Finding Missing Person

1 Introduction

A Person who is not found by his/her family member for more than 2 days is declared as Missing Person according to law. So, the Report cannot be registered before 2 days of missing. This project "Finding Missing Person" using Face Recognition is a scheme that is used on mobile for capturing images and uploading that into an application, getting results on the basis of face recognition.

2 Purpose of Project

The overall objective is to develop an application which is basically designed to perform all the tasks that the previous system can perform all functionalities that are provided by existing applications as well as it gives additional features to users. We got an idea about how the interface should be for adding a new complaint (How add complaint form user) from this application.

Proposed System will provide following functionalities:

- Information about missing person.
- Add a new complaint.
- Removing Complaints.
- Searching for a person by particular attributes such as name, location etc.
- Notification Portal.

3 Existing Solution

In the current system if the person is missing, the usual process to track a person is using investigation in which an FIR is launched in a police station. There needs to be a mandatory waiting period for 24-hours or 48-hours before approaching the police to file the case. Then, there are two scenarios:

1) They start the investigation manually by checking nearby CCTV footage and asking nearby people. This is a time consuming process and requires manpower for searching and can be many time

2) There is another scenario where online process takes place in which data of the missing person is uploaded on the website and if the person is found then has to be informed to police through application form.This is very time consuming process as you have to find the detail of the person from the whole database to inform police.

3.1 Drawbacks in Traditional System

- Consumes huge man power
- Takes up a great deal of time

4 Proposed Solution

There are two scenarios in our project:

1). I have to report a missing person: Firstly, the user will create an account. Furthermore, he/she will add the details of the missing person, which are -

- Clear Photos of him/her.
- Details to further contact him/her.

All the following conditions are not necessary:

- Details including Name, Age, Gender Etc
- Any Government ID
- Specific identification marks present (scar, mole, tattoo etc)
- Last Seen Location / Last Seen Time

After every successful entry into the database, a machine learning algorithm will be used to map the facial characteristics.

2) I want to help to find the missing person: In this case, if someone finds a missing person, he will log in to the application. Then, he will enter the details:

- Clear Photos
- Details to further contact him/her.
- Location Found

All the following conditions are not necessary:

- Details including Name, Age, Gender etc
- Specific identification marks present (scar, mole, tattoo etc)

After successful entry, data will be stored and mapped again and if there are potential matches, all relatives of the potential matches will be sent a notification to confirm if they know the person found to proceed for further legal proceedings.

5 Necessary/Sufficient Conditions:

Below are necessary condition to raise report on Application:

- Person must be missing from more than 2 days
- More than 3 clear photos of missing person
- FIR must be registered.

6 Scope Of Project

We are setting up to design a system which will provide a fastened way of identifying the missing people. This system will replace the manual method of scanning through the databases for each picture to check the match, by an efficient face recognition method which finishes the work in less time.

Tasks of the system as follows:

- The data and pictures collected will be validated and stored securely in the database.
- With the help of face recognition software, we will match the images of missing / found within the database.
- On getting a match, we will aim on reuniting the person with their loved ones by notifying via email and SMS.
- If a match is not found, we will continue maintaining our quest.

Though the system has some limitations as follows:

- Age limit (The project is more helpful for children aged below 10 yrs and elderly people suffering from alzheimer)
- Picture must be clear.
- Picture must not be too small.
- Physical limitations of the system to store huge data to process the data

7 Stakeholder Of Project

- User : There can be two types of users, one who is adding details of missing person and other who add the details of found person.
- Missing Person: The person who is missing.
- Police : Role of police is to find the missing person after matching of person is passed and help in getting back to their families.
- Developer : Produce technically excellent systems and use the latest technologies.

8 Flowchart

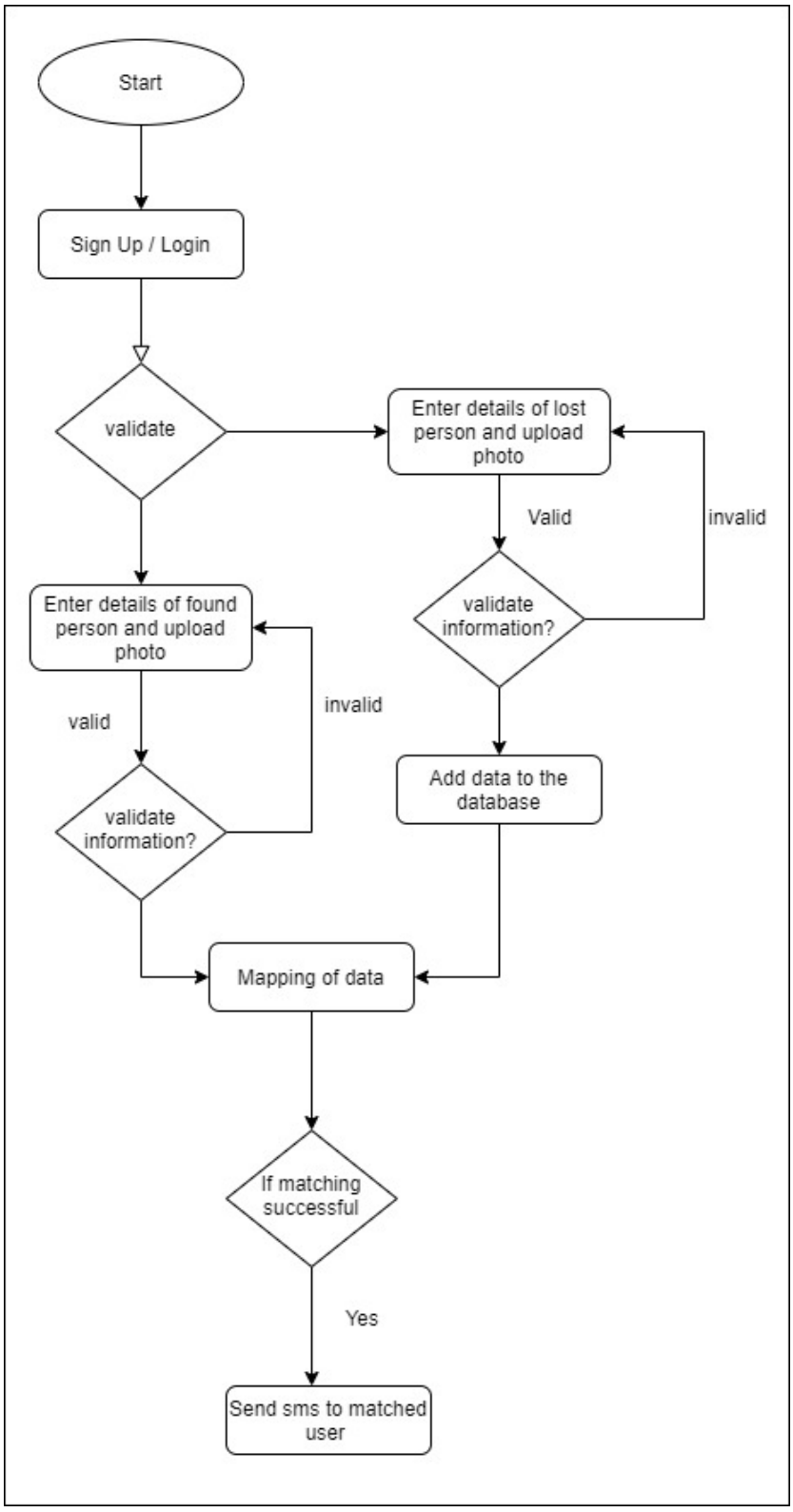


Figure 1: Flowchart

9 Justification

1. Overcomes the drawbacks in traditional system
2. Best suitable AI algorithm used
3. Provides all authorized access facilities.

We are using CNN algorithm to find the potential matches of the missing person as it has the highest accuracy in face recognition as compared to other algorithms.Using CNN algorithm we find the top 10 accurate(above 80%) results and then send the details of that found person to them.

Hence it reduces time consumption to find the details of the missing person in comparison to existing solutions.

9.1 Face Recognition Algorithm:

A face recognition algorithm is an underlying component of any facial detection and recognition system or software. Artificial neural networks are the most popular and successful method in image recognition. Facial recognition algorithms are based on mathematical calculations, and neural networks perform large numbers of mathematical operations simultaneously.

The algorithms perform three main tasks:

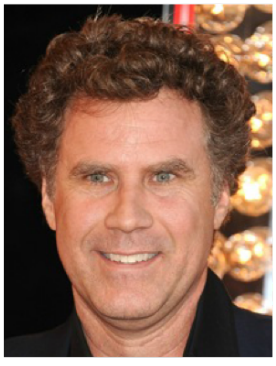
1. detect faces in an image
2. calculate a mathematical model of a face
3. compare models to training sets or databases to identify or verify a person

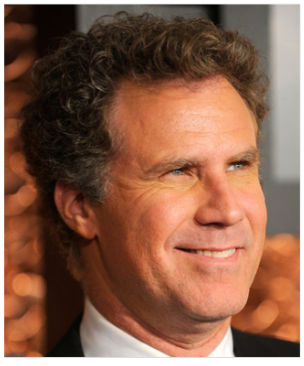
9.1.1 Detect Face in an Image:

So, our first step in recognizing any image is to detect faces, and to do so we will use Histogram of Oriented Gradients(HOG) algorithm, Which is the most reliable solution that exists now for detecting faces.

9.1.2 Posing and Projecting Faces:

we isolated the faces in our image. But now we have to deal with the problem that faces turned in different directions look totally different to a computer.

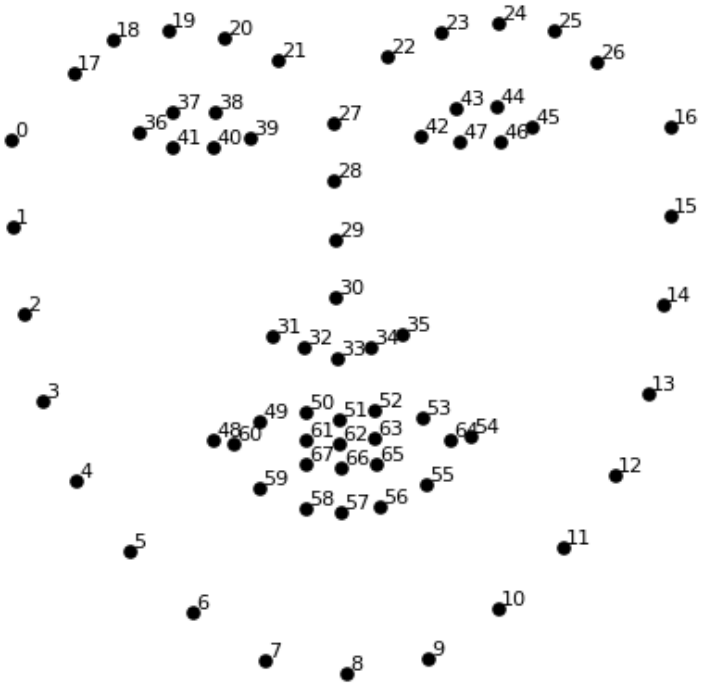




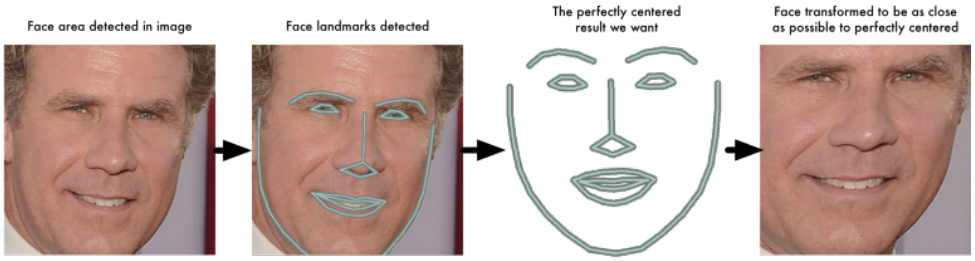
To account for this, we will try to warp each picture so that the eyes and lips are always in the sample place in the image. This will make it a lot easier for us to compare faces in the next steps.

To do this, we are going to use an algorithm called face landmark estimation.

The basic idea is we will come up with 68 specific points (called landmarks) that exist on every face — the top of the chin, the outside edge of each eye, the inner edge of each eyebrow, etc. Then we will train a machine learning algorithm to be able to find these 68 specific points on any face:



Now that we know where the eyes and mouth are, we'll simply rotate, scale and shear the image so that the eyes and mouth are centered as best as possible.



Now no matter how the face is turned, we are able to center the eyes and mouth in roughly the same position in the image. This will make our next step a lot more accurate.

9.1.3 Encoding Faces:

We need a way to extract a few basic measurements from each face.Then we could measure our unknown face the same way and find the known face with the closest measurements. For example, we might measure the size of each ear, the spacing between the eyes, the length of the nose, etc. The solution is to train a Deep Convolutional Neural Network. But instead of training the network to recognize pictures objects, we are going to train it to generate 128 measurements for each face.

9.1.4 Mapping:

The last step is actually the easiest step in the whole process. All we have to do is find the person in our database of known people who has the closest measurements to our test image.You can do that by using any basic machine learning classification algorithm. No fancy deep learning tricks are needed. We'll use a simple linear SVM classifier.

References

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   https://www.researchgate.net/publication/321286547_A_New_Method_for_Face_Recognition_Using_Convolutional_Neural_Networkv