

Finding missing people using Face Recognition: A Comprehensive Case Study

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Abstract— Face recognition using feed forward technique may be an important technique to use in computer innovation by machine learning, bio metrics, pattern recognition, pattern analysis and digital image processing. It is a systematic method for training multi-layer convolution neural network. Now a day’s bio metric is a currant topic for the research community. Bio metric is used for security purpose for its real time applications. Face recognition is one of the challenging issues in bio metrics. These issues in our mind, we are focusing on the face recognition problems. Face recognition must address several difficult problems such as pose, illuminations and expression, background imaged head size, and head orientation. This difficulty arises from the fact that faces must be represented in a way to distinguish a particular face from all other faces. Face recognition system consists of four modules: face detection, face normalization, face feature extraction and matching. The face recognition process is often operated in face verification, face identification and face watch. In face verification a query face image is compared against a template face image whose identify is being claimed. In fact identification a query face image is compared against all templates in the database to determine the claimed identify. In face tracking and surveillance, face images are tracked and compared with stored databases. Our study is focusing on analysis the various face recognition algorithms and investigate to propose the face recognition algorithm with its enhanced performance.

Keywords: Face Matching, Neural Network, Feature extraction, Machine Learning

I. INTRODUCTION

Humans are very good at recognizing faces and complex patterns by the common sense. Even a passage of time does not affect this capability and therefore it would help if computers become robust as humans in face recognition. This can help in many ways. One of them is finding the lost person by using the images. This research paper is a step towards developing a face recognition system, which can recognize static images and it also modified to work with dynamic images. In that case dynamic images are first converted into static one’s and the same procedure can be applied on them Face identification is the application of the extracting and recognizing the faces using in Machine Learning, Computer Vision, Bioinformatics, Digital Image Processing, Pattern Recognition and different areas of the security and identification organizations. The main purpose of face recognition is using for identification and verification of human for security purpose. In the current scenarios there are different algorithms are using for face identifications. Now a days Face identification is the very big challenge in current environment, because in this time

crime and cybercrime is goes to very high. So everyone wants to secure his life and his nation.

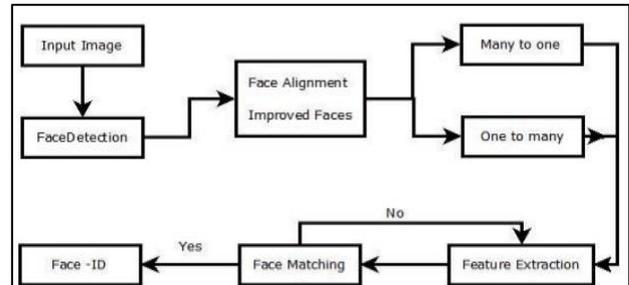


Fig. 1: Processing flow of face image

A. Input Image:

The term image accession is refers to the process of capturing the real world images. After capturing this image we stored it in the registered database with complete detail of the images. Now days digital cameras are using for capturing the images, because they are directly converted it into the digital form and computer is read directly and get updated in the registered database.

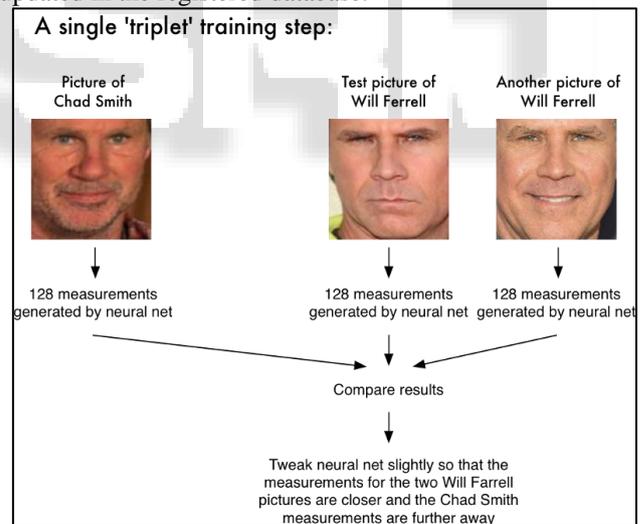


Fig. 2: Various input image for face recognition

B. Face Detection:

Face detection plays an important role in image recognition system. Face recognition system are consisting different modules represent in Figure 1. There are different phases to including these categories for recognition. It also includes the face areas from the images. And they are directly detecting the face using a face tracking components.

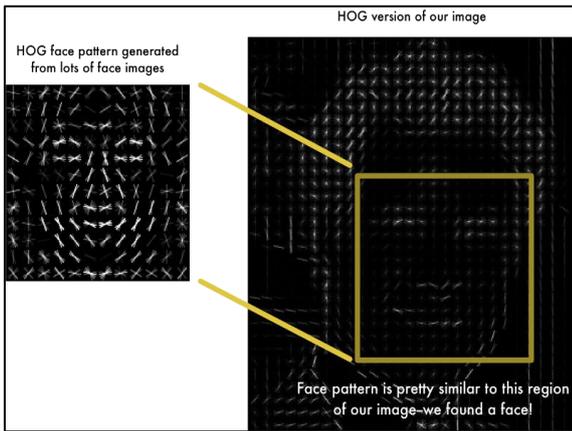


Fig. 3: Face pattern detection.

C. Face Alignment:

Face alignments are using the dimensions of faces such as horizontals and verticals. Face alignment, contrast and illumination aimed to achieving the more accurate value of localization and normalization of the faces. Therefore, face recognition provides initial feature of estimating the location and scale of every faces. These features are including eyes, nose, mouth, colour, shape texture and other components of the faces. Face detection is normalizing to including the geometrical properties such as pose, size and colour using geometrical transform and morphing. There are basic feature of the faces that are pre-processed to analyse the faces and improving the quality of faces for pre-processing.

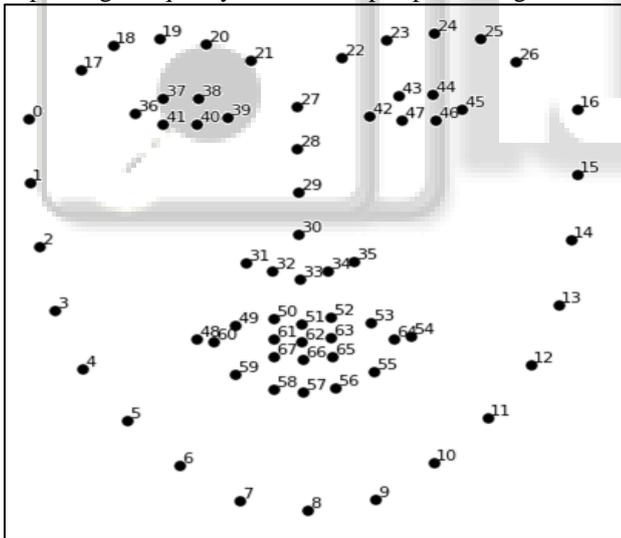


Fig. 4: Alignment of the facial points identified

D. Feature Extraction:

Information extraction is a very important application used by extracting the feature from images for face detection and face recognition. Such types of applications are widely used in Computer Vision, Digital Image processing, Pattern Classification and Machine Learning. Feature extraction is transforming input data or image into the set of their features from database, because selected feature are containing the most appropriate information from the original data. Feature extraction is very useful in Bioinformatics, Computer Vision, Pattern Classification, Digital Image Processing and Machine Learning.

E. Face Matching:

Face recognition module is using for input image from registered database. In this module if face is matched to the registered database then it is authorized to the next step unless they are going to previous step for recognition.

II. LITERATURE SURVEY

Website uses best possible way to get missing person back to their home is using the technologies to make them meet their families. The technology they offer is just a website to register missing person complaint and search the huge database to find the missing person, with no advanced algorithms. All the websites of missing person till now, only uses details and a lot of manual work to identify the person.

Madhya Pradesh Police has implemented Crime and Criminal Tracking Network and Systems (CCTNS) which is a Mission Mode Project of Government of India. Under [4] Project all Police Stations and Higher Police Offices in the State and across the Country is being computerized and networked. For convenience, all Police officers are interconnected and work is undertaken in a centralized application. The Citizen Portal is developed for the Citizen of Madhya Pradesh which have various benefits including Information related to 'Missing person', 'unidentified dead bodies' etc. is easily available.

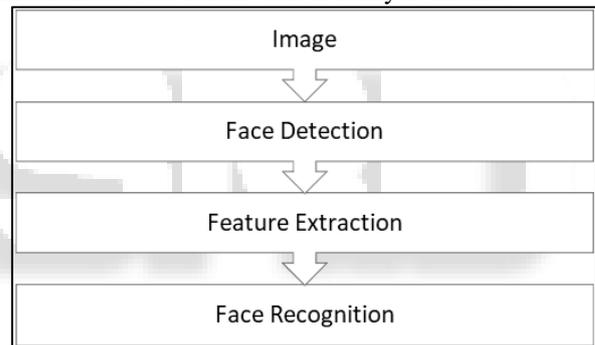


Fig. 5: Face Matching Process

III. MACHINE LEARNING APPROACHES FOR FACE IDENTIFICATION

There is different machine learning approaches are used in face identification.

A. Feed forward Neural Network:

Feed forward neural network is most popular types of deep neural networks for face identification. Feed forward neural network is controlling learning features from input data and used it from 2D convolutional layers. Feed forward neural network used for the need of manual feature extraction. So they are identifying feature used to classify the images. Feed forward neural network is working on extracting features directly from stored images and learns whole the related feature in the networks. In figure 2 represents architecture of feed forward network with weight and bias are also called the three layer multi neural network. A three layer multi feed forward network with one layer of hidden layer is shown in figure 6. The output layer has v_{oi} bias and h hidden layer has w_{oi} as bias. In this network found that bias is the both output layers and hidden layers. This bias is working as

weights on network from whose output is always 1. From above figure 6 is clear that the feed forward network is find one input layer, one hidden layer and one output layer.

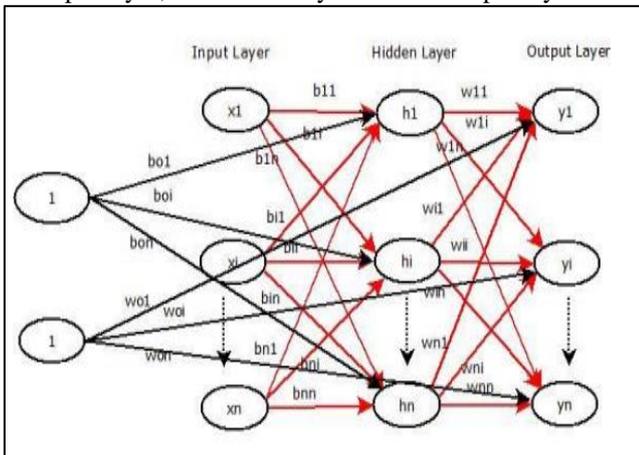


Fig. 6: Architecture of feed forward neural network with weight and bias

There are included n numbers of input layers, hidden layer and output layer. The input layer ($x_1, \dots, x_i, \dots, x_n$) are connected to the hidden layer ($h_1, \dots, h_i, \dots, h_n$) and hidden layer are connect with the output layer ($y_1, \dots, y_i, \dots, y_n$) by means communication of the interconnection of the weights. At the instant feed forward back propagation phase of learning in the network, the flow of signal is reverse direction. After increasing hidden layers the computational complexity of the network is very high. The bias is very effective for, Computer vision, Digital image processing and Machine learning. The best example of Convolution neural network is automatic driving car image related problem and now used in machine learning. Convolution neural network are using for both output and hidden layer, to working upon the complete input to be calculated.

B. Convolution Neural Network:

Convolution neural network is one of the best techniques used in Pattern recognition network is transforming an input image to output image using hidden layers. Convolution neural network is associated in computer vision and pattern analysis with historical history back to the 1980s by Kanihiko Fukushima proposed neural network architecture in image processing system. The previous existing algorithm could recognize geometric pattern in image for face identification.

C. Deep Convolution Neural Network

A deep convolution neural network is combining with one to more non-linear processing layers. Now it is using for simple faces operates in machine learning approaches for face detection and face recognition. Deep convolution neural network are connected with multiple hidden layers with communication input layer and output layer. These layers are connected with neurons or nodes. The processing of deep convolution neural network is the set of objects and after using deep convolution neural network they have automatically recognize the objects corresponding input images. In deep convolution neural network labeled images known as training data images in machine learning

approaches for face identification. Deep convolution neural network is first to understood the specific object features and then matching there corresponding categories. Every layer in the network of deep convolution neural network to contain the data from previous layers and transform or passes the next layer of networks. The deep convolution neural network is increasing the complexity and detail of the objects. They are learning its pattern features from layers to layers in network.

D. Principal Component Analysis

Principal component analysis is the oldest and very popular technique of the digital image processing, pattern recognition, and Computer vision. It was introduce by Pearson (1901) and developed by Hotlling (1933). It was widely used for electrical computers but now it is well entrenched in stational computer package and database. Principal component analysis id reducing the Eigen value and Eigen vectors problem in a matrix. Simply Principal component analysis is used for a wide range of variety in different applications such as Digital image processing, Computer vision and Pattern recognition. The main principal of principal component analysis is reducing the dimensionality of a database. In the communication of large number of interrelated features and those retaining as much as possible of the variation in the database.

E. Linear Discriminant Analysis

Linear discriminant analysis method is related to fisher discriminant analysis. Linear discriminant analysis method is using to describing the local features of the images. Features are extracting the form of pixels in images; these features are known as shape feature, colour feature and texture feature. The linear discriminant analysis is using for identifying the linear separating vectors between features of the pattern in the images. This above procedure is using maximization between class scatter, when minimizing the intra class variance in face identification.

IV. CONCLUSION

In machine learning approaches for face identification. Feed forward algorithms face learning problem available to search for all hypothesis space defined to all weight values for all units in the networks. The error is replaced by P and the other category of the space corresponding to all of the associated weight with all of the units in the network. In this equation in the case of training a single unit module the output attempts to find a hypothesis to minimize P . In pose variation can be classified into two categories depends on the different type of database. Many to one face identification is direct extension of frontal face recognition in which the feed forward algorithm requires gallery images of every subject at every pose After a pose estimation stop the algorithm geometrically align the images to object poses of the database subjects. In face recognition algorithm the automatically determined location of the different feature. This alignment is refined by optical view. Recognition of face images is performing by computing normalized correlation scores in many face identification scenarios the pose of the probe and registered database image are

different. Feed forward algorithms are the basics algorithm identification of the identification process.

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