Retrieving Profiles By Image-Based Search

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***Abstract*—In order to rebuild a long lost friendship, searching for them in a traditional manner is inconvenient. Now in the world of Technologies, Social media will be the most suitable way of re-establishing connections. In the existing Social media networks,searching will be possible primarily by name. If the name in the network is not the same as the entered, then it will not give the expected result. So, in this system, an image of the person who is being searched is given as the primary data to the social media network. The photo is segmented and the person's facial features are extracted. The system is trained using CNN to predict the percentage matching of a person even if an old photo of the person is given as input. After training the system, it will be capable of recognizing the profile of the person even after years. This is compared with images in the database. More available information about the target person is provided at this point like the workplace, age, first name, etc...so as to filter the results. The retrieved information is cross-checked and validated.**

***Index Terms*—Convolutional Neural Networks (CNN),Age Estimation,Gender Estimation,OpenFace,Face recognition,Image,Search,Facial Feature Extractor**

I. Introduction

As technology is improving, the distance between two people is reducing.So that they can be connected even after a long time. Nowadays, the best way to be connected is by social media and images are the connecting points. As if they can be recommended to other people who all are having similar interests or facts. So that, from the suggestions each can choose their own connections[1]. But still if any connections are lost in its midway, restoring will be a cumbersome task. The proposed system aims to connect people only by means of images[12]. As the relations are lost years before, some of the information regarding the person may change. Regardless of the information specified, one can search about a person by his/her images even after years of separation. And can retrieve the Profile in social media networks[1].

Earlier, to establish a connection through social media networks, one has to search the name and relevant details about the person to be found[1]. If the data entered are not satisfying the seekers interest, the search is considered as a failure. To overcome this, a new idea with image as the primary search key is proposed. In place of the name and other relevant details of the person,if an image to be searched is given as input by the seeker, the search will be accomplished successfully[11][12]. When the image based search is enabled, the problem that may occur is that the seeker may not be having the latest image of the searched person. The image can be as old as their friendship or even their separation time. Even the image may be less accurate due to the facts as pose, lighting, age, etc. To overcome these problems age invariance[2] is added.

Among the limitations, ageing is complex, as it affects face texture and shape. After the image is given as input, it checks the image based on the factors. Later, the age of the person in the image is estimated and the gender is also identified[11][12]. Thereafter, the essential information from the image is retrieved and the information is compared with the database of images from the network[11]. The more accurately recognized faces will be viewed as an output. Among the results the expected person's current image will lead to their profile.

The system offers a great chance of identifying the person who is being searched with a minimal amount of information about the person. Such as image, first name, etc.

II. Related Works

To make lost connections to be active, searching is the only possible method to solve the problem. To rebuild the connections among the lost, search with various dimensions are possible[12].

A. Image based search

To overcome the issues in traditional search, a method with image as input is given[12]. The image of the person to be searched is given as the image as a key for the search[11]. But the limitation that this arises is that, the image must me

a latest photograph of the person and that should there in the network. Else the result will be a failure. But while searching the person will be holding a photo which is having an age of their friendship. So that the photo will be in there early days so the comparison between the photos will not lead to an expected result.

B. Age and gender Estimation

Age and gender estimation is more common with Convolutional neural networks(CNN). When an RGB image of any size is given as an input to CNN, two binary classes are given as output for gender calculation[3][4], where 0 for Female and 1 for Male[3][4]. Based on the method age can be in the form of either a single integer value or as an age group.

C. Face Recognition

Visually a person feels the difference between two people by their faces[11]. Thus face recognition is some kind of daily experienced task that is being done by humans. Where machines identify the faces by means of images. When an image is given, the face present in the image is detected by a face detector. After detecting the face, the facial features are extracted from the face in an image which is used to recognize the person[8][12].

III. UNITS

A. User Interface

For a social media network to work effectively, needs users for their key functions. Where users are given a wide range of facilities like sign in, login,upload image,search image,like,share, furthermore.

B. Face Detector

From the image uploaded,the face is detected by a list of points which is marked based on the facial features. The points all together form the shape of the face[10]. To avoid the unnecessary details in the image face detector, the points are marked based on its structure.

C. Facial feature extractor

To differentiate a face from another, the extraction of facial features is helpful. When the face is detected, the essential features of a face as eye,nose,mouth,etc. are extracted and stored mathematically[3][12].

D. Age and gender estimators

Age and gender are two facial attributes which are used to refine the number of possible outcomes for a system. When an image with a known gender and age is given for search, based on the facts the search can be filtered in the network to obtain a feasible count of results.

E. Facial recognition

To identify the person in the image, the features from the image are compared with the data in the database[12]. Based on the probabilities of matching, the data is categorized and the most similar face is recognized to be the person in the image.

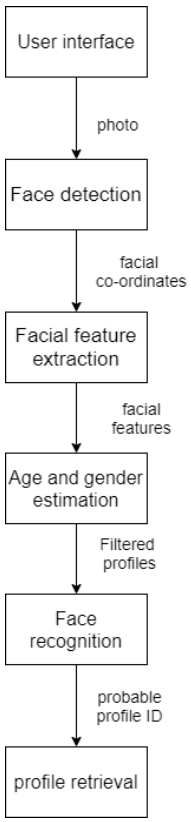

Fig. 1. Block Diagram

IV. THE PROPOSED APPROACH

Our system contains a search with an image where an image is given as an input. Along with the image search, a name search is also provided so that the search can be accomplished. When an image is given as an input to the system the face should be recognized[1]. Recognizing faces by our own eye will not be raising any problem, as the face seems different for different people. But for a system, distinguishing a face from others seems difficult as they are all the same for them[7]. And to make the photos different, multiple algorithms are designed, where essential facial features are retrieved and stored as data for understanding the difference between images. This data is again compared with the other data, extracted in the network and provides the available result from the search[11][12]. It mainly consist of four functions, namely:

- Face Detectors
- Gender Recognition
- Age Recognition
- Face Recognition

A. Face Detectors

From the time immemorial personal information where controlled by verification of documents like passport etc. And verifications are the crucial tools for a better functioning of any section of society. Forged documents interrupt the normal function. To safeguard the information a more suitable

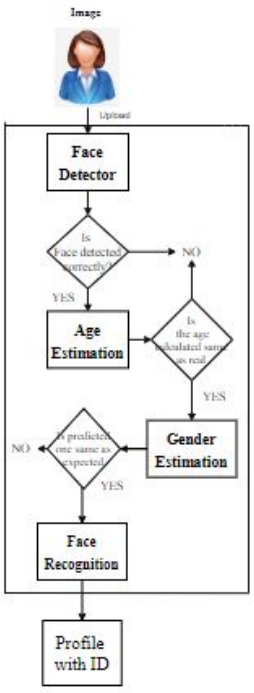

Fig. 2. System Architecture

method as face recognition and biometric identifiers are used nowadays[4]. Face is the key for personal identity. Essential facial features holds the information[11].

One of the primary functions of face recognition is separation of the face from the image uploaded[11][12]. For the detection of faces from the image, numerous algorithms are available. Facial recognition with OpenFace[5] uses a combination of HOG (Histogram of Oriented Gradient) and Support Vector Machine (SVM), or OpenCV's Haar cascade classifier, providing highest accuracy with less data. When face is detected,the most essential facial features are also extracted and stored.

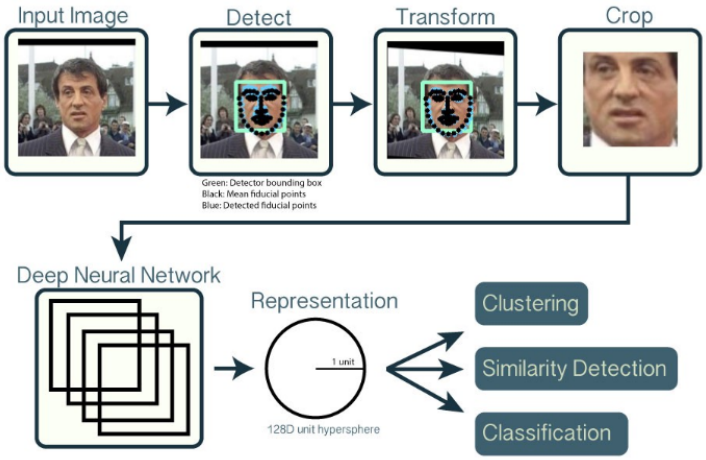

Fig. 3. Steps of face detection.

In this system, OpenFace is a neural network used to predict the faces with more probabilities to the image given and is shown in algorithm 1 and fig2 as per [11].

Input : Image
Output : Possible and Similar Faces

Algorithm 1

Step 1 : Isolating Face from Background.
Step 2 : Pre-processing the face.
Step 3 : Generate the Embedding.
Step 4 : Training a classification model

Fig. 4. Pictorial representation of output of Face Detector

B. Age Recognition

One of the most important biometric characteristics is age[3]. Thus Human age is an effective way to discriminate identity. For the estimation of age,there are mainly aging feature extraction and feature classification. Where aging feature extraction using Convolutional neural network, extracts facial features. And in feature classification, based on the features the age of the face is given as a single integer value or as a group.

When similar and possible face based on the face in the image is listed, to reduce the number of possibilities age estimation is done. So that it can be filtered by the original age and the calculated one. Thus the number of possibilities is reduced and the chances for the execution to be successful is larger.

C. Gender Recognition

Another important facial feature characteristic is gender estimation[6][12]. Based on femininity and masculinity characteristics in the image, the face can be classified either to be the face of Male or Female. Without access to personal information with a basic image one person's gender can be identified by gender estimation[3][4]. When features of face are extracted, based on the peculiarities it is identified as male or female. The output for the gender estimation will be two binary classes where 0 denotes female and 1 denotes male usually[12].

When the faces from age filter is given to gender estimation it can reduce the number of faces based on gender. When a female's face is confirmed, the related faces of male can be avoided by gender estimation.

D. Face Recognition

To differentiate two different people, faces of the respective matters a lot. Faces are the unique identification key for a person. The faces can be easily understood by humans rather than machines. To recognize[9] a person from a photograph or from a video, the extracted facial features from the face detected in the system is converted into mathematical representation which is further used to compare with the data of other faces in the database.

The face template[9](ie. Particular features about a face) is compared with other templates from the database, giving the most probable match percentage. Based on the percentage results, a face or more with maximum compatibility is recognized.

Fig. 5. Recognized faces of fig 4

V. Conclusion

In this paper, we propose a system which helps in improving the relationship with old friends. In the system, an old friend's image can be given as an input where the possible profiles related to the image is given. When an image is uploaded, the face detector detects the face and extracts the vital information regarding the face. The information collected can be used to filter out the possible faces received from face detectors. Firstly, it's passed to an age detector where the faces can be selected based on the known age. Using the result of age estimation method the remaining faces are categorized by gender where the expected gender can be used forward. From the filters applied the number of faces matching to the initial face is reduced. And for the face recognition, face templates of the reduced solutions are compared with the initially uploaded face. The resultant of this system provides the profile of the people whose face is more similar to the input image. The system can further be extended, even if the input image is a partial face.

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