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Real Time Gender and Age Prediction using Deep Learning Techniques

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Abstract: ***Face recognition plays a vital role in security purpose. In recent years, the researchers have focused on the pose illumination, face recognition, etc,. The traditional methods of face recognition focus on Open CV's fisher faces which results in analyzing the face expressions and attributes. Deep learning method used in this proposed system is Convolutional Neural Network (CNN). Proposed work includes the following modules: [1] Face Detection [2] Gender Recognition [3] Age Prediction. Thus the results obtained from this work prove that real time age and gender detection using CNN provides better accuracy results compared to other existing approaches.***

Keywords : Convolutional Neural Network (CNN), Face Recognition, Feature Extraction, Open CV's fisher faces.

I. INTRODUCTION

Face recognition plays an elementary role in social interactions. Languages reserve completely different salutations and descriptive linguistics rules for men or girls, Despite the essential roles these attributes play in our daily lives, the facility to mechanically estimate them accurately and faithfully from face pictures remains removed from meeting the requirements of business applications. Previous approaches [1] estimate and classify these attributes from face pictures have relied on variations in facial feature dimensions or "tailored" face descriptors. Some approaches area unit supported solely face recognition [2] which ends in recognizing the face by considering the big information set. Few of these past strategies were designed to handle the assorted challenges of free imaging conditions.Example for real time dataset for face recognitionFig 1. provides an example for real time dataset for face recognition.

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Fig. 2. shows Face Detection, Landmark Localization, Pose Estimation, and Gender Recognition using Deep Learning Framework [10].

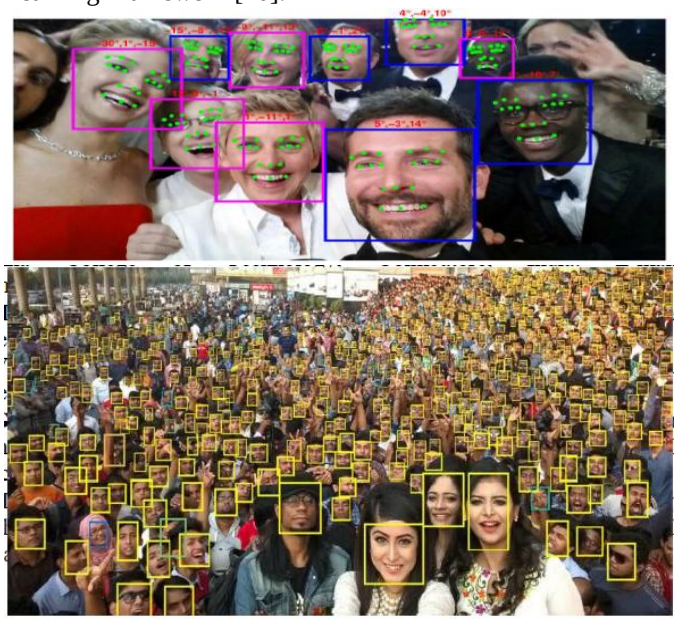


Fig. 1.**Deep learning framework for face recognition**

II. LITERATURE SURVEY

Wei-Lun Chao et al describes the new age estimation framework byconsidering the intrinsic properties of human ages, which is used to improve shortcomings of dimensionality reduction [3].

Kouzani et al proposed many techniques which are knowledge based on arrangement of geometry features which include size, shape and texture [4].

Kurmi et al [5] proposed a rapid matching and compactness representation of images to overcome the drawbacks of model-based strategies. Main advantage of this framework is reduction of complexity of face detection.

Zafaruddin et al suggested a method which is based on global representation of image for identifying entire images. This proposed model is divided into three classes which includes non-linear, linear and neural [6].

III. PROPOSED METHODOLOGY

Proposed methodology consists of four phases namely 1) Real Time dataset, 2) Pre Processing, 3) Feature Extraction that extracts the unique features such as skin texture, beard, moustache, hair and 4) Classification is the combination of both gender and age predictions which has certain classes in it.

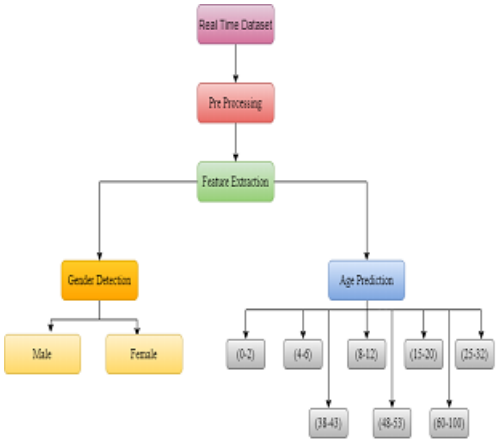


Fig. 2. Overflow chart of Proposed Methodology

A. Real Time Dataset

Initially, the Webcam is triggered by the capture function according to the code functioned using Python framework. Once the face is detected by Webcam it recognizes the face and captures it which will be preprocessed later.

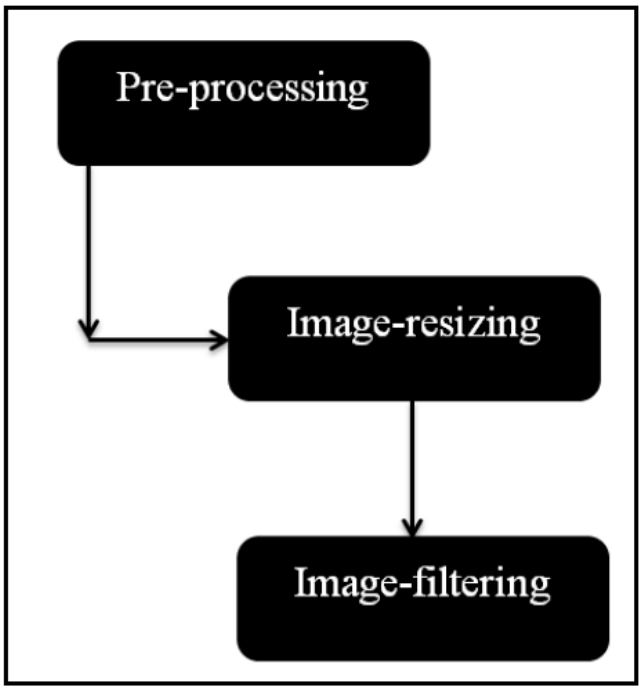


Fig. 3. Various preprocessing methods of proposed work

B. Pre Processing

The caught pictures are rescaled to 256 × 256 and they are resized to measure of 227 × 227. When the pictures are resized separating strategy is applied [7]. Fig 4 shows the two kinds of preprocessing applied in this proposed framework

There are three ensuing convolutional layers are characterized as follows.

(1) 96 channels of size 3×7×7 pixels are applied to the contribution inside the first convolutional layer, trailed by an amended administrator (ReLU), a maximum pooling layer taking the maximal estimation of three × 3 areas with two-pixel strides and a zone reaction standardization layer. (2) The 96 × 28 × 28 yield of the past layer is presently prepared constantly convolutional layer, containing 256 channels of size 96 × 5 × 5 pixels. Once more, this is frequently trailed by ReLU, a maximum pooling layer and a zone reaction standardization layer with a proportional hyper parameters as in the past.

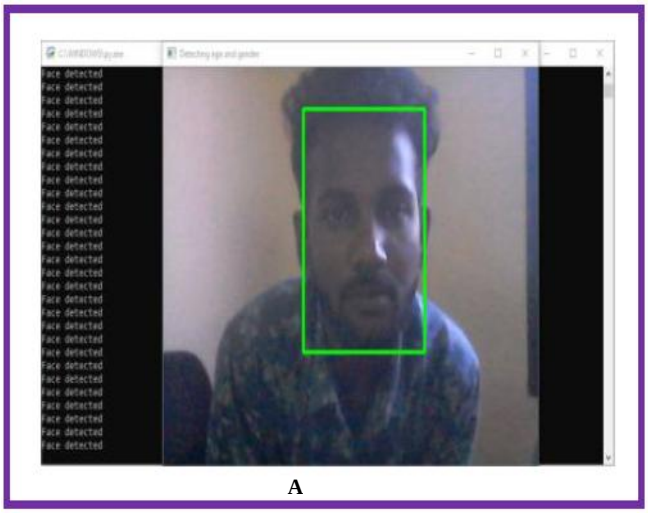
(3)Finally, the third and keep going convolutional layer works on the 256 × 14 × 14 mass by applying a gathering of 384 channels of size 256 × 3 × 3 pixels,Again, this is regularly trailed by ReLU and a maximum pooling layer.

The completely associated layers are then characterized as follows:

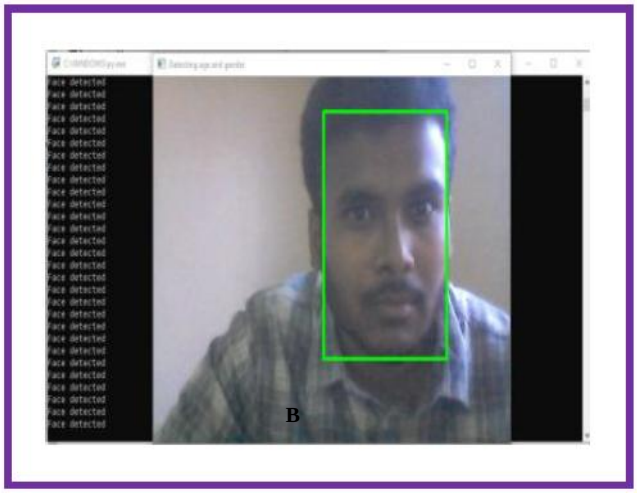
(4) essential completely associated layer that gets the yield of the third convolutional layer and contains 512 neurons, trailed by a ReLU and a dropout layer.

(5) A second completely associated layer that gets the 512-dimensional yield of the essential completely associated layer and again contains 512 neurons, trailed by a ReLU and a dropout layer.

(6) A third, completely associated layer which maps to a definitive classes for age or sexual orientation. At long last, the yield of the last completely associated layer is taken care of to a delicate max layer that doles out a likelihood for each class. The forecast itself is framed by taking the class with the maximal likelihood for the given test picture.pixels,Again, this is often followed by ReLU and a max pooling layer.



A



B

Fig. 4. (a),(b). Real Time Face Detection

Face when exposed to Webcam it capture the face and preprocess it by resizing and applying filtering technique as shown in fig 5(a), (b).

C. Feature Extraction

Feature extraction identifies the feature which is necessary to detect the gender and age of the particular person who is involved in this process and it observes the skin textures, Hair, moustache and beard to predict the gender and age respectively.

- **Gender Detection***:* Gender Detection is the procedure followed by Pre Processing and afterward gender (male or female) is lead to identification [8]. The gender determination phase comprises of two fundamental characterizations. By prompting the CNN's (Convolutional Neural Network) calculation the comparison is to be held right now finding the least complex way to gender discovery, for example, Length of the hair, Beard, Moustache and skin texture. Every single highlights which are extricated by CNN's calculation. Fig 6 (a),(b) depicts real time gender detection using CNN.

(a)

(b)

Fig. 5. (a),(b). Real Time Gender Detection

- **Age prediction:** Age Prediction consists of eight several classifications, they are (0-2), (4-6), (8-12), (15-20), (25-32), (38-43), (48-53) and (60-100). By CNN's(Convolutional Neural Network) algorithm the comparison is to be held to predict the age of the particular individual. The main feature which is extracted to predict the age is Texture of the skin, Skin texture varies for different age group [9]. For example the skin texture of a kid is comparatively softer than the aged people and then the aged people and youngsters. In which the frame is captured while the face is detected in real time video format and then it converts the captured face image to a gray scale image and then age is predicted by extracting the texture of the skin.

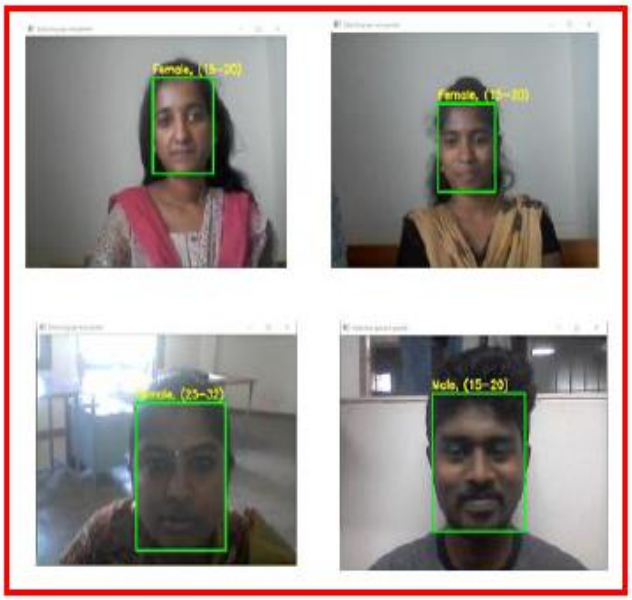


Fig. 6. Real Time dataset for age prediction

IV. PERFORMANCE ANALYSIS

Result of CNN for face recognition has been tested for 250 real time datasets. CNN when applied accuracy of 90.15% whereas existing traditional methods provides only 87.95%. Table-1 depicts the performance analysis of existing system and proposed system in terms of accuracy. Fig 8 shows the graphical representation of Performance Analysis.

Table- I: Performance Analysis of CNN and existing approach.

Performance Metrics	Existing System	Proposed System
Accuracy	87.95%	90.15%

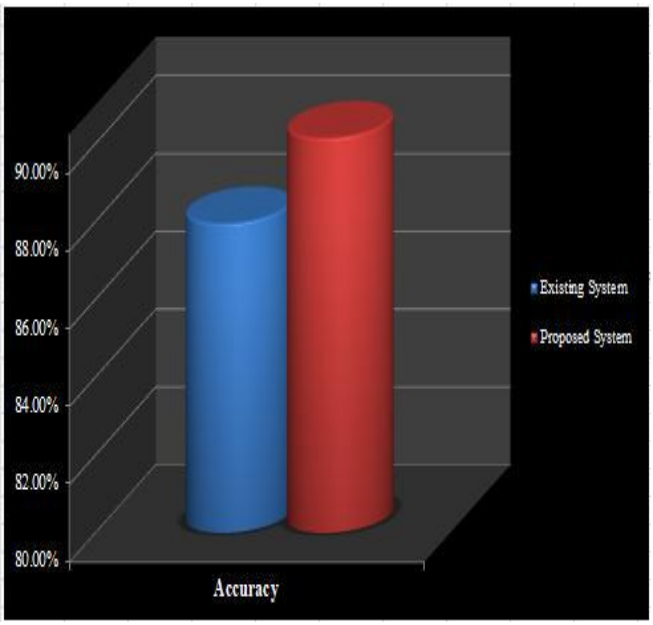


Fig. 8. Graphical representation of performance analysis.

V. VALIDATION

Table- II: Validation proof of proposed approach.

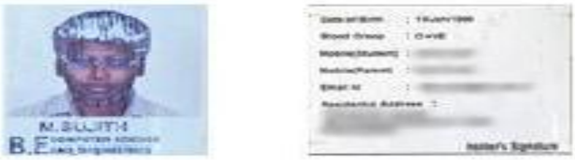
PHOTO	ID PROOF	VALIDATION
	 M.SUJITH	
	 M.SUSHMITHA	
	 R.SRASRIRAMI	
	 V.JAISWARYADEVI ASSISTANT PROFESSOR	
	 S.THIRAIMATHI	
	 HAGAVATHI SRINIVAS	

Table II shows validation proof of results obtained by our proposed work

VI. CONCLUSION

Deep learning which a subset of machine learning is provides more accurate results when applied in image processing. This proposed work includes real time dataset collection, followed by pre-processing and classification. Using those image processing techniques real time face datasets are analysed and their gender and age is predicted. Performance analysis is done in terms of accuracy where 90.15% is obtained for CNN whereas 87.95% for existing system.

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