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Age and gender detection using deep learning

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Abstract - *The extraction of auxiliary data from various biometric approaches, including fingerprints, faces, iris, palms, voices, etc., is currently the subject of research. Gender, age, beard, mustache, scars, height, hair, skin tone, glasses, weight, facial scars, tattoos, and other traits are all included in this data. Each piece of information acquires relevance during identification. One of the most important developments in facial recognition is the ability to determine a person's age and gender. Given the significance of age and gender in social interactions, it might be challenging to infer these two facial characteristics from a single-face photo. The term "computer vision" refers to the several terminologies used to scan images and determine an individual's age and gender.*

***Key Words*: Age, Gender, Detection, Features, Extraction, Data Visualization, Classify, CNN, proposed framework, Training data.**

I. INTRODUCTION

In recent years, data from a human face has been used in numerous real-world applications, including social networking, security monitoring, advertising, and entertainment. Automatic age and gender prediction from face images is a key field for computer vision researchers because it plays a crucial role in interpersonal communication. Face analysis has attracted the attention of academics in fields including demographic data gathering, surveillance, human-computer interaction, marketing intelligence, and security because face analysis includes a crucial component called face age and gender recognition. Both healthy and ill people are paying more heed to nutrition advice lately. [5] This essay focuses on giving dietary recommendations to people according to their age and gender. Numerous techniques exist for identifying a person's gender based on their biological characteristics, mannerisms, and behaviors. The features of a person can give away precise information about them, including their age, gender, mood, ethnicity, and expression. Gender identification from a person's facial image is a difficult application in the field of computer vision, image analysis, and artificial intelligence, which categorizes gender based on masculinity and femininity. A binary classification problem leads to the assignment of a gender category to an individual. Gender identification is one element of facial analysis that concentrates on classifying the images in a controlled environment. According to, gender classification is necessary in an uncontrolled context. The gender of a person gives additional information that makes retrieval quick and accurate. It is crucial to identify the data present in the photos. For the purposes of detection, the data that the image includes must be altered and manipulated. Different kinds of strategies are used for both problem detection and solution. In a facial recognition method: There is a wealth of information contained in the looks on the faces. There are numerous expressions involved whenever a person interacts with another person. Calculating certain parameters is made easier by modifying expressions. Age estimate is a multi-class problem in which different categories of years are used. It is challenging to compile the photographs because people of different ages have different facial features. There are numerous age-detecting techniques. The preparation is applied to the image. The convolution network is used to extract features from the neural network. The image is then assigned to one of the age classes based on the trained models. The photos' features are taken out for additional processing. After more processing, the features are transmitted to the training systems. The databases offer a study of the facial features and aid in face detection to prove the age of the subject in the picture.

II. LITERATURE SURVEY

The study entails a thorough documentation of individual differences based on age, gender, identity, and other characteristics. In 2001, D. Kornack and P. Rakic proposed Adult Primate Neocortex [1]. Age estimation using convolutional network was introduced by Chenjing Yan. The face-matching brain activation tests are carried out and tested outside of the scanner. In terms of facial processing, both older and younger persons showed the same results. M. Young with proposed identical facial perspectives in both scenarios, performance is excellent [2]. There is no single cause for the aging of the elderly. The accounting of such findings is the consequence of a mix of many elements. The findings, which are based on all credentials stored in certain environments, need to be monitored. In this research, Hang Qi et al [3]. Made the claim that a number of methods have emerged for the detection of faces that can also determine a person's age. Here, an automated system that can determine the age and assist in differentiating between a child's and an adult's face has been suggested. The system is composed of three components. A. Kumar and F. Shaik's theory about age categorization, face alignment, and face detection are the three [4]. The standard face detection and alignment techniques are used to build the face samples. Eran Eidinger, Roee Enbar, and Tal Hassner's theory helps with unfiltered face. [6] The local face components that are visible in the

photos are extracted using ICA. It has been demonstrated that this system is substantially faster and that the outcomes are effective. Aditya K. Saxena, Shweta Sharma and Vijay K. Chaurasiya used curvalet domain[7]. Therefore, this system may be used as a prototype in the future. The Conditional Probability Neural Network (CPNN), a distributed learning technique used for age prediction from facial expressions, was proposed by Chao Yin et al in the paper. Age estimation using a hierarchical classifier based on global and local facial features [8]. The goal values and the conditional feature vectors are utilized as the input in a three-layer neural network-based model. This may aid in its learning of actual ages. The neural network's link between the facial image and the associated label distribution is how this system learns. According to the earlier strategy, the connection should be applied in accordance with the maximum entropy model[9] . CPNN has demonstrated that it outperforms all previously developed methodologies in terms of results. Results were easily obtained using this procedure, and there was computationally involved and the outcomes are very efficient and good in this case.

III. IMPORT LIBRARIES

Before we actually get into the model-building phase, we need to ensure that the right libraries and frameworks have been installed. The below libraries are required to run this project:

Pip install OpenCV

Python numpy

pip install pafy

pip install youtube_dl

pafy : Pafy library is used to retrieve YouTube content and metadata.

IV. METHODOLOGY

Deep Learning

A kind of artificial intelligence (AI) called deep learning aims to replicate the human brain by learning from experience. These representations are learned through an instructional process. We must first train the software with a huge number of object photos that we categorize into several classes in order to teach it how to detect an object. On average, deep learning-based algorithms need more training data and take longer to train than conventional machine learning techniques. Finding distinctive characteristics when attempting to identify any object or character in an image takes effort and complexity. When applying deep learning techniques, issues can be resolved as opposed to classical machine learning, where features are automatically extracted from data. An elaborate neural network with hidden layers is known as deep learning.

Convolution Neural Network (CNN):

CNN, a sort of artificial neural network, is often used for categorizing and recognizing objects in images or pictures. Using a CNN, deep learning can identify items in an image. An input layer, hidden layers, and an output layer make up a conventional neural network. The structure of the human brain served as inspiration for CNN. Artificial neurons, also known as nodes, in CNNs, accept inputs, process them, and then provide the outcome as an output, much like a neuron in the brain does when sending information between cells. The images are used as a source of data. There may be numerous hidden layers in CNN's, and each one employs mathematics to extract features from the image. The layer at the bottom that divides features from inputs is the convolution layer.

V. ALGORITHM:

When an image is taken from a great distance and traits that resemble haar are used, gender recognition can be somewhat challenging. We came up with a simple but effective solution for this issue. We used a cascading approach. ROI (Region of Interest) serves as our face in this study. As shown in fig-5.1 we gave the classifier the ROI image. We attempted to identify the female face in this document. 500 photos of women and 500 photographs of men were used to train our haar cascade classifier. In order to practice, we used frontal face photos with external elements like a hairdo, makeup, and accessories like earrings and glasses. This research attempts to identify an object that has positive XML training. In our instance, we only use good and negative images of men and women.

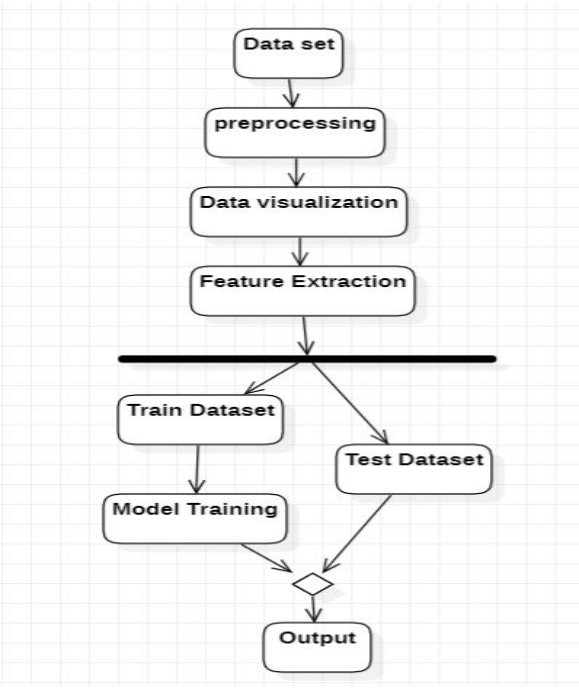

Fig: 5.1 Flow chart

VI. INPUT

This study's major objective is to streamline and accelerate a whole system. The data can be entered into the algorithm in a number of different ways to expedite the process. To begin, the user can immediately gather data by using the system's webcam or similar webcam digital device.

VII. FACE DETECTION

A piece of software called a face recognition system may compare a human face in a frame of video or a digital image to a database of faces. Some natural (lighting, posing angles, facial labeling) and digital (noise, interference) adjustments are made when a face is detected in a frame. The challenge of recognizing a human face is caused by two characteristics of a human face as a template: (1) There are a huge and almost definitely infinite number of templates, or faces to be classified. (2) Almost all patterns resemble one another. To resolve this issue and make the algorithm as effective as possible, we can use a variety of audience records. The audience set also serves as a benchmark for gender categorization in neural networks.

VIII. FACE PROCESSING

If a face is discovered following the face detection process. To start processing, a convolutional neural network, or CNN, might be employed. This particular deep neural network is used largely for image processing. During its training phase, CNN generates a range of estimates. It's a type of deep neural network that's frequently employed in image processing and NLP. CNN will conduct the actual training phase, and many forecasts will be made. The two genders that can be anticipated are male and female. Estimating age is a multi-class job where the eras are broken down into groups. It's challenging to compare the facial features of persons of different ages because they have to get precise data. To expedite the process, we separated the population into several age groups. Eight kinds of age estimations are possible: (0- 2), (4-6), (8-12), (15-20), (25-32), (38-43), (48-53), and (60–100).

IX. OUTPUT

Launch the path of the code directory into the command prompt. Then the path to the location of the code has been set. Now, execute the code using the command python filename.py. The project window appears on the screen which begins to identify the object in front of the webcam. If the object is identified, the algorithm classifies the gender type along with age group as shown in below fig-9.1 .

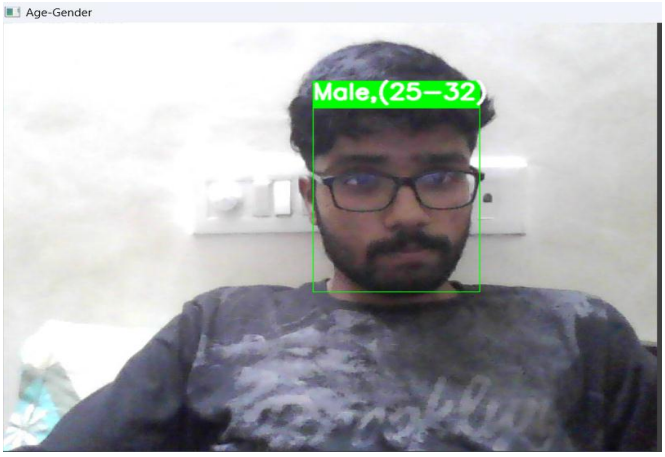

Fig: 9.1 Output

X. CONCLUSIONS

This project's discoveries regarding age-estimating contributions and gender categorization can be used to solve challenges in real-time applications. Although age and gender classification concerns were addressed by earlier systems, much of this research was previously restricted to constrained photos taken in lab settings. The visual discrepancies that are common in real-world photos on social media platforms and in online archives are not sufficiently reflected by such settings. On the other hand, it is more difficult to find photographs online because there are so many more of them. We examine Deep-performance CNNs on these tasks using Internet data and a related field's example of facial recognition. We present our results utilizing a lean Deep Learning architecture that avoids overfitting due to the absence of labeled data. In particular current network topologies, our network is "shallow", minimizing the number of parameters and the risk of overfitting.

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XII. REFERENCES

[1] Turabzadeh, Saeed, Hongying Meng, Rafiq M. Swash, Matus Pleva, and Jozef Juhar. "Real-time emotional state detection from facial expression on embedded devices." In 2017 Seventh International Conference on Innovative Computing Technology (INTECH), pp. 46- 51. IEEE, 2017.

[2] Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton. "Imagenet classification with deep convolutional neural networks." In Advances in neural information processing systems, pp. 1097-1105. 2012.

[3] A. Kumar and F. Shaik," Importance of Image Processing", 2016.

[4] Eran Eidinger, Roee Enbar, and Tal Hassner,"Age and gender Estimation of Unfiltered Faces", 2014 in IEEE.

[5] Aditya K. Saxena, Shweta Sharma and Vijay K. Chaurasiya," Neural Network based Human Age-group Estimation in Curvelet Domain", 2015 The Authors Published by Elsevier.

[6] J. Chen, S. Shan, C. He, G. Zhao, M. Pietikainen, X. Chen, and W. Gao. Wld: "A robust local image descriptor", Trans.Pattern Anal. Mach. Intell., 7. S. E. Choi, Y. J. Lee, S. J. Lee, K. R. Park, and J. Kim. "Age estimation using a hierarchical classifier based on global and local facial features", Pattern Recognition, 44(6):1262–1281, 2011

[7] Hang Qi and Liqing Zhang," Age Classification System with ICA Based Local Facial Features", 2009 Springer-Verlag Berlin Heidelberg.

[8] Chenjing Yan, Congyan Lang, Tao Wang, Xuetao Du, and Chen Zhang," Age Estimation Based on Convolutional Neural Network", 2014 Springer International Publishing Switzerland.

[9] Dehghan, Afshin, Enrique G. Ortiz, Guang Shu, and Syed Zain Masood. "Dager: Deep age, gender and emotion recognition using convolutional neural network." arXiv preprint arXiv:1702.04280 (2017).