

## UNEARTHING THE GONE ASTRAY

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### ABSTRACT

*This paper presents the culmination of existing research paper based on their summary of literature surveys, authors approach, viewpoint, implementation, techniques used, merits, demerits, future scope, and conclusion. The research paper is also based on finding the missing person using face recognition using AI powered model. This effectively present the ongoing research on finding the missing person. By the end of this research paper an effective and better way will be discovered and the drawbacks of previous research paper will be highlighted. Finding a missing person is not at all easy. Lots of paperwork, time and efforts have to put in and may be all can go in vain because of inaccurate results. Our project empowers both police and public and help them accelerate the process of finding the missing person using face recognition techniques. It allows the guardian of the lost person to upload the image of the person in the database.*

**KEYWORDS** Open CV, ML, DL.

### 1. INTRODUCTION

In India around 500+ persons are missing on a daily basis. In which around 175+ are children. Half of this number left with no clue i.e., still untraced. This project will help us to increase the tracking rate. Missing of a person or children is a societal issue and we must resolve it. For the purpose to fulfill, we have decided to develop a system to find the missing persons by face recognition using machine learning, deep learning, and artificial intelligence. According to NCRB (National Crime Records Bureau) on an average 1lakh + people go missing in a year. State and UT 's police receive multiple reports of missing persons annually. A number of them return soon after their disappearance, but there are some who are untraced, no matter how hard you try. So, we are trying our best to beat this complex task of finding missing person through AI-powered application named "UNEARTHING THE GONE ASTRAY", a perfect solution with the help of the deep learning concept. To detect specific individuals, several prior studies were done and most of them were focused on DL-based facial recognition schemes, however, in real world situations, it may be required to recognize specific persons in CCTV images. In such cases, there are several limitations and problems like image noise and low resolution. Also, these previously existing methods require some training over a large dataset having the feature and characteristics and features of the person to be searched, but in result have significantly less scalability and compatibility. Also previous studies have not considered working on embedded solutions, but there is need of embedded platforms in order to detect the specific person.

### 2. LITERATURE SURVEY

Previously, Pournami S. Chandran and his colleagues have presented a paper that serves with an identical problem statement and objective of finding a missing person. The system that they had proposed, includes the extraction of facial features based on deep learning and then these features are matched using SVM (Support Vector Machine). The faces are detected from those images that are

uploaded and stored in the database and the features of the face are recognized and learned through a Convolutional Neural Network Model which are then sent to SVM classifier for training. This method was basically adopted to distinctively identify the faces of missing children. The main difference among ours and their methodology is that our system can take the pre labelled images of the missing children and people via the common people who find them. These images would then be registered into our system's database. The methods and algorithms they used were very slow and complicated which made the feature extraction tougher than ours. This feature of image registration with the help of common people was not included in theirs. These complexities and slowness were major drawbacks of older systems.

In 2016, a team of Rohit Satle and his fellow mates addressed a system for facial recognition which was developed using the Principal Component Analysis method. This PCA method-based system has two major limitations, i.e., its high computational complexity and capability to only recognize faces having the same or similar facial expression. Another system was built for missing people identification using RFID technology and it was put forward by Swarna Bai Arniker and her team, but this feature was not feasible because in this method a person is required to physically wear a RFID tag every time over his/her body. Birari Hetal and her team used SWF-SIFT method to analyse faces for finding the lost people, but SIFT method has some computation issues like it was quite complex and require plenty of time because it is based on histogram of gradient in which every pixel inside the patch area is sent for the computation process. In 2015 papers Thomas M. Omweri and Andrew M. Kahonge used mobile based web services to find a lost person. This method was not efficient because modern technologies were not implemented in this system. The Parents or family of the missing person was required to register an image of their loved ones with their contact number on the website, anyone can then contact the family of missing person using the given contact on successful finding of the person. To search out the missing person, Professor Sumeet Pate along with his colleagues put forward in 2016 describing the Line Edge Method for facial recognition. This system has a success probability of .85. In 2018, a face recognition system was presented under the guidance Peace Muyambo from Zimbabwe, which used LBPG (Local Binary Pattern Histogram) method to recognize a person's face. This method had a success probability .68.

### 2.1 Missing Child Identification System Using Multiclass SVM and Deep Learning (2019)

In this research paper a unique methodology based on deep learning was used to recognize the lost child with their available images and photographs. In this system, local people can register the images of doubtful children into a specialized portal along with the place of finding and details. These images will then be compared with the pre-registered images present in the system. After this, the classification process is applied, and those images are filtered from the database that have the most similar match. To do this whole process, a deep learning model is trained that recognize the images of lost children from the images stored into the database of the system. In order to extract the features a pre trained CNN model is used. The proposed system has used CNN only for feature extraction and the recognition is done through a pre-trained SVM (Support Vector Machine) classifier. The model used was insensitive to any kind of contrast, illumination, or noise and it successfully performed approx. 43 child cases with the success ratio of 99%.

### 2.2 Missing Child Identification Using Face Recognition (2016)

A facial acknowledgment framework might be a PC application fit for distinguishing or checking somebody from a computerized picture. In these papers we have utilized PAC (Principal Analysis Component) for perceiving the substance of missing youngster.

The PCA has been widely utilized with the end goal of algorithm for face recognition. It decreases the dimensionality of the picture, yet additionally holds some of the varieties with in the picture information. PAC chips away at the capacity of projecting face picture onto an element space that traverses the various varieties among realized face pictures. The huge highlights are alluded to as "Eigen faces", since they are the eigenvectors (Principal Component) of the arrangement of faces they are doing , not sreally relate to the elements like eyes, ears, etc. This activity portray an individual's face by a weighted amount of the Eigen faces includes thus to recognize a chose face it is fundamental just to really take a look at these loads to those people.

### 2.3 Identification of Missing Person using Efficient Face Recognition System (2014)

This Face Recognition System will help police just as open by speeding up observing the lost people utilizing face acknowledgment strategies. There is a face acknowledgment model in our framework that will attempt to observe the missing individual by its picture by matching it from our data set utilizing the procedure of facial encoding if the pictures. It is done by looking at the face encodings of the transferred picture of the missing individual to the face encodings of the pictures in the data set of the framework. Assuming a match is found, it will be informed to the police and the gatekeeper of that individual alongside the area of the individual. This framework gives the consequence of 99.38% of exactness on the marked countenances inside the Wild Benchmark which consist of almost 13,000 pictures for examination.

### 2.4 Android Based Application - Missing Person Finder (2018)

This application contains usefulness to add grumbling just as view all allegations by the clients. By utilizing these complaints, trusted individuals will endeavor to track down lost individual in different regions. This application will transfer grievance on web server which may be gotten to by any of the trust part having this application. This task Finding Missing Person involving Face Detection on Android Application presents the answer for this intricate issue of tracking down lost individual. We are utilizing four modules User, Police, Complaint holder and Admin for getting appropriate outcomes. Administrator consistently Update the information base and erase the pointless information from the data set. It is a strategy that is utilized on android versatile for catching pictures and transfer those pictures into the application lastly getting results based on face discovery innovation. In this framework SWF-SIFT calculation is used for classifying the pictures of individuals.

### 2.5 LBPH Algorithm for Face Recognition (2018)

Face identification is a critical problem in machines vision industry and many solutions have been developed to tackle the complexity of face identification during the past three decades. LDA, PCA, ICA, and ANN based algorithms have been used in order to get the solution of face recognition. Recognition of face algorithms are suffering from illumination, therefore variation in affect the face recognition. Consequently, composite methods have been developed that comprises of two different methods. Face recognition technique has been broadly used to develop security systems and also for the development of surveillance system to beware from the fraud and criminal activities that taking place. The Local Binary Histograms (LBPH) method is used to develop the prototype of a system to find the missing people with the help of facial recognition or biometric technique. The salient point of the research is to evaluates the precision of the system along with the recognition percentage of the particular model.

### 2.6 Research Papers Studied

After the study of some IEEE papers, we have written a review paper. All the papers are related to our project and are based on matching the faces of persons. In all the papers we analysed that some common machine learning algorithms and technologies are used like KNN algorithm, Support Vector Machine, Face Recognition, Face Modelling, and Face Detection which gives different accuracies.

### 2.7 YEAR 2016:

In 2016 a research paper was published giving details about FAREC- a CNN powered face identification technique using Dlib. In this project, the dataset of FAREC has very large storage capacity and the Dlib. algorithm, which is an Open-Source library, provides the best results in the field of face recognition. However, the major drawback of this model was that it had used C++ as its programming language and the accuracy was just only 96%.

In the same year 2016, another research paper was published that gives the information about the robust method for face identification and emotion detection system using the SVM (Support Vector Machine). This model was built using Open CV, Machine Learning Principle Components Analysis, Linear Discriminant Analysis, Fisher face, Active Shape Model, Dlib. and scikit. The performance of the project was better than the previously discussed research paper as Haar Cascades is very efficient in performance and is popularly used for faster results.

### 2.8 Year 2017:

In 2017 another research paper Face Modelling Process based on Dlib, related to our problem statement, was published. In this paper various algorithms such as Random Forest Training, tree of Regression was discussed. The classification is done by Random Forest Algorithm for better results but it is very time-consuming process and unstable as a small change in data leads to change in structure. Finally, the accuracy of the model comes out to be 95%.

In the same year another research paper was introduced. The algorithms that were the part of this model are Viola-Jones face detection, Successive Mean Quantization Transform and the Sparse Network of Windows Classifier method, neural network-based face detection and Support Vector Machine (SVM). It further includes the comparison of the specified face detection algorithms, precision and recall are evaluated by the detEval software. Viola Jones face algorithm provide competitive object detection rates. The major drawback associated with this model is that, every time the kernel is selected, it is tested for the classification problem and it may not yield the good results as produced by the sample set.

### 2.9 Year 2018:

In 2018, a research paper on face recognition and tagging with the help of Deep learning technique was introduced which was showing face recognition and face tagging techniques. In this model face recognition was done by

CCTV footage for identifying the person in case of theft. The model was able to give accuracy upto 85% for tagging the faces which are successfully detected.

### 2.10 Year 2019:

In the year 2019, a research paper about the Designing of Face Recognition System was introduced. Various algorithms used in this system are AdaBoost Classifier for the classification procedure, Haar Cascade, Local Binary Pattern, Open CV, python face detection (by Viola-Jones algorithm), Feature Extraction and Classification. The whole procedure is divided into various number of pieces having the different values of the pixels present. These pixel values are compared with the threshold level and finally provides the decisions.

We found that all the papers which we have studied are having some different issues regarding the pixel size and motion of image but we are going to develop a system which will give better result. So, our aim is to make a dynamic system which will be having the prediction outcome probability higher even if there is any change in image like change in age.

## 3. METHODOLOGY

This system is used to identify missing people by using face recognition technique. We can add images in the database of our system. If police or general public wants to find about any person who may be mentally challenged or roaming on the road, they can upload the picture of that person and then portal will match the image with already stored images. If no match is found then we can register it in the system with location and remarks and if match is found a message is sent to the police or to the concerned person.

If the encoding distance between the image already stored in data system and the uploaded image is less than or equal to threshold then user is notified that match is found and if the distance is more, it means that the image is not same. So like this, our system will be extremely useful to find the missing person. The various steps involved in our system are:

**STEP-1: REGISTERING NEW CASES-** The first step is to register a new case. The application allows the user to collect all relevant information and store it in the database.

**STEP-2: WAITING FOR USERS TO SUBMIT IMAGES-** So far we have only talked about how new cases will be registered, the next thing we have to do is to match these registered cases with the images uploaded by the users. These users are common people who will use the application on their mobile to submit photos of people who they think have lost or found begging.

**STEP-3: MATCHING CASES-** The next step is to match the case images and user submitted images for which various algorithms can be used.

A Flask API goes with our model to give a greatly improved client experience. When the client opens up our application they will be approached to upload the picture of the missing individual. In the event that a match is found, they will be given with the picture and insights concerning the match. In the event that the match isn't found, they will be inquired as to whether they need to enlist that picture as another section into the data set of our framework. Assuming that they wish to enlist, they will be approached to enter the important part about the picture or the subtleties of the individual.

The proposed architecture of our system is presented in figure as shown below:

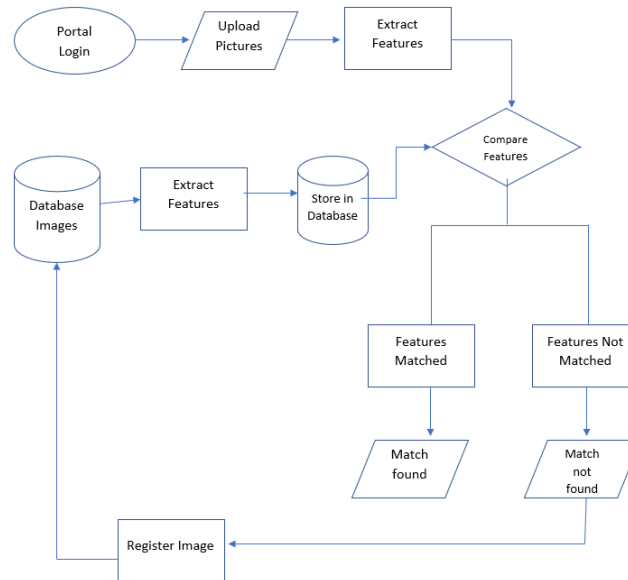


Figure 1 People Identification System Architecture

### 3.1 Problem Statement

As the traditional approach finding missing person is a very complex process and it takes a lot of time. The time required for registering the FIR (First Information Report) is more, so it takes lot of time to search a missing person. Every day approximately more than five hundred missing person complaints remain unanswered in India. To overcome these drawbacks, we are committed to solve the problems that lead to such scenarios with our proposed system as “**Unearthing the gone astray**”. This Deep Learning, Web-based application is basically designed to help in solving the cases and to find the missing ones as swiftly as possible and to perform all the tasks and functionalities that are provided by existing applications with some additional features to make it more efficient.

### 3.2 Proposed Solution

Nowadays to seek out a missing person is an extremely hard task and very time consuming as it requires a lot of paper and still there are very less chances of getting a serious result. Our project provides a platform that will help both the police department and public by enhancing the process of searching the missing person using face recognition technique.

Our system comes into action when the parents or guardians of the missing person perform a search in our system by feeding the images of loved one. Our Face Recognition model is capable to search in the database for the accurate match if the details of the missing person are previously being registered by someone. If the parents do not find the result, they can register the image for a missing person. But if the system found a match, then the results would be displayed in the notification window.

The Main objective of the project is to develop an application which will be helpful for the common people to find their beloved ones who have been abducted, missed or rescued by the people. In this project "Unearthing the gone Astray", we'll be providing with the entire database of the missing children so that the police can track whereabouts or file a case pertaining to the issue. The main motive of this

project is to help the higher authorities and police authorities to track down the missing people more quickly and more efficiently. The traditional methods for finding a missing person are quite time-consuming and sometimes ends in an unsuccessful manner if the missing person has been shifted or moved to a different locations. In such cases, police usually faces failure. And to avoid such failures, we are making an application which will help the authorities in finding the missing person quickly and more efficiently.

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## Authors

### 1. Prachi Chauhan

Prachi Chauhan was born in 2000 in Bijnor, UP. Since her childhood she wants to become an IT professional that led to her career in that field. After completing 12th in 2018 she decided to pursue BTech. Prachi considers her family to be the most important aspect of life and in her leisure time she wants to spend time with family and friends. She also likes dancing and singing.



### 2. Prashant Bansal

Prashant Bansal was born and raised in the Bilari and grew up a very outgoing and active student. Always staying proactive, he ventured into a lot of different activities to show his talent. Always dreamt of becoming a successful IT professional and capable of helping everyone in every aspect of life. Has an interest in deep talks related to social issues and discussing solutions regarding different day to day life problems.



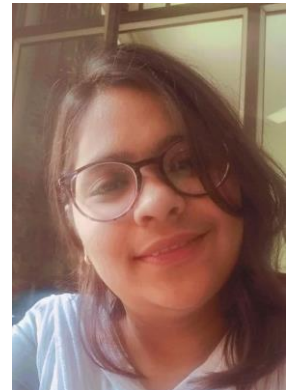
### 3. Pallavi Tyagi

Pallavi Tyagi was born in the heart of district Bijnor . She aspire to receive a bachelor's degree in Computer Science. . She want to become a civil servant so that she can take many talents to the next level and take control of her economic future. Her desire is to reach toward a higher standard and prove to herself that she have the talent and skills to realize her dreams, while also setting a positive example for those that come behind her.



4. Oshiba Ali

Oshiba Ali was born and raised in Rampur. Throughout her education, she was always on the honor roll and received numerous awards for academic achievement. She has the courage and determination to succeed, no matter how difficult the obstacles she has to overcome.



5. Neha Gupta was born in Moradabad. She aspires to receive a bachelor's degree and master's degree in computer science. She wants to become a researcher in computer science field. She is working as Assistant Professor in MIT Moradabad.

