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Deep Neural Networks-Generation of a New Algorithm

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ABSTRACT: This paper deals with researches and literature reviews on Deep Neural Network. In the field of biometrics, authentication, access-control, compliance, digital card, surveillance systems and face recognition (FR), identifying the procedure of human beings using facial imagery, is a multitude of hands-on applications. Convolutionary neural networks (Cov-Nets) have proven to be successful for FR, a form of deep networks. Some pre processing steps such as sampling must be taken for real-time systems before using in CovNets. Nevertheless, then full images are also transferred (all pixel values) to Cov-Nets as a input and all steps are performed by the network (feature collection, function filtering, training). That is why Cov-Nets are often difficult and time-taking to implement. Cov-Nets are in the growing stages, with very small accuracy, so they have high future scope. This paper offers a new sight of utilizing a deep neural network for facial recognition .A new approach is developed in this paper. In this approach facial features which are extracted are provided in place of providing raw pixel values as input. This reduces the difficulty and gives the Yale faces data set accuracy of 97.05%.

KEYWORDS- DNN, Cov-Nets,FR,Ann,AI,Yale

I. INTRODUCTION

The face recognition (FR), by matching the face database, identifies a face. Due to improved design and apps learning and facial recognition models, it has achieved great strides throughout recent years. When people will identify others regardless of age, lighting conditions and various gestures, it will be extraordinary. The researchers' goal is to develop an RF device that can equal or even surpass the approximately 97.5 percent human recognition rate. The techniques in the best systems for face detection will rely on the system's application. Two wide categories of face recognition systems can be divided into:

- In a broad facial database (e.g. a police database), find a person on his face. The deep neural network for recognition of human facets of these systems (64-bit) returns the information of the search indivisually. Just one picture per person is often available. Recognition in real time is usually not required.
- Identify a person, in real world. We are utilized in structures that grant access to and remove access to a particular group of people. For training and real-time identification, multifaceted images are often available per person. The idea is proposed for the second system with different facial measurements, features and angles. An ideal facial feature remains an open problem.
- The traditional pipeline for face identification is composed of four stages: facial identification, facial alignment, facial depiction and classification. The input image takes features of face by new proposed process and its gives rise to deep neural network . This contains softmax layer . The network architecture is versatile and good results will be obtained by adding and removing DNN. Several libraries, features and interfaces have recently been developed and updated for a network. CovNets are sophisticated neural network that has good framework of spaced bars topology for processing data. For practical applications these networks are extremely successful, which include data from time series and that can be regarded to 1D grid, and data in the images can be considered as a 2D framework of spaced bars of pixels at regular intervals. Convolutionary réseaux are simple neural networks that use convolutionary network rather than the multiplication of the general matrix in at least one layer. Based on a mathematical operation it indicates network which represents convolution. "Convolutionary neural network" is a linear operation of a special type.

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II. LITERATURE SURVEY

Several CovNets or deep CovNets recently showed good face verification results. Recent results as stated by Yi Sun et.al showed that the methods which are existing typically approach the FR problem in two stages: features extraction(to get a better picture we have to design or learn features from every face image) and recognization (calculate similar features between two faces by using a rep).

To decrease the size of SOM, which is an efficient algorithm,transforming methods are used for self-organizing maps (SOM) and Karhunen Loeve (KL).Already successfully implemented for the same purpose is Master Component Analysis (PCA). Although CovNets showed promising results for FR, the design of a good CovNet architecture is still ambiguous because of the lack of theoretical instructions for a particular classification project. According toAI agencies, 97.08% accuracy for matching two photos of the same individual has been shown in a restricted setting by CovNet Restricted Boltzmann machine (RBM).

The geometric features such as mouth width and location, noise location , face size and shape of chin, were determined by Brunelli and Poggio. In a 47-person sample, they registered a recognition rate of 90%. We revealed, however, that a very simple method matching scheme determines 100% recognition for the similar dataset. The mixing distance technique, implemented by Cox, et.al, reached a 95% detection by means of an interrogative database of 95 images with 30 manually extracted functions representing each face.

Best results are present on a large database by Pentland et al (95 percent of 200 out of 3000 recognition). Breakthrough findings are challenging as large number of pictures of the people seemed to be same.Meanwhile Lades et al.. introduced a dynamic link architecture, the nearest stored graph uses elastic graph matching, for distortional invariable object recognition. We showed good results with an 87 person sample and 150 year old test photos consisting of various gestures and faces. A parallel system with 23 transuters uses a similar method which is computer-cost, taking about 25 years compare it to 87 stored objects. Eigen faces are therefore a fast, simple and useful algorithm. However the pixel-intensity for the training and test images may be reduced, as the optimal output requires a high level of correlation. Graphics match is another way to recognize the face.

In the Face Recognition Technology (FERET) database Wikott et al used an improved methodology and compared 300 sides to 300 different sides of the same men. They have recorded a 97.3 percent awareness score. The hand-crafted results in the FR have been respectable in restricted environments such as Local binary patterns and Local Phase Quantization . Furthermore, if applied to pictures taken in unregulated conditions, such as different facial posture, speech and illumination, performance degrades drastically.

Typically high-level recognition is based on many processing levels, such as the Marr processing paradigm for matched models from images to surfaces through to 3D model. Turk and Pentland argue that a 2-Dimentional image processing process is also in place. They proposed a method for the identification of face images in which the main elements of the original trainers ' pictures are projected. In contrast with known persons, the resulting Eigen faces are graded. None of the previous methods used only the extracted functionality for the FR research in deep neural networks. The paper proposes to preprocess images that are used to supply as input to pro-found neural network for face recognition in place of transferring pixel values to CovNets by the use of hair cascade (frontier face).

III. DEEP NEURAL NETWORKS

An inspired algorithm by human brain is a neural network designed to identify trends in numerical datasets. The actual data in the world such as images, text sound , videos, etc are used for neural networks which is translated into numerical vectors. A neural network consists of various layers and each layer contains several number of nodes. Based on the type of the model, the neural network attempts to determine the weight of every input data that is fed into a node. The input data ,weight determine the value of for the final result. The weighted sum of the input values is estimated and the output for the node is decided according to certain threshold biases.

Some activation function is used to map input to output. The aim of a neural network is to rough a certain "f" function. A basic function which classifies, y= f(x) , is to categorize the input data x in class y, while the neural network classify a parameter , β and thus y = f(x).

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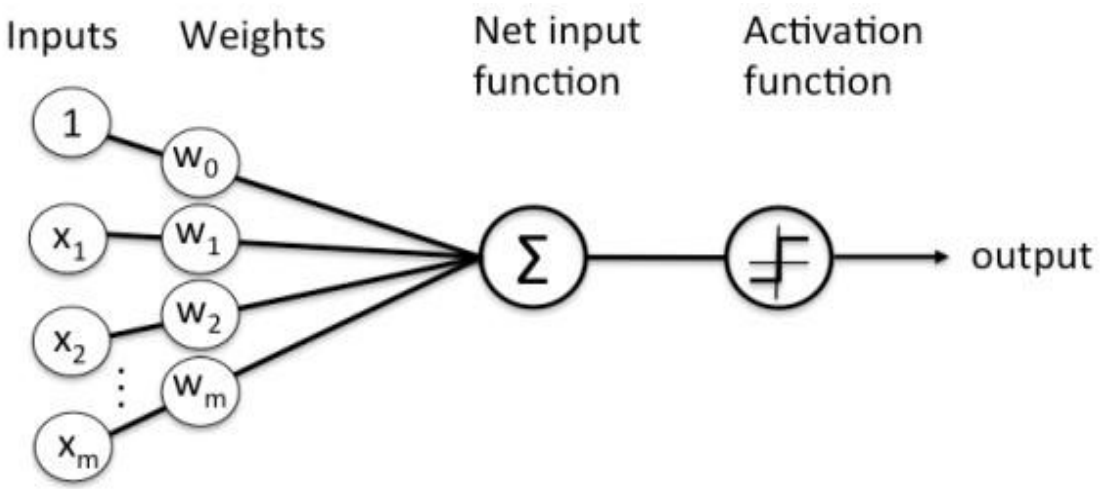

Fig1. Small Neural Network

The network of these functions can be represented as the f(x)= f4(f2(f1(x))), a single neural network. In the row, the first layer is called f1, and likewise the second layer is called f2 etc.The depth of the neural network is determined by the length of chain. The output layer is referred to as the final layer. Neural network representation is shown in Fig2. The target layer output is not seen when exercising, so the center layers are known as the secret-layer. A deep neural-network (DNN) is a multiple-hidden layers and higher abstract feed-in Artificial Neural Network (ANN).

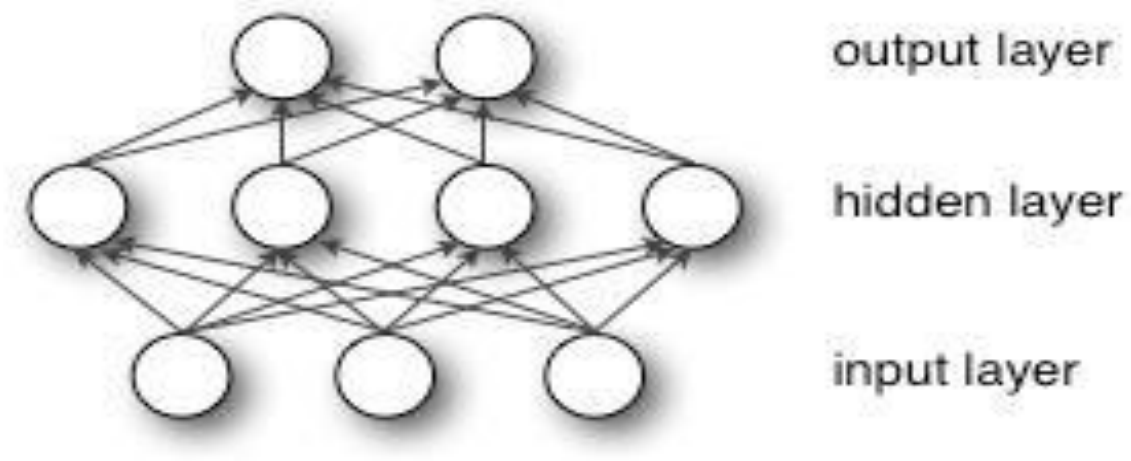

Fig.2. Small Neural Network

The dimensionality of the hidden layer defines the width of the DNN. Calculation is done by active feature of the hidden layer values. Training in deep neural-networks involves reducing the expenditure feature, as the difference between the product and the label is in the case of the cost classification feature. For this function, normally gradient descent is used. The Rectilinear Unit or relu should be used as an activation mechanism in a modern neural network. The activation of a single secret device:

$$h^{(□)} = □\ (□^{(□)□}□)$$

If (μ) is the tan function, then w(i) is the unit is covered by the weight vector, and x is the entry. Over-passing in DNN generally causes limited data problems. This drop is avoided by using weights. It drops a few nodes on the basis of their likelihood randomly events. "Drop out" indicates that units and their incoming and outgoing edges are temporarily removed. It's shown in Fig 3.

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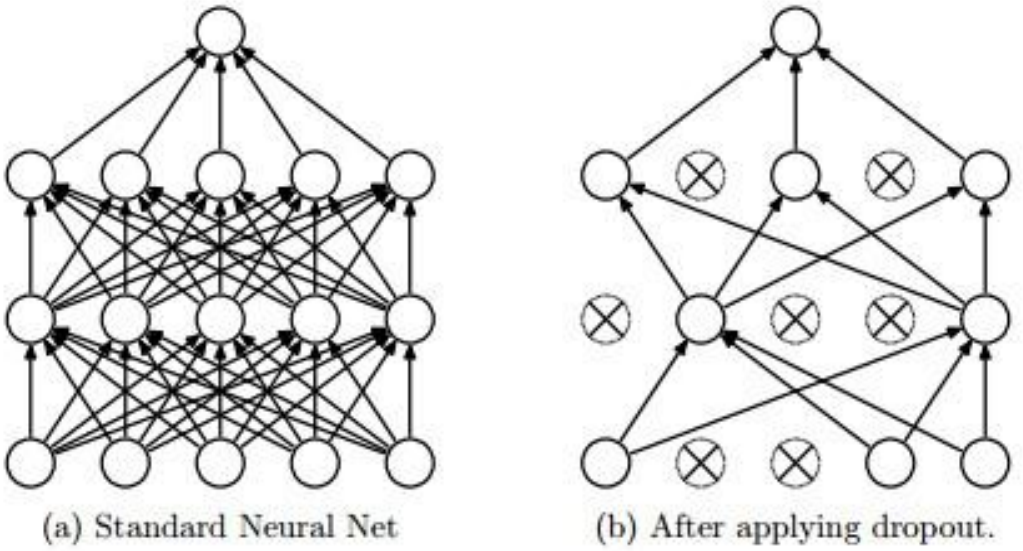

Fig.3. Dropout Neural Net Model

IV. ALGORITHM

Based on the research literature reviews we have done a new algorithm can be proposed:

- Pixel values are loaded into the dataset from all the images.
- By using hair cascade identify the presence of facial features in all images
- According to the output of before step ,crop face
- To cross validate in the ratio 9:1 we have to split data

Design the following Neural-Network Algorithm:
This Model contains four layers of Neural Network

1. 512 outputs with relu activation and dropout of 0.2 are given by the First-layer that is dense layer.
2. 512 outputs with relu activation and dropout of 0.2 are given by the Second-layer that is dense layer.
3. 256 outputs with relu activation and dropout of 0.2 are given by the Third-layer that is dense layer.
4. 15 outputs with softmax activation and dropout of 0.2 are given by Fourth-layer that is output layer is
dense-layer.

- Training the Neural Network with the value epoch=50.
- By using training and testing accuracy, plot the graph.
- Calculate the final average accurate result.

V. CONCLUSION

Instead of raw pixel values, hair cascading is used in the extraction of and feeding of facial features to reduce the complexity of the neural network-based recognition process with a lower number of redundant entry features. The use of DNN rather than CovNets lightens and fasten the process. In addition, in the proposed method, the exactness is not compromised since the average accuracy obtained is 97.05%. Although a further step is being taken in extracting facial features from each file, the method for small datasets is still better.

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