App for finding missing people using CNN algorithm

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***Abstract*- Everyday thousands of people are reported missing in India and many of them are never found. Despite the efforts of police and other agencies countless number of people are missing and many of them land in the hands of exploiters and evil environments. The proposed system is based on providing help for major issue of finding missing people. It will allow citizens to capture and upload the picture along with location of victims. The captured image will be matched with the database of police records of missing people with the help of image processing. The alert notification with current location will be sent to the nearest police station, if match is found. Face recognition will play a key role in this process. For image recognition, convolutional neural network (CNN) plays important role.**

***Index terms*- face recognition, missing people, image processing, police database, convolutional neural network**

1. INTRODUCTION

Nowadays finding the missing person is very difficult task to find out by people or police department, lots of documentation and hard work is there also it takes the lot of time duration as well as there is no guaranty of appropriate result. The idea behind developing the proposed system is to skip the rush caused in finding missing person. Proposed system will use approach treats face recognition as a two-dimensional recognition problem. In this scheme face recognition is done by convolutional neural network. Face recognition is a technique used to detect faces of people whose images are stored in dataset. Facial recognition is mostly used for security purposes, though there is increasing interest in other areas of significant attention as it has potential for a wide range of application related to law enforcement as well as other enterprises. Face images can be captured from a distance and can be analyzed without ever requiring any interaction with the user/person. As a result, no user can successfully imitate another person. The face recognition system needs to find a face in the image. For this, the system can use a variety of algorithms: Linear Discriminant Analysis, Principal Component Analysis, Neural networks algorithms etc. With the use of face recognition algorithm such as convolutional neural network, the recognition and classification of a specific lost person will get easier and fast.

2. PROPOSED SYSTEM

A. Preprocessing of images-

Preprocessing of image is the part of face recognition. In this process, first the algorithm finds all the faces in the particular images. Then it highlight the unique characteristics of the face, which can be used to distinguish it from other people for example, the size of the eyes, the elongation of the face, etc.

And the neatly aligned face from that image is extracted.

This is the initial and important step done in the both server and user sides.

User side:

Using the Android application, user can take a picture of suspected person and send it to the server. On the server side preprocessing is done on that image and internally aligned image is formed which is ready for feature extraction.

Server side:

Database of missing people is present at the server side. Police department uploads the picture of missing people on the server. On the server side, preprocessing is done on every image present in database and internally aligned image is formed from each one of the image present in database, which are ready for feature extraction.

The most important measurements for face recognition programs are the distance between the eyes, the width of the nostrils, the length of the nose,

the height and shape of the cheekbones, the width of the chin, the height of the forehead and other parameters. After that, the obtained data are compared with those available in the database, and, if the parameters coincide, the person is identified.

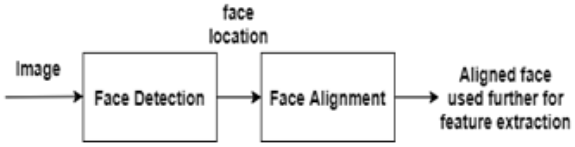

Fig.1. Preprocessing of image

B. Feature Extraction-

Features are nothing but the unique signatures of the given image or unique properties that defines an image. Features are extracted in order to differentiate between the images. Features extractions are used in almost all machine vision algorithms. The process of feature extraction is useful when you need to reduce the number of resources needed for processing without losing important or relevant information.

There are methods, which performs feature extraction using neural networks. Convolutional neural network is one of them.

In the proposed system, Convolutional neural network algorithm is used for feature extraction method because of its high accuracy and speed.

Convolutional neural network (CNN)–

CNN is a popular algorithm of deep learning. It allows much better and faster identification than any other deep learning algorithms. Neural Network has continued to use pattern recognition and classification. Convolution Neural network is a type of neural network that work really well for images by providing building blocks that does not need as many parameters. It finds information in the image by detecting different things at each layer of the network.

When an image is run through a neural network, it reliably yields a set of features which are most critical data of face. The biological neural network does it daily when we see a familiar person and recognize the person, similar principle applies here. This network can generate nearly identical features for images of a similar individual, which are contrasted in testing stage with, distinguish the individual. The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision. CNN is also computationally efficient.

CNN methods are broadly followed for image-recognition problems like preprocessing.

It is a type of feed-forward neural networks made up of many layers.

A typical CNN architecture can be seen as shown in Fig.1.

The structure of CNN contains Convolutional layer, pooling, and fully Connected layers.

A. Convolutional Layer

Convolutional layer performs the core building block of a Convolutional Network that does most of the computational heavy lifting. A Convolutional operation is a fundamental building block of computer vision. The primary purpose of Convolution layer is to extract features from the input data which is an image. Convolution preserves the spatial relationship between pixels by learning image features using small squares of input image. The input image is convoluted by employing a set of learnable neurons. This produces a feature map or activation map in the output image and after that the feature maps are fed as input data to the next convolutional layer.

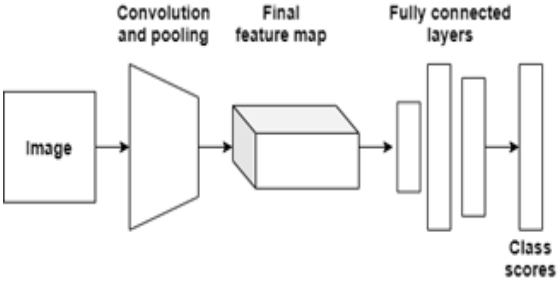

Fig.2. Convolutional neural network architecture

B. Pooling layer

Pooling layer reduces the dimensionality of each activation map but continues to have the most important information. The input images are divided into a set of non-overlapping rectangles. Each region is down-sampled by a non-linear operation such as average or maximum. This layer achieves better generalization, faster convergence, robust to translation and distortion and is usually placed between convolutional layers.

C.Final Feature Mapping

The features extracted from the above layers are then mapped with their corresponding images.

D. Fully Connected Layer

Fully Connected Layer (FCL) term refers to that every filter in the previous layer is connected to every filter in the next layer. The output from the convolutional and pooling layers, are embodiments of high-level features of the input image.The goal of employing the FCL is to employ these features for classifying the input image into various classes based on the training-dataset.

Architecture of the proposed system-

Following Fig.3 shows the block diagram of proposed system

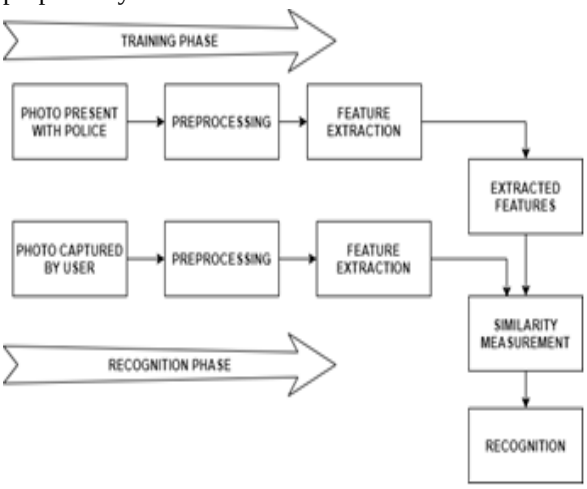

FIG.3. Block diagram of the system

The system will work in the two phases, training phase and the recognition phase in backend and frontend respectively. Preprocessing and feature extraction using CNN method are common in the both phases. After feature extraction, neural network yields encodings, that tells us when two pictures are of the same person. An embedding is a mapping of a discrete categorical variable to a vector of continuous numbers. In the context of neural networks, embedding are low-dimensional, learned continuous vector representations of discrete variables. Where the discrete variables are the parameters used for face recognition in the feature extraction. These embedding generated from both phases are matched and similarity measurement is done. Using the classification technique, system classifies if the two images are matched or not.

3. CONCLUSION

The proposed system is to be implemented in Python, using Convolutional neural network approach. It will be very helpful to reunite the lost children and old people with their families. It will also make the awareness in public due to which Police department will get the help in their process.

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5. FUTURE SCOPE

Scope of the proposed system can be increased by enlarging the database and spreading awareness of the application nationwide.

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