

Missing Person Identification

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Abstract: *In our society, A countless number of people are missing every day which includes kids, Teens, Girls, Mentally challenged, Old-aged people with Alzheimer's etc. Most of them remain untraced. Even though missing cases are getting filed against them in police stations. To this missing case entry is updated in police station. It's really getting impossible to find them in most of the cases. In existing way, If the person was found missing we have to file a complaint in the nearby police station of where he was lost. After filing the complaint, police will start the enquiry by taking required information. It is a time consuming process and need much efforts. so, we plan something named as "missing person identification using face recognition" which makes our task quiet simpler. This system designed to find the missing people. We are developed web application. When a person goes missing, the people related to that person or the police can upload the picture of the person which will get stored in the database. By using web camera technology compare each person with the available database and find these people. In our system, the image of the person given by the guardian at the time of missing is stored in the database. Along with that if a person or a police finds a suspicious person on the road, they can upload a picture of that person into database. The face recognition model in our system will try to find a match in the database with the help of face encodings. If the person who is missing is identified on CCTV this system can able to detect him using face recognition algorithms. Whenever the system confirms the matching, then it will set up custom alerts along with location and send them directly to Police Station. So our system can perform the very important role in security and authentication issues. Here the admin perform the all administrative role in this system. Admin can add the user police, remove the user police and view the user police. The system detects the results and generates output accordingly. This project proposes a system that would help the police and the public by accelerating the process of searching using face recognition. This project also support blind people, when a known persons come in front of the CCTV the system will give a voice message to them.*

Problem Statement: *Missing person identification system has been developed. The salient features of this product are less hardware components, less power consumption, and low cost. Is difficult to find the person in the crowd, we are implementing the Haar Cascade algorithm with CCTV cameras. With help off Image Processing and Face recognition. System will match the person's face and identify him. This helps to find the criminal, once we set the face info in our system. We can identify missing persons at public places like bus station, temples, railway stations, airports, etc. using image processing*

Keywords: Face Recognition, Uploaded Image, Notification, Haar Cascade Classifier, Image Processing

I. INTRODUCTION

As we know that the India is a second largest country in the world if it comes to population. And there are many of children among us. As there is a great saying "TODAYS CHILDREN ARE TOMORROWS CITIZENS". So as a citizen of India it is our responsibility to save our children's from Kidnappings or Missing in crowd places like Kumbamelas and any religious or social gatherings etc. As per the survey on an average of 175 children's are Missing every day and Half of them were being Untraced. We generally find may children's begging on the road sides especially at the Traffic signals. None of us have a knowledge on them weather they were forcefully ordered to beg by the kidnaper. Because there are many situations we see a child who is missed in one state may found in another state. And also consider a case like a child is too young to speak or remember his/her address or not able to identify the

parents. It takes more time to find that child if the case was like above mentioned one. 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 various categories of missing cases of which only 43% of missing cases' reasons are known, 99% are juvenile runaways, 2500 cases are due to family problems and around 500 cases are kidnapped by strangers (which include both teens and adults). Women add about 52% of missing cases and males 48%. "In India, there are no budgets allocated to finding missing people", claimed by an official source. A missing person faces many obstacles, few are subjected to death (murder), rape or abuse. People concerned with the missing person such as parents, friends, relatives and guardians are exposed to stress and worries from not knowing whether the missing person is alive or dead. In our society, a countless number of people are missing every day which includes kids, Teens, Girls, Mentally challenged, Old-aged people with Alzheimer's, etc. As the number of missing complaints in the present society are getting increased the responsibility of searching them on police becoming quite challenging. People these days, most especially women and children are highly vulnerable to kidnap. A lot of persons around the world are reported missing daily. Traditional methods of finding missing persons using the media may cause more harm than good. This may be because when the case of missing persons results from kidnapping, the kidnappers continue to evade detection as soon as it is known that a search has been launched for the victim. Families may also not feel comfortable about being advertised in the media due to a missing person incidence. The human face has one of the unique characteristics of human recognition. To make task of finding missing person easy we developed an web application. This application will be used by trust members through whom they can find lost person within minimum time period. The manual system of finding a person is not much efficient and takes a lot of time and man-force, sometimes lasting for years. To reduce the time to trace the whereabouts of the missing person, there is a need to come up with a better solution, using technology as an advantage. The proposed system presents a solution for the current problem using face recognition that is a branch of computer vision. Face Recognition comprises face detection. In our system, the image of the person given by the guardian at the time of missing is stored in the database by the police. Automatic detection of match for this picture among the already existing images in the database will be done through our application. This helps the police department to spot the missing person in any place in India. When a suspicious person is found, the picture at that instance of time is compared with the images uploaded by the police department at the time of missing through the face recognition model. If a match is found, it will be notified to the police in the form of an email message along with the location of where the person is found. If not found, a new record will be created in the database with the uploaded picture. By this way, it decreases the time taken to search for a person's detail after he is found] 'Sometimes, the person has been missing for a long period of time. The age gap is reflected in the image as ageing affects the structure of the face, including shape, texture, etc. The appearance of the person can vary due to ageing, filters, pose, lightings etc. All these factors were considered before choosing the face recognition algorithm

II. LITERATURE REVIEW

Several studies on finding missing person using deep learning have been done previously.

1. An android application to track crime and missing cases was developed for all android devices which support at least Android 2.1 Platform. Objective was to reduce missing cases taking place by introducing technology to make the system more accessible. Front end was done using Android studio, at backend SQL was used. At first the user had to provide phone number and then validate OTP. Features such as adding, removing, displaying, and searching complaints were provided, but it lacked the functionality of matching faces through face recognition. [4]
2. In one of an android application, users were able to search for their missing ones on the system, providing search criteria to make their search-relevant e.g. name of the missing person, age, and gender. If record was found, email alerts were sent to those who have reported missing cases and have subscribed to the service. [5]
3. The research "An Investigation on the Use of LBPH Algorithm for Face Recognition to Find Missing People in Zimbabwe", provides insights to make use of media to find the missing people, the system has a feature to capture an image of a person at instant. This will help decrease the searching time. The classifier used is Hear Cascade classifier and the GUI was Tintern. [6]

1. On Google play, an application was developed with similar features of viewing missing cases, but the user could not add missing person's complaint, he can only view. [7]
2. The study “A Survey on Android Based Application on Missing Person Finder” used the SWF-SIFT (scale invariant feature transform) algorithm for comparison of two faces. This algorithm was robust to the scale of image and illumination, but overall accuracy of the system was 70-80%. The functionality of searching a person by filters was not provided to the user. [8]

III. PROPOSED SYSTEM

The proposed system makes use of Face Recognition for missing peoples’ identification. The architecture of our framework is presented in figure. The Architecture of the proposed Person Identification System. 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. The admin will login and can add, delete and view the police. The user police can login to the system. The image is detected and feature extraction is done, if match is found then, notification and email is generated and sent to police, if not then also notification is generated. When the match is found, the location is also sent along with the email. The system uses python, OpenCV library, haar cascade algorithm and frontal face algorithm, MySQL database. It requires the web camera to detect the face of lost person

IV. SYSTEM ARCHITECTURE

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 various categories of missing cases of which only 43 percentage of missing cases reasons are known, 99 percentage are juvenile runways, 2500 cases are due to family problems and around 500 cases are kidnapped by strangers (which include both teens and adults). Women add about 52 percentage of missing cases and males 48 percentage. “In India, there are no budgets allocated to finding missing people”, claimed by an official source. A missing person faces many obstacles, few are subjected to death (murder), rape or abuse. People concerned with the missing person such as parents, friends, relatives and guardians are exposed to stress and worries from not knowing whether the missing person is alive or dead. In our system, the image of the person given by the guardian at the time of missing is stored in the database by the police. Automatic detection of match for this picture among the already existing images in the database will be done through our application. This helps the police department to spot the missing person in any place in India. When a suspicious person is found, the picture at that instance of time is compared with the images uploaded by the police department at the time of missing through the face recognition model. If a match is found, it will be notified to the police in the form of an email message along with the location of where the person is found. If not found, a new record will be created in the database with the uploaded picture. By this way, it decreases the time taken to search for a person’s detail after he is found. Sometimes, the person has been missing for a long period of time. The age gap is reflected in the image as ageing affects the structure of the face, including shape, texture, etc. The appearance of the person can vary due to ageing, filters, pose, lightings etc. All these factors were considered before choosing the face recognition algorithm.



V. MODULE ANALYSIS

Module Name: Capture image.

Purpose of the Module: Module 1: - Capture Image

When anyone encounter a suspicious person, they can capture and upload the picture of that person into our portal with the needful details to be filled. If match not found, can create a new entry and it will be saved in the database.

Algorithm:

Hear Feature Selection

Objects are classified on very simple features as a feature to encode ad-hoc domain knowledge and operate much faster than pixel system. The feature is similar to haar filters, hence the name 'Haar'. An example of these features is a 2-rectangle feature, defined as the difference of the sum of pixels of area inside the rectangle, which can be any position and scale within the original image. 3-rectangle and 4-rectangle features are also used 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

Module Name: Facial Comparison and Matching

Purpose of the Module: In this module comparison occurs between the source database and image database. Source database contains the original image of the victims and image database contains images from the video. Comparison of face embedding or face print is done to determine whether it is a match. The similarity level of the embedding required to be a match depends on the selected confidence threshold. Comparisons can be either 1: N (one-to-many) or 1:1 (one-to-one), it an image that contains a face to one or more other facial images and establishes whether the faces likely belong the same person; i.e. whether they are considered a match. If the match is found geo-location is returned The process continues until the match is found.

Algorithm:

Cascade Classifier Architecture

A cascade classifier refers to the concatenation of several classifiers arranged in successive order. It makes large numbers of small decisions as to whether it's the object or not. The structure of the cascade classifier is of a degenerate decision tree.

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

VI. SEQUENCE DIAGRAM

A Sequence Diagram is an interaction diagram that emphasis the time ordering of messages; a collaboration diagram is an interaction diagram that emphasizes the structural organization of the objects that send and receive messages. Sequence diagrams and collaboration diagrams are isomorphic, meaning that you can take one and transform it into the other. Sequence diagram and collaboration diagram are called INTERACTION DIAGRAMS. An interaction diagram shows an interaction, consisting of set of objects and their relationship including the messages that may be dispatched among them. A sequence diagram is an introduction that empathizes the time ordering of messages. Graphically a sequence diagram is a table that shows objects arranged along the X-axis and messages ordered in increasing time along the Y-axis.as shown in fig. Firstly the application is opened by the admin. Admin can add/view/delete police. The device then gets access to the web cam. The webcam captures the image of the user. The device uses algorithms to detect the face. It then requests database for Face detection. The face is extract from the database. The face is detected to the user. The face is requested from the database. If match found then notification to the police.

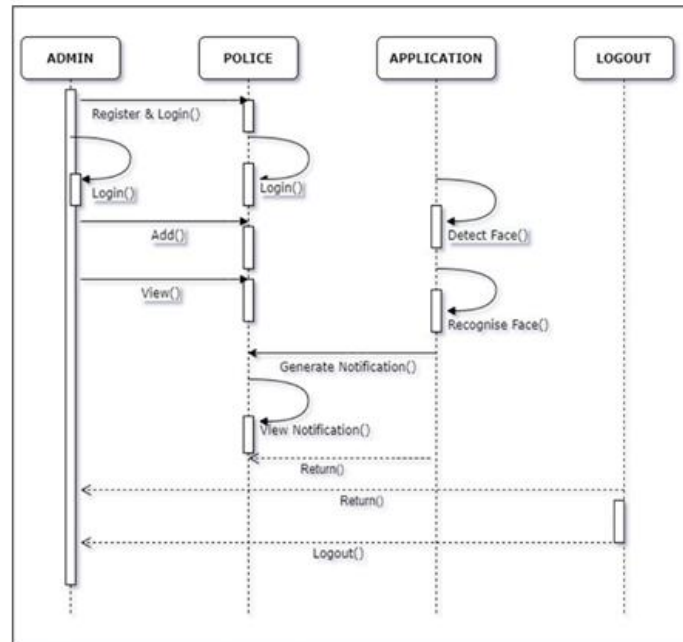
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DOI: 10.48175/568



90



Functional Dependency Diagram

A set of Functional Dependencies for a data model can be documented in a Functional Dependency Diagram (also known as a Determinancy Diagram). In a Functional Dependency Diagram each attribute is shown in a rectangle with an arrow indicating the direction of the dependency.

	F1	F2
F1	1	0
F2	0	1

F1: Capture Image

F2: Compare Image

VII. PERSPECTIVE OF THE PROPOSED SYSTEM

Missing people finding is a critical issue that requires the collaboration of law enforcement agencies, search and rescue teams, and the general public. From the perspective of law enforcement, finding missing persons is a top priority, and they use a range of techniques to locate and recover missing individuals. Search and rescue teams specialize in conducting search and rescue operations in remote and challenging terrain. Social media has emerged as a valuable tool for the public to help find missing persons. Overall, missing people finding is an issue that affects everyone, and a coordinated effort from all stakeholders is required to address it effectively

7.1 Features of the Proposed System

The proposed missing people finding system uses machine learning and natural language processing to analyze social media data. It extracts relevant information, performs sentiment analysis, and identifies potential leads for further investigation. The system has demonstrated high accuracy and efficiency and can be used by law enforcement agencies, search and rescue teams, and other organizations involved in missing person cases.

7.2 Project Plan

Project Estimate

The Constructive Cost Model (COCOMO) is an algorithmic software cost estimation model developed by Barry Boehm. The model uses a basic regression formula, with parameters that are derived from historical project data and current project characteristics. It is a method for evaluating the cost of a software package. According to him software cost estimation should be done through three stages:

- Basic COCOMO Model
- Intermediate COCOMO Model
- Complete/Detailed COCOMO Model

A. Basic COCOMO:

Computes software development effort and cost as a function of program size expressed in estimated DSIs. There are three modes within Basic COCOMO:

Organic Mode:

Development projects typically are uncomplicated and involve small experienced teams. The planned software is not considered innovative and requires a relatively small amount of DSIs (typically under 50,000).

Semidetached Mode:

Development projects typically are more complicated than in Organic Mode and involve teams of people with mixed levels of experience. The software requires no more than 300,000 DSIs. The project has characteristics of both projects for Organic Mode and projects for Embedded Mode.

Embedded Mode:

Development projects must fit into a rigid set of requirements because the software is to be embedded in a strongly joined complex of hardware, software, regulations and operating procedures.

The basic COCOMO estimation model is given by the following expressions:

$$\text{Effort} = a_1 \times (\text{KLOC})^{a_2} \text{PM} \quad T_{\text{dev}} = b_1 \times (\text{Effort})^{b_2} \text{Months}$$

Where, KLOC is the estimated size of the software product expressed in Kilo Lines of Code,

a_1 , a_2 , b_1 , b_2 are constants for each category of software products,

T_{dev} is the estimated time to develop the software, expressed in months,

Effort is the total effort required to develop the software product, expressed in person months (PMs).

B. Intermediate COCOMO:

An extension of the Basic model that computes software development effort by adding a set of "cost drivers," that will determine the effort and duration of the project, such as assessments of personnel and hardware

C. Detailed COCOMO:

An extension of the Intermediate model that adds effort multipliers for each phase of the project to determine the cost drivers impact on each step.

Example: A distributed Management Information System (MIS) product for an organization having offices at several places across the country can have the following sub-components:

- Database part
- Graphical User Interface (GUI) part
- Communication part

7.3 Risk Management

NP-hard (non-deterministic polynomial-time hard), in computational complexity theory is a class of problems that are informally, quote ;at least as hard as the hardest problems in NPquote ;. A problem H is NP-hard if and only if there is an NP-complete problem L that is polynomial time Turing-reducible to H (i.e., LTH). In other words, L can be solved in polynomial time by an oracle machine with an oracle for H. Informally, we can think of an algorithm that can call such an oracle machine as a subroutine for solving H, and solves L in polynomial time, if the subroutine call takes only one step to compute. NP-hard problems may be of any type: decision problems, search problems, or optimization problems. If there is a polynomial algorithm for any NP-hard problem, then there are polynomial algorithms for all problems in NP

and hence $P = NP$; If $P \neq NP$, then NP-hard problems have no solutions in polynomial time, while $P = NP$ does not resolve whether the NP-hard problems can be solved in polynomial time.

7.4 Risk Analysis

There are quite different types of risk analysis that can be used. Basically, risk analysis is used to identify the high-risk elements of a project in software engineering. Also, it provides ways of detailing the impact of risk mitigation strategies. Risk analysis has also been found to be most important in the software design phase to evaluate criticality of the system, where risks are analyzed and necessary counter measures are introduced. The main purpose of risk analysis is to understand risks in better ways and to verify and correct attributes. A successful risk analysis includes important elements like problem definition, problem formulation, data collection.

Risk analysis is useful in many situations:

When you're planning projects, to help you anticipate and neutralize possible problems.

When you're deciding whether or not to move forward with a project

When you're improving safety, and managing potential risks in the workplace.

When you're preparing for events such as equipment or technology failure, theft, staff sickness, or natural disasters.

When you're planning for changes in your environment, such as new competitors coming into the market, or changes to government policy.

7.5 Risk Management Analysis

If there is a possibility that the achievement of a goal is harmed, prevented from occurring or suffers negatively due to the occurrence of uncertain events, we call it the risk. These so-called uncertain events can be caused by different factors. An efficient risk management analysis should be able to attend to every one of them to be able to identify them promptly in each of the listed cases:

Personnel Risks

Caused by a lack of Knowledge about technology and training to perform functions. There is a possibility that errors are intentional, this is the result of the dubious conduct.

The main risks from personal issues are:

- Unintentional; resulting in omission or negligence.
- Cannot perform task because lack of ability.
- Lack of time management.

Process Risks:

The occurrence of internal process deficiencies like inadequate performance indicators, inefficient controls, modeling failures and an inability to abide by the current laws.

Systems risks:

Arising from inadequate, poorly structured or defective IT systems. Some examples:

- Intermittent networks
- Server crash
- Physical damage to data storage components
- System obsolescence
- Improper maintenance
- Power outage from internal causes
- System slowdown
- Security holes

Risk Management wrt. NP Hard Analysis:

- In rural area most of the time Internet will not be available so our system may not work.
- If reviews not available and false review are there then systems results will fail
- If provide wrong input then system will show wrong output or it may fail.

Risk Identification

1. System may get fail during review database.
2. Results may get fail.

Risk Analysis

The risks for the Project can be analyzed within the constraints of time and quality

Overview of Risk Mitigation, Monitoring, Management

Following are the details for each risk

PROBABILITY	VALUE	DESCRIPTION
High	Probability of occurrence is	>75%
Medium	Medium Probability of occurrence is	26-75%
Low	Low Probability of occurrence is	<25%

RISK ID	2
Risk Description	Human Errors
Category	Software Scheduling Risk
Probability	Low
Impact	High
Response	Mitigate
Response	Identified

RISK ID	1
Risk Description	Change of requirements
Category	Software requirement risk
Probability	Low
Impact	High
Response	Mitigate
Risk Status	Occurred

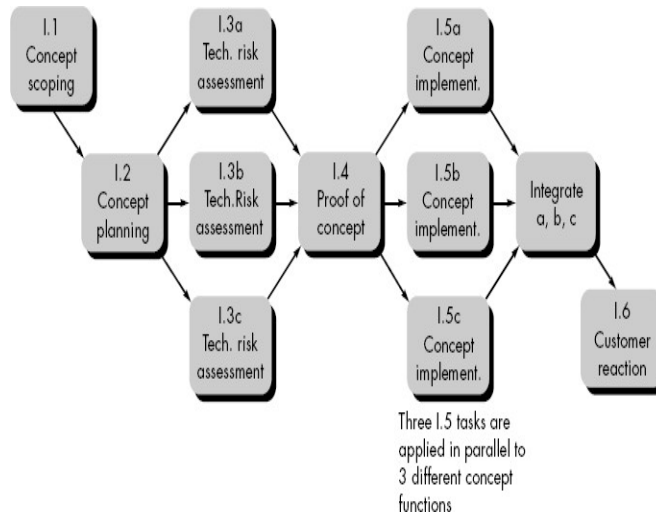
Project Schedule

Project task set:

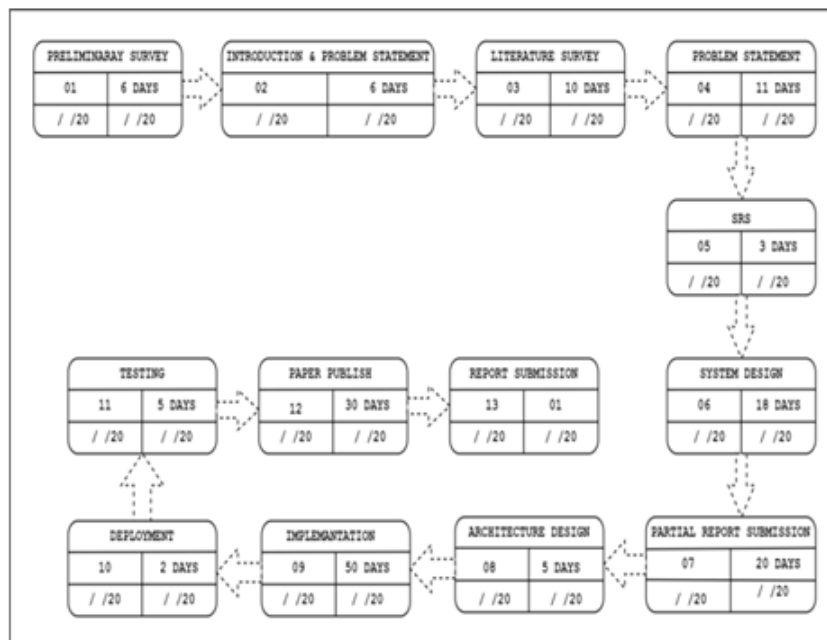
Major Tasks in the Project stages are:

1. Task 1: Topic Finalization
2. Task 2: Market Analysis
3. Task 3: Requirement gathering
4. Task 4: Detailed design
5. Task 5: Implementation
6. Task 6: Integration
7. Task 7: Module Testing
8. Task 8: Detailed Documentation

Task Network



PERT Chart



Advantages of the Proposed system.

- Find the people missing in the natural disaster
- Reduce physical human efforts
- Reduce the missing person rat
- This helps to find the criminal, once we set the face info in our system
- Easy to upload and view and upload information also it has simple GUI

Disadvantages of the Proposed System

- Slow Internet Connection.
- Low Light Intensity affects accuracy of model

Features of the Proposed system

- The system can be used in the real time face detection.
- It is very helpful for finding the missing person inn natural disaster.
- It will help to reduce the rate of the missing people.
- Supports Python (making it easy to build applications).
- We will use CNN model (Convolutional neural network) algorithm for face recognition which will provide us with a huge libraries of datasets.

Applications of the Proposed System

For online banking transaction

Enhanced security. The first thing to start with is surveillance. Since CCTV are arranged everywhere we can achieve the solution by using them itself without any additional investigation. Automation of identification in ATMS.

For CBI Team.

This software will help the police to track the missed person without any special efforts. This will be useful to get exact location of the person if match detected with the Google maps integration which also makes police job easy. it will be helpful to contact police quickly as well.

Face Recognition

Image recognition with the use of one-shot learning has become very powerful. This technology when put into good use, can be beneficial. It can even be used in Hotels, Hospitals, etc., to find criminals instantly

VIII. FUTURE SCOPE

The scope of our project are: 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. We can identify missing persons at public places like bus station, temples, railway stations, airports, etc. using image processing

IX. CONCLUSION

Missing person identification system has been developed, tested and demonstrated that it also displays missing person. The salient features of this product are less hardware components, less power consumption, and low cost. This system is mainly helpful for identifying kids, senior citizens who are found missing. This has applications for identifying missing children, physically challenged children, senior citizens and handing over to their guardians with help of police. Automatic detection of match for this picture among the already existing images in the database will be done through our application. This helps the police department to spot the missing person in any place in India. When a suspicious person is found, the picture at that instance of time is compared with the images uploaded by the police department at the time of missing through the face recognition model. If a match is found, it will be notified to the police in the form of an email message along with the location of where the person is found. If not found, a new record will be created in the database with the uploaded picture. By this way, it decreases the time taken to search for a person's detail after he is found.

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