

Identity Verification System using DNN

Dr. V. Priyadharshini
Assistant Professor,
Department of Computer Science,
Christ College of Arts and Science

Mrs. Jayalakshmi. V
Assistant Professor,
Department of Computer Application,
Christ College of Arts and Science

Abstract:- In recognizing a person, the major focus at primary attention is face. The humans have the capability to identify the several hundreds of faces which it learned over the lifetime and identifying the well-known faces a few seconds even though after many years. But, human seems it difficult when there exist face modifications because of expression, viewing conditions, aging, and disturbances like hair style changes, beards or glasses. This research develops a model that might recognize the individual with the support of face by employing the AlexNet of the Deep Neural Network. This model is executed by two phases. They are learning phase and testing phase. Image acquisition, filtering, learning, preprocessing and extraction are involved in the learning phase. The individual image is taken as the primary stage of the model. The image is filtered as it contains many noises like background and so on. And the filtered image will be converted into a feature matrix and is provided as input towards the AlexNet of the Deep Neural Network and it is fed towards the network. This type of unsupervised learning is trained and generates a knowledge base for the further usage. The persons' face image is taken in testing phase for recognition. The features are given towards the network for classification. From the knowledge base, the face image will be classified by the network.

Keywords:- Deep Neural Network(DNN), Convolution Neural Network (CNN); Face recognition.

I. INTRODUCTION

The human being capability to identify the face is highly significant and to derive the character or intelligence out of the appearance of face is remarkable. In identifying a person, the major focus at primary attention is face. The humans have the capability [1] to identify the several hundreds of faces which it learned over the lifetime and identifying the well-known faces at few seconds even though after many years. But, human seems it difficult when there exist face modifications because of expression, viewing conditions, aging, and disturbances like hair style changes, beards or glasses. In numerous applications like verification of credit card, criminal identification and security systems, recognition of face is highly significant problem [2]. Even though, it is absolute that the human beings can be better at recognizing faces, it is not known that how the human brain encode or decode the faces of human beings. To build a system model that might imitate like people in identifying the faces, the researchers are working over time. This model might carry out sensing by visually such as recognizing things like office, people faces, printed words, home, motor car, handwriting and vocal sensing such as recognizing the voice. However, these systems are well versed in redundant activities such as estimating the total of some digit counts and it is inefficient in processing task of huge sums of various data types that the vision system does.

The researchers are studying about these models to reduce the complexities [3] which might recognize artificially in common sense recognition. In the present decade, the recognition of human face through the computer model might be studied. As the human faces are multi-dimensional visual stimuli and complex, building a computational model for recognizing faces is highly complex unfortunately. Hence, the recognizing of face is a big computer vision task in that numerous prior vision methods [4] are included. The recognition of faces is the usual task that the humans are doing in the daily lives without the knowledge of the human itself. Though the studies about recognition of faces are done from 1960's, it has derived the more interest of the researching group nowadays. In the present times, numerous face modeling methods and face analysis is grown majorly. But, the trustworthiness of the face recognition methods is highly challenging the research group still.

Face recognition (FR) is defined as the process by which the facial images are used to identify people. This technology is widely used in biometrics, information on security, access to controlled areas, law enforcement, smart cards, and monitoring technology. Two measures are used to build the facial recognition system. The first step is a process by which the facial features are collected or extracted, and the second step is classification of the pattern. Deep learning, especially the convolutionary neural network (CNN), has made commendable progress in FR technology recently.

II. RELATED WORK

The face recognition is an older subject when comparing with the computer vision due to the theoretical interest and practical significance of many cognitive researchers. Even though there exists many identification techniques which might be accurate, face recognition usually gains a main focus for study due to the non-invasive way and due to the individual's prior technique of individual identification [5]. More work in computer face recognition has aimed at detection of distinct characteristic like nose, head outline, eyes and mouth and derived a face model through size, relationships and position over the features. Those methods prove to be complex in expanding to several purviews and seem to be fragile, and needs proper primary guess to guide. However, studies in human methods of face recognition have demonstrated that the distinct features and its relationships have an inadequate representation for the face identification of adult human [6].

Fischler and Elschlager[7] tries to determine same attributes robotically. To measure and search the facial attributes, they defined the linear embedding technique which employed global measure and local feature template matching. Through the present Yuille and Cohen [8] study, this template matching technique might be conveyed and enhanced. This method depends on the deformable templates that are face parameterized models and the attributes in the attribute rate are decided through communications in the face image. Through face categorization through a collection of geometric attribute and carrying the pattern recognition depending on attributes, other done the face recognition in an automated manner. The primary model in that the entire phases of recognition procedure were automatically done was by Kanade's [9] by employing a control strategy in a top-down manner through common structure of desired features.

A collection of facial attributes was estimated by him out of a distinct face picture and in face matching, the technique of pattern classification is used out of the known collection, which a absolute traditional technique that is based on absolute gray-scale and local histogram analysis rates. Neural network is used by Miros for the construction of TrueFace face recognition. Mr. Payroll uses TrueFace for check cashing structure and might be adopted at casinos and same placed in numerous states of US [10].

III. APPLICATIONS IN FACE RECOGNITION

Human-Computer Interaction Few computer games at present may be played with the movement of body peripherals in spite of keyboard or mouse. *Security Monitoring* The model of face tracking might be employed as security model in public regions, private firms and shopping malls. *Banking System* The highly employed phenomenon in banking is the detection system of human face. *Information Retrieval* Face detection of human is highly significant thing for information retrieval.

IV. OUTLINE OF A FACE RECOGNITION SYSTEM

Two phases are comprised by the model: 1. Learning process 2. Testing process *Learning Process* The primary task is that the system has to learn about the input pattern feature vectors. In order to do this, some six common phases are used

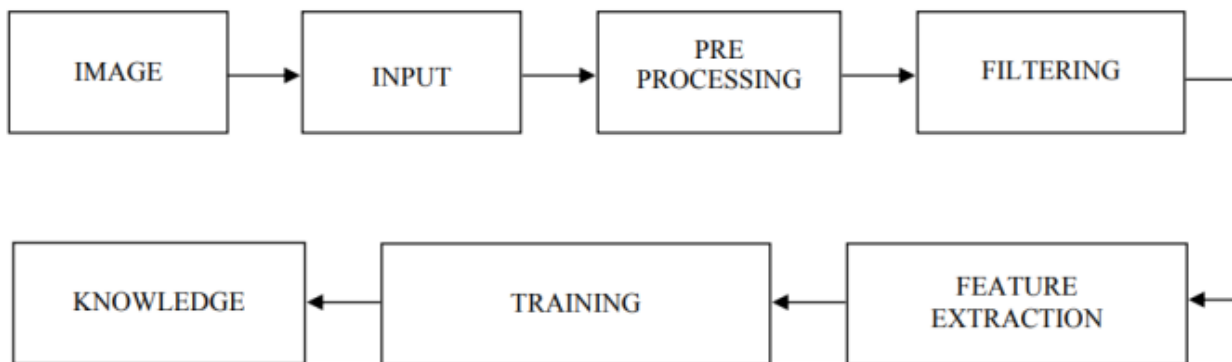


Figure 1: Learning Process *Testing Process* In testing process, six fundamental phases are required whether it is identified or not.

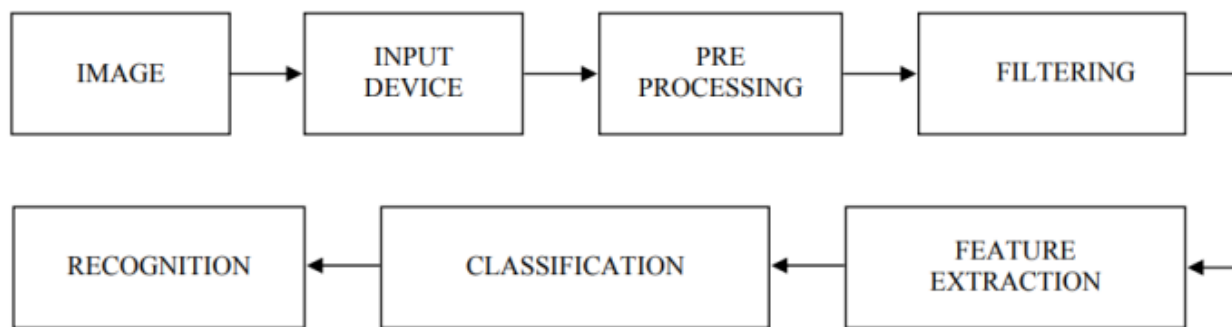


Figure 2: Recognizing Process

Four phases are same as the learning procedure among these phases. The face image of the individual is considered and it is processed which is carried in learning procedure. The applied attributes are given towards the network in the classification phase and from its knowledge base it will categorize the image. Fig. 1.2 shows the testing procedure.

V. RESULTS AND DISCUSSION

The model performance is based on the variety of dataset training during the learning phase of AlexNet of Deep Neural Network. The labeled images of the identical twins dataset are A, B, C correspondingly. We estimated the accuracy and loss during the training process. When training of the dataset is done with the labeled data, the next phase is testing, the shortest

distances of every pattern is examined with each other pattern in each iteration. The outcomes are plotted over a graph. During learning, the winner node are highlighted which are subjected to the recognition phase. The original probability of finding during recognition depends on the face matching with the learned faces so far. A certain threshold value is set to determine the winning node and it is adequate value to match with a face.

OBTAINED OUTCOMES

It is absolute that the network is learned using the Alexnet model with the identical twins dataset and also it attempts to identify a pattern in those faces, and total accuracy of 80% is attained by this experiment. Hence, in recognizing the identical twins dataset, our model is effective on the whole. While we attempt identify a person face with different in face expression, it differs. To measure the similarity, the below formula is used: (1)

$$\text{Similarity} = \frac{2.0 - \text{Minimum Distance}}{2.0} \times 100\%$$

VI. CONCLUSION

There exists no smart mode which has been build to offer cent percent accurate outcomes still now. Because of the modifications in inputs, few errors occur. Recognition of face is highly complex model as the human face modifies based on expressions, age and so on. For human being, there exist lot more expressions in face. Hence, it is not probable to the model to learn the entire expression kinds towards the network. The reason for the unrecognition. However, because of the input device variations, face cannot be correctly detected and pattern might modify drastically. By employing AlexNet of the Deep Neural Network, our work build and demonstrated a recognition system of faces of human being. The major goal of face recognition model was to derive a model which is simple to learn. That is the learning time minimization will react good with various images of identical twin, even though it contains noisy input and optimization is probable. In spite of the traditional techniques like Backpropagation and Kohonen self organizing map, we have used AlexNet of the Deep Neural Network which takes reduced time to learn the model. Hence, it is highly simple and effective to learn with increased accuracy.

REFERENCES

- [1] Imran, J.; Raman, B. Deep motion templates and extreme learning machine for sign language recognition. *Vis. Comput.* 2019.
- [2] Ravi, S.; Suman, M.; Kishore, P.V.V.; Kumar, K.; Kumar, A. Multi Modal Spatio Temporal Co-Trained CNNs with Single Modal Testing on RGB-D based Sign Language Gesture Recognition. *J. Comput. Lang.* 2019, 52, 88–102.
- [3] Al-Emadi, S.; Al-Ali, A.; Mohammad, A.; Al-Ali, A. Audio Based Drone Detection and Identification using Deep Learning. In *Proceedings of the 2019 15th International Wireless Communications & Mobile Computing Conference (IWCMC)*, Tangier, Morocco, 24–28 June 2019; pp. 459–464.
- [4] Prasad, P.S.; Pathak, R.; Gunjan, V.K.; Rao, H.V.R. *Deep Learning Based Representation for Face Recognition*; Springer: Berlin, Germany, 2019; pp. 419–424.
- [5] Taigman, Y.; Yang, M.; Ranzato, M.; Wolf, L. Deepface: Closing the gap to human-level performance in face verification. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*, Columbus, OH, USA, 23–28 June 2014; pp. 1701–1708
- [6] Boufenar, C.; Kerboua, A.; Batouche, M. Investigation on deep learning for off-line handwritten Arabic character recognition. *Cogn. Syst. Res.* 2018, 50, 180–195.
- [7] Carey, S., and Diamond, R, "From Piecemeal to Configurational Representation of Faces", *Science* 195, pp. 312 313, (1977).
- [8] Fischler, M. A., and Elschlager, R. A., "The Representation and Matching of Pictorial Structures", *IEEE Trans. on Computers*, c-22.1, (1973).
- [9] Kanade, T., "Picture Processing System by Computer Complex and Recognition of Human Faces", Dept. of Information Science, Kyoto University, (1973).
- [10] Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", First Edition,