Real Time Age and Gender Prediction

I. INTRODUCTION

Face recognition is one useful method to identify any person by features of the face. But with age progression, the face features changes and the database should be updated regularly, which is a tedious task. A human face is the prolific information source, that comprises of lot of information. Human facial image processing research is undergoing in many directions and it is still active and interesting.

The other research areas include predicting feature faces, reconstructing faces from some prescribed features classifying gender, races, and expressions from facial images. Age is a significant attribute of humans and plays an important role in interpersonal communication. It reveals peoples personal conditions, social background and human behaviours. Therefore, age estimation has become a hot research area in the field of computer vision.

II. MOTIVATION

Age estimation is a basic ability required for smooth communication between humans. People at different ages have different requirements and preferences in various aspects, such as linguistics, aesthetics, consumption habit etc. A good understanding of age leads to successful communication between humans. It can be effectively used for security control and surveillance monitoring, biometric identification, criminal investigation, content analysis of media.

This research is to develop a human age group estimator From the given face images irrespective underlying challenges and handicaps.

III. PROBLEM FORMULATION

Age prediction can be regarded as the problem of pattern recognition including two common steps: extraction of features and identification. Identification can easily be done using regression and classification processfrom an extracted feature. Age classification is basically problematic with the training set through which system is trained and test set on which testing is applied for age classification. The main objective is to develop an algorithm that identifies the person's age from the extracted features. The system can be useful for preventing the young children from, not to have access to the adult contents or materials from the internet and stop or prevent underage drinkers from buying alcohol, cigarette, etc. It provides a wide variety of applications like content analysis of multimedia, designing an interactive and intelligent robot.

IV. OBJECTIVE

- To Predict gender of the subject in front of primary camera.
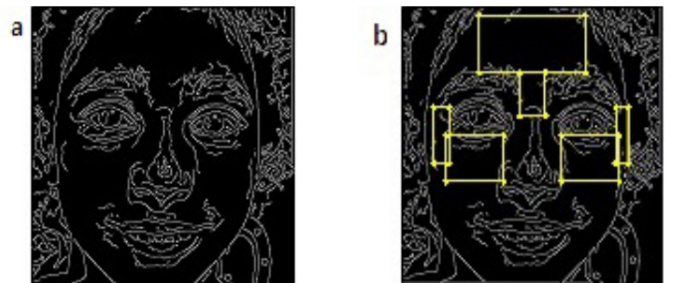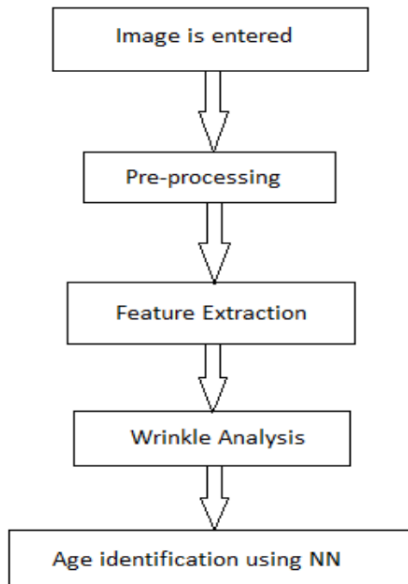- To Predict age of the subject in front of primary camera.

V. SOLUTION METHODOLOGY

Fig. 4. (a) Edge detected face (b) Edges in wrinkle area

A. Pre-processing

The first step of pre-processing is the extraction. Face region extraction means that image is extracted from entered input image by using cropping tool. The input color image is converted to gray image and stored in database for processing . The cropped face region and converted gray image.

B. Feature Extraction and Wrinkle Analysis

Extraction of global and local features is made from face images. The global features include various distance ratios of all crucial facial objects like left eyeball, right eyeball, nose, chin, lip, and forehead. The local feature that is mainly used here is wrinkle feature of some particular portions of the face like forehead region, eye corners regions, eyelids, mid of eyebrows. Using five distance values, six features namely feature 1 to feature 6 are calculated in the following way:

- Feature 1 = (left to right eye ball distance) / (eye to nose distance)
- Feature 2= (left to right eye ball distance) / (eye to lip distance)
- Feature 3= (left to right eye ball distance) / (eye to chin distance)
- Feature 4= (eye to nose distance) / (eye to lip distance)
- Feature 5= (eye to nose distance) / (eye to chin distance)
- Feature 6= (eye to chin distance) / (virtual top of head to chin distance)

Using wrinkle features of face image, feature 7 is calculated. Edge detection is widely used for detecting discontinuities in an image. Feature 7 is calculated in following way. The input face image is first converted into gray scale image. Then it passes through canny edge detection technique. It provides a binary image with wrinkle edges as shown in Fig. 1(a). The white pixels of the wrinkle area give information about wrinkle present in the facial image. In binary image, binary value 1 is used for white pixel, and binary value 0 is for black pixel. So, sum of the pixel values of wrinkle area in binary face image is directly proportional to wrinkle present in the face as shown in Fig. 1(b).

- Feature 7= (sum of pixel values in forehead area / number of pixels in forehead area) + (sum of pixel values in left eyelid area / number of pixels in left eyelid area) + (sum of pixel values in right eyelid area / number of pixels in right eyelid area) + (sum of pixel values in left eye corner area / number of pixels in left eye corner area) + (sum of pixel values in right eye corner area / number of pixels in right eye corner area)

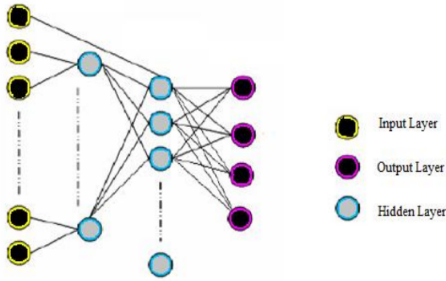## C. Age Classification using Neural Network

Fig. 3. Neural Network Structure

To achieve the target, we have constructed NNs. The neural network has 7 inputs representing the face features parameters in addition to the wrinkles on the face.
The Neural Network structure i.e. used in the proposed method is shown in the figure. There are 7 neurons used for the input. Two hidden layers are used. Six inputs that are given in the NN are the distance between the face parameters and the seventh input is obtained from the wrinkle analysis.

VI. Recources Required

- SCIKIT-LEARN
- PICKLE
- MATPLOTLIB
- NUMPY
- PANDAS
- OS/SYS
- CV2
- KERAS
- TENSORFLOW

VII. Expected Outcome

Prediction of gender and age with minimum deviation and maximum accuracy.

VIII. References

[1] DAGER: Deep Age, Gender and Emotion Recognition Using Convolutional Neural Networks
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[2] Age identification of Facial Images using Neural Network
Link - http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.301.2519&rep=rep1&type=pdf

[3] Age Estimation from Face Image using Wrinkle Features Network
Link - https://core.ac.uk/download/pdf/82570713.pdf