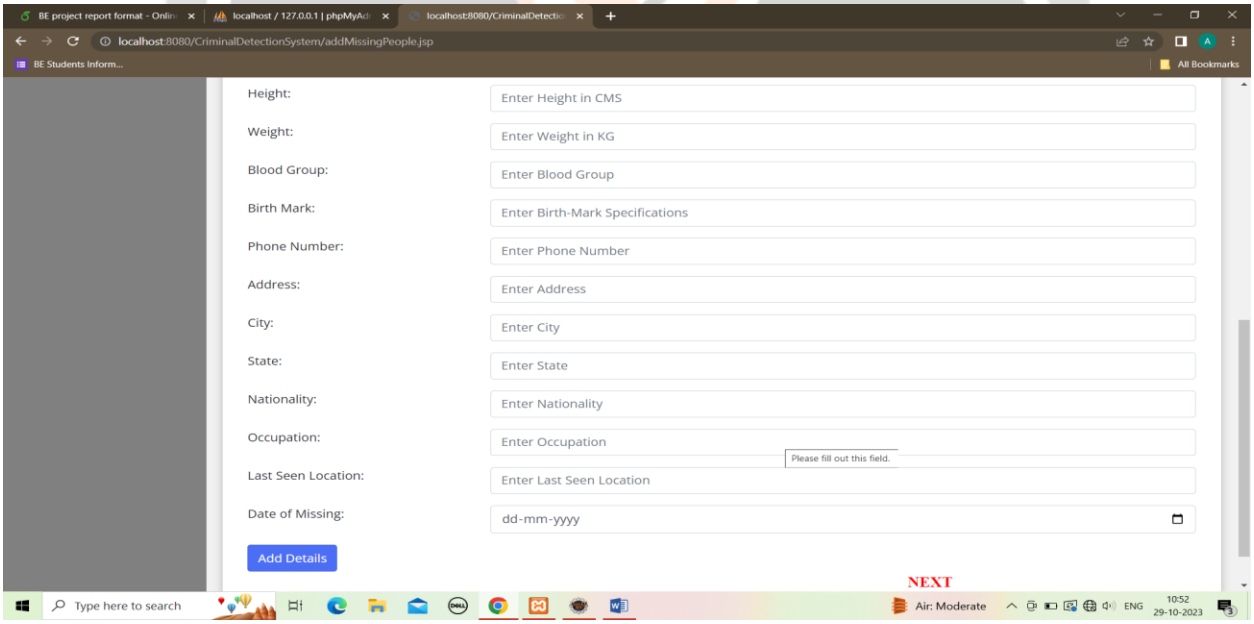
2. Privacy Issues: There are serious privacy issues with the use of image processing for identification, especially with regard to the gathering and storing of facial data.

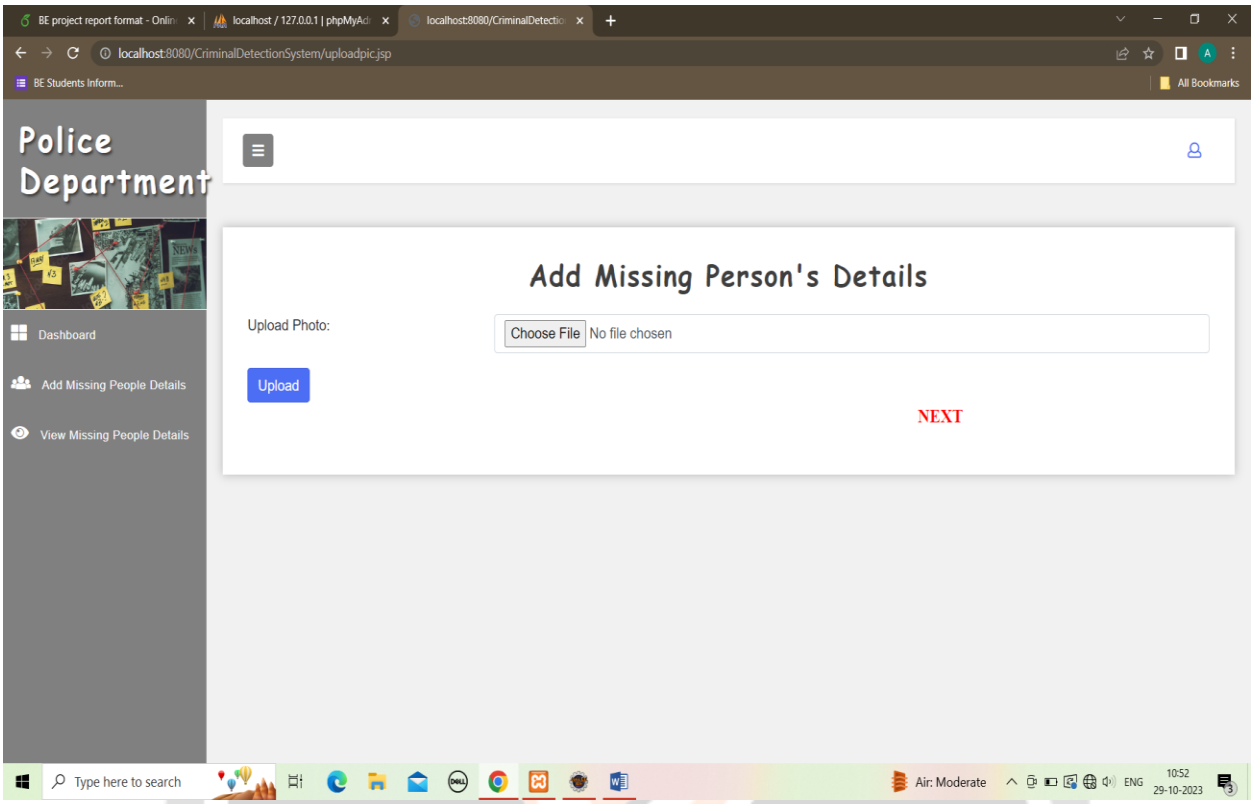
14. IMPLEMENTATIONS

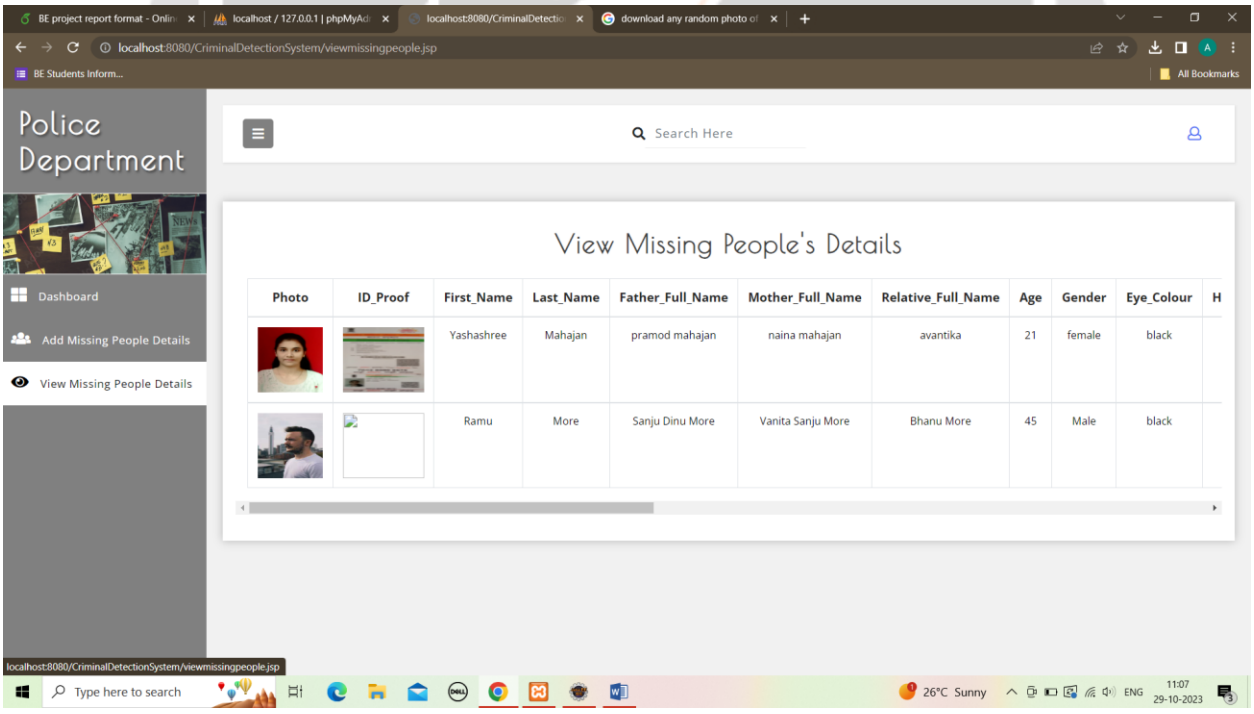

MISSING PERSON AND CRIMINAL IDENTIFICATION SYSTEM
Admin Login
Email id
Password
Show Password
LOG IN
Branch Login? Click Here

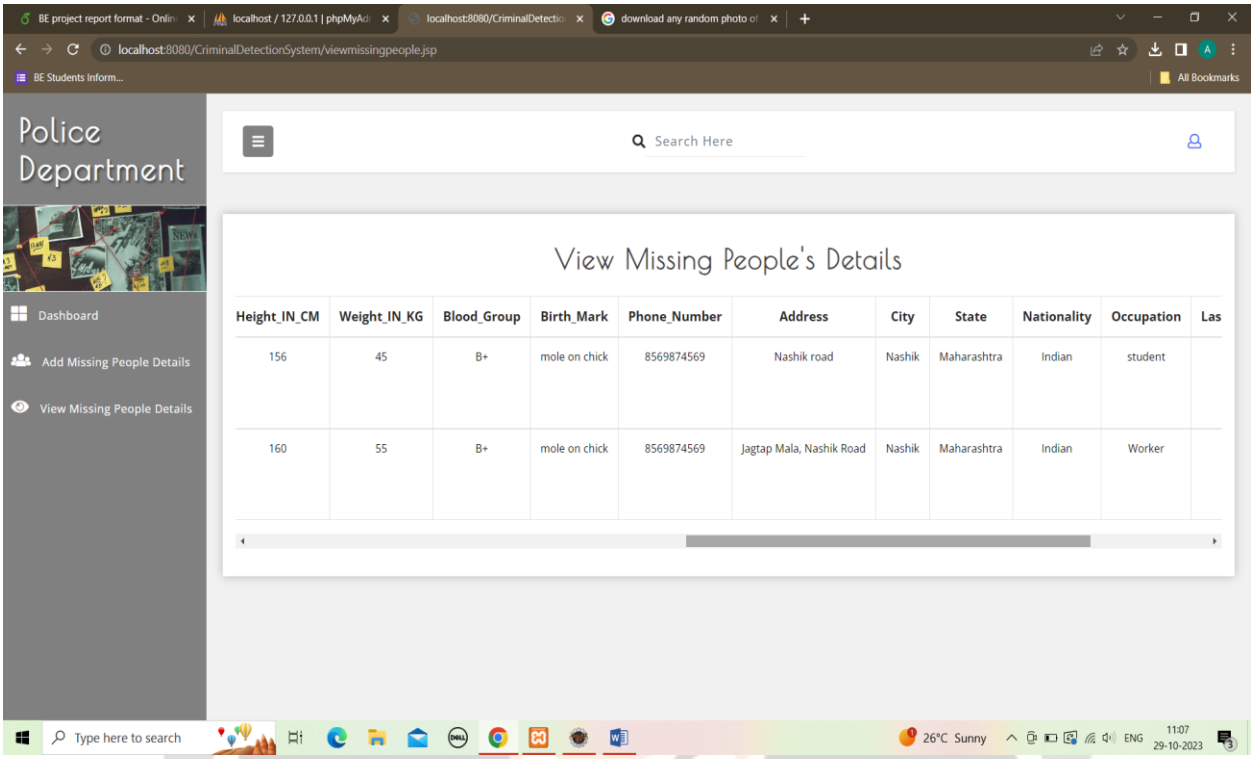

localhost:8080/CriminalDetectionSystem/Branchlogin.jsp
Branch Login
gangapur@gmail.com
Show Password
LOG IN
Admin Login? Click Here


Police Department
Logout
Dashboard
Add Missing People Details
View Missing People Details
welcome


Height:
Enter Height in CMS
Weight:
Enter Weight in KG
Blood Group:
Enter Blood Group
Birth Mark:
Enter Birth-Mark Specifications
Phone Number:
Enter Phone Number
Address:
Enter Address
City:
Enter City
State:
Enter State
Nationality:
Enter Nationality
Occupation:
Enter Occupation
Last Seen Location:
Enter Last Seen Location
Please fill out this field.
Date of Missing:
dd-mm-yyyy
Add Details
NEXT


Police Department
Dashboard
Add Missing People Details
View Missing People Details
Add Missing Person's Details
Upload Photo:
Choose File
No file chosen
Upload
NEXT


Police Department
Search Here
Dashboard
Add Missing People Details
View Missing People Details
View Missing People's Details
Photo
ID_Proof
First_Name
Last_Name
Father_Full_Name
Mother_Full_Name
Relative_Full_Name
Age
Gender
Eye_Colour
Yashashree
Mahajan
pramod mahajan
naina mahajan
avantika
21
female
black
Ramu
More
Sanju Dinu More
Vanita Sanju More
Bhanu More
45
Male
black



10. CONCLUSION

A method for identifying missing people has been created, tested, and shown to display missing people as well. This product's key characteristics are its low cost, low power consumption, and minimal number of hardware components. The primary use of this method is in the identification of missing children and elderly people. This can be used to identify elderly people, physically challenged youngsters, missing children, and give them to their guardians with the assistance of the police.

11. REFERENCES

1. AniruddhaDey, “A Contour based Procedure for Face Detection and Tracking from Video” 3rd Int'I Conf. on Recent Advances in Information Technology I RAIT-20161.

2. Andreas Ess, Bastian Leibe, Konrad Schindler, Luc Van Gool, “A Mobile Vision System for Robust Multi-Person Tracking”978-1-4244-2243- 2/08/$25.00 ©2008 IEEE.

3. Rolf H. Baxter, Michael J. V. Leach, Sankha S. Mukherjee, and Neil M. Robertson, “An Adaptive Motion Model for Person Tracking with Instantaneous Head-Pose Features ” IEEE SIGNAL PROCESSING LETTERS, VOL. 22, NO. 5, MAY 2015.

4. He Guohui,WangWanying, “An algorithm for fatigue driving face detection and location” 2015 8th International Conference on Intelligent Computation Technology and Automation.

5. K. V. Arya, AbhinavAdarsh, “An Efficient Face Detection and Recognition Method for Surveillance” 2015 International Conference on Computational Intelligence and Communication Networks.

6. PrantiDutta, Dr.Nachamai M, Department of Computer Science, Christ University Bengaluru, India “Detection of Faces from Video Files with Different File Formats”.

7. Lihe Zhang, Huchuan Lu, Dandan Du, and Luning Liu, "Sparse Hashing Tracking" IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 25, NO. 2, FEBRUARY 2016.

8. Dennis Mitzel, Esther Horbert, Andreas Ess, and Bastian Leibe, " Multi- person Tracking with Sparse Detection and Continuous segmentation ".

9. Francesco Comaschi, Sander Stuijk, TwanBasten, HenkCorporaal, "ROBUST ONLINE FACE TRACKING-BY-DETECTION".

10. Xiaoming Liu and Tsuhan Chen, "Video-Based Face Recognition Using Adaptive Hidden Markov Models" Electrical and Computer Engineering, Carnegie Mellon University, Pittsburgh, PA, 15213, U.S.A.