

Age and Gender Detection

Parth Anand Wadkar
Vishwakarma Institute of
Technology,Pune

Varad Wangikar
Vishwakarma Institute of
Technology,Pune

Prof. Pramod Kanjalkar
Vishwakarma Institute of
Technology,Pune

Abstract:- Due to the technological advancements made by mankind, the 21st century represents the beginning of an era of unfathomable accomplishments. The technologies indicated above can be used to our advantage to determine someone's age and even gender based on their glance into a camera, photograph, or even a video. This study paper will carefully outline the entire process, the approaches and algorithms that can be employed, the most accurate one, and how it all fits together. Additionally, it will emphasize how crucial it is and how applying it can improve our day-to-day lives. The main goal of the research is to develop a gender and age detector using deep learning on the audience dataset that can roughly predict the gender and age of a picture of someone's face. Additionally, to overcome the issues of accuracy and timing in order to obtain the most accurate predictions and results. Additionally, the map for how this technology can be used for our advantage and a look at the broad range of applications where it can be used, from dating apps to matrimonial sites, from security services, CCTV surveillance, and policing.

Keywords:- Convolution Neural Network, Artificial Intelligence, Machine Learning.

I. Introduction

Images and videos are what keep today's world running, from security services to watching movies of adorable dogs, but these images and videos can help bring about a change in how people behave and can aid in the efficient and convenient operation of the authorities. Understanding the application of the prediction model that will be created, how it may be integrated into our daily lives, and how it can contribute to a safer world. Our model will be able to determine a person's age and gender simply by looking at an image or video, which could be CCTV surveillance footage, thanks to the prediction algorithm that will be used. But the thought occurs: Why is it required? I'll provide a straightforward illustration to address your query: A man on the run after stealing \$5 million from Pacific Standard Bank. Multiple fake identities have prevented his identity from being proven up to this point. However, the police are aware of the person's age and gender. Everyone who fulfils the age and gender specifications will be extensively examined using this algorithm, which can be used as a visual surveillance model in the surveillance cameras in a 1-mile radius of the bank.

II. COMPUTER VISION

With the help of computer vision, computers are now able to analyse digital photos and movies as if they were real-world objects. The difficulties it encounters are mostly brought on by biological vision and the advantage humans have over machines due to the millions of years of development our civilization has undergone. The computer has difficulties with this because it is unable to comprehend biological vision. Computer vision primarily entails collecting, processing, analyzing, and comprehending digital images in order to extract information from the real world and produce symbolic or numerical data that is used to make decisions. This procedure involves various training, such as object recognition tracking a video.

III. LITERATURE REVIEW:

[1] B. Abirami , T.S. Subashini, V. Mahavaishnavi ,“Gender and age prediction from real time facial images using CNN”, This research assessed how to automatically determine a person's age and gender using real-time face photographs. The haar cascade pretrained model was used for face identification, and the area of the found face was added to the CaffeNet CNN architecture.

Inside this CaffeNet model, a total of 1250 photos were trained, with 650 pictures being female and 600 being male. The system delivered a total accuracy of 68.89%.

[2] Sai Challa, Sowjanya, Ruchitha Reddy, “Age and Gender Prediction using Face Recognition” In this paper, authors demonstrate that by learning representations using deep-convolutional neural networks, they were able to significantly improve age and gender recognition using the Caffe Architectures of Deep Learning Framework (CNN). They suggest a considerably more straightforward convolutional net architecture that can be used even in the absence of learning data.

[3] Vaibhav Malik,Vanshaj Rathi,Vanshika Jaiswal, “Compute Age and Gender of Person through ML”, Two key inferences are drawn from their findings. First, CNN can be used to classify people's ages and genders more accurately, even when studying marked contemporaneous unconstrained samples that are substantially smaller in size. Second, by using our model, others working on similar projects or projects in the future that will require more training data sets can further enhance the system.

IV. LIBRARISE USED

• *Opencv*

OpenCV, which stands for "open source computer vision," is a computer vision and machine learning library that is free and open source. This library is primarily used for real-time image and video processing, as well as for business analytics. Additionally, it supports a variety of Deeo learning frameworks, including Cafe and TensorFlow. Due to the structure of Opencv, numerous shared or static libraries are included in the package.

• *Tensorflow*

Google developed and made available the Python library TensorFlow, which is used for quick numerical computation. It is a foundation library and is primarily used to directly create deep learning models, occasionally using wrapper libraries to make the process that is built on top of tensorFlow more straightforward.

• *Keras*

In essence, Keras is a high-level Application Programming Interface (API) of Tensorflow; it offers the fundamental building blocks and abstractions required for the creation and delivery of machine learning solutions coupled with a very high iteration rate. Without Keras, it would not have been feasible to fully utilise Tensorflow's scalability or its cross-platform capabilities. Keras supports engineers and researchers and encourages users to do so. You may export the Keras models to run in Google Chrome or any other browser on any smartphone or mobile device, as well as on a sizable cluster of GPUs or TPU.

• *Math*

Almost all programmes that require mathematical functions use this library, which is the most basic one. Access to them, as described by the C-standard, is made available by this module.

Complex numbers cannot be used with this module's functions since there is no support for them. Another module called "cmath" helps offer the support for all the complex number functions that may be required in order to accomplish that. This distinction was made since the majority of consumers don't need or comprehend complex numbers. As a result, it is not included in the basic math module. Most users manipulate numbers directly to conduct both simple and complex mathematical operations. Furthermore, receiving an exception in an "if-else" or other conditional statement case is simpler than receiving a complicated result and requiring the programmer to ascertain the result in order to execute the conditional statement.

V. FLOWCHART

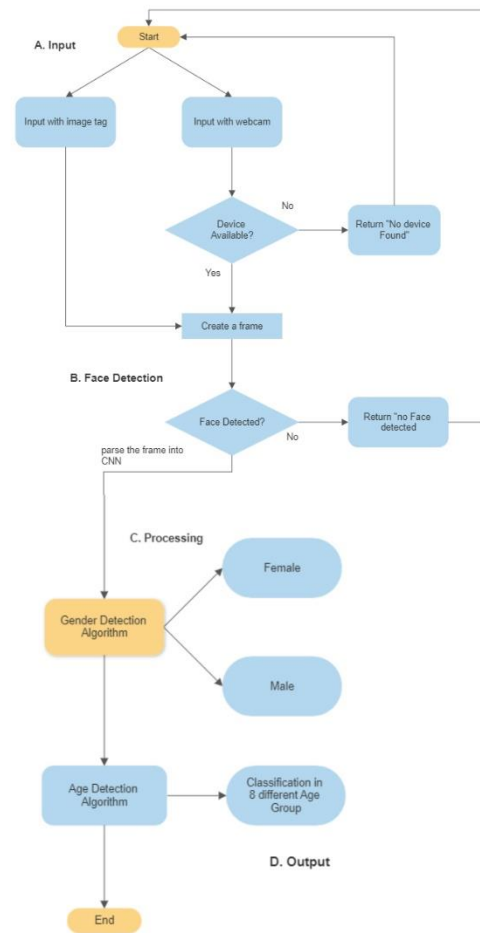


Fig 1: System workflow

VI. FRAMEWORK

Here, the preexisting model known as opencv face detector.pbtxt is used to construct the function highlightface(), which will receive the image from the data set or can take the real-time image and detect the distinctive facial dimensions in the image. First, the model is used to identify the face's width and height. Second, the blobfromimage function, one of the most essential deep learning algorithms, is introduced during image recognition (). The image is prepped using this function.

This technique works by attempting to elevate your image to the same level of property as the source image. The researchers that developed or used these models examined a variety of photographs that they had amassed themselves and stored in their own database. According to the level of properties like brightness, profile, and saturation, those images are totally different. In order to use the image for detection, the function blobfromimage() strips the image of all variables and additional factors, converting it into this minimal format.

VII. IMPLEMENTATION

```
import cv2
import os
import math
```

These libraries, which were explained earlier in the section on how to use libraries, have been imported.

```
def detectFace(net, frame, confidence_threshold=0.7):
    frameOpencvDnn=frame.copy()
    print(frameOpencvDnn.shape)
    frameHeight=frameOpencvDnn.shape[0]
    frameWidth=frameOpencvDnn.shape[1]
    blob=cv2.dnn.blobFromImage(frameOpencvDnn,1.0,(227,227),[124.96,115.97,106.13],swapRB=True,crop=False)
    net.setInput(blob)
    detections=net.forward()
    faceBoxes=[]
    for i in range(detections.shape[2]):
        confidence=detections[0,0,i,2]
        if confidence>confidence_threshold:
            x1=int(detections[0,0,i,3]*frameWidth)
            y1=int(detections[0,0,i,4]*frameHeight)
            x2=int(detections[0,0,i,5]*frameWidth)
            y2=int(detections[0,0,i,6]*frameHeight)
            faceBoxes.append([x1,y1,x2,y2])
            cv2.rectangle(frameOpencvDnn,(x1,y1),(x2,y2),(0,255,0),int(round(frameHeight/150)),8)
    return frameOpencvDnn,faceBoxes
```

The highlight face function that we created is this. In order to successfully carry out this operation, the network and the frame images are used as the parameters.

1. A copy of the framework is generated in order to face the facial dimensions.
2. By using blobfromimages, the copies were transformed into blobs.
3. After setting the input, the network receives a forward pass.
4. The confidence is defined in the range 0-1 for each value in 0 to 127 for the empty list face Boxes. Coordinates x1, y1, x2, y2 are obtained when the confidence beats the threshold of 0.7(as defined in the parameter).
5. The coordinates are appended to the list faceBoxes.
6. Each list of coordinates in the faceBoxes accounts for the rectangles on the image.
7. The function returns the copy of frame as well as list of faceBoxes.

```
faceProto='opencv_face_detector.pbtxt'
faceModel='opencv_face_detector_uint8.pb'
ageProto='age_deploy.prototxt'
ageModel='age_net.caffemodel'
genderProto='gender_deploy.prototxt'
genderModel='gender_net.caffemodel'
```

VideoCapture() function from openCV library is used to read the image. It either gets the image from argument parser or else it will get a live image using the webcam i.e. VideoCapture(0) by setting padding value as 20.

Now a while loop is used to continuously read the image until any key is pressed. Live Stream from webcam is read and then stored in hasframe and frame. A waitkey is again called followed with break. This is when it is not a live video and an image is read from argparse.

facehighlight() function is called with face detection network configuration (facenet) and frame as parameters and the output is stored in variables resultimg and faceboxes.

If the network does not recognise any face then faceboxes list would be empty and hence a message is displayed saying "no face detected".

Imshow is used to display the result.

```
videocv2.VideoCapture(0)
padding=20
while cv2.waitKey(1)<0:
    hasframe,frame=videocv.read()
    if not hasframe:
        cv2.waitKey()
        break
    resultimg,faceboxes=detectface(facenet,frame)
    if not faceboxes:
        print("No face detected")
    for faceBox in faceboxes:
        face=frame[max(0,faceBox[1]-padding):min(faceBox[3]-padding,frame.shape[0]-1),max(0,faceBox[0]-padding):min(faceBox[2]-padding,frame.shape[1]-1)]
        blob=cv2.dnn.blobFromImage(face,1.0,(227,227),[124.96,115.97,106.13],swapRB=True,crop=False)
        genderNet.setInput(blob)
        genderPreds=genderNet.forward()
        gender=genderList[genderPreds[0].argmax()]
        ageNet.setInput(blob)
        agePreds=ageNet.forward()
        age=ageList[agePreds[0].argmax()]
        cv2.putText(resultimg,f'{gender},{age}',(faceBox[0],faceBox[1]-10),cv2.FONT_HERSHEY_SIMPLEX,0.8,(0,255,255),2,cv2.LINE_AA)
        cv2.imshow("detecting age and Gender",resultimg)
    if cv2.waitKey(5) & 0xFF == ord('q'):
        break
cv2.destroyAllWindows()
```

VIII. RESULT

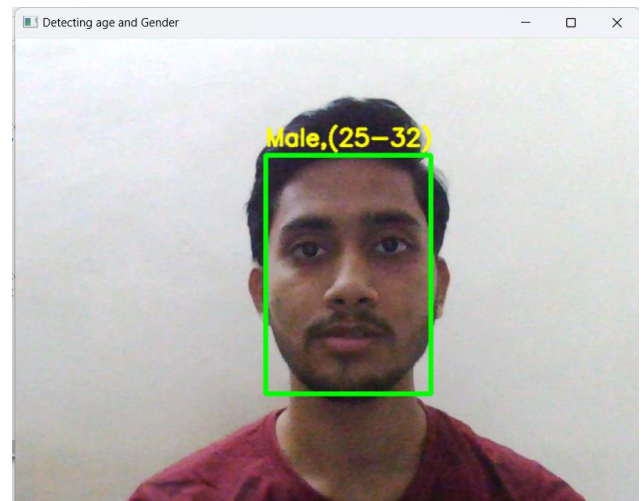


Fig 01. Image test 1

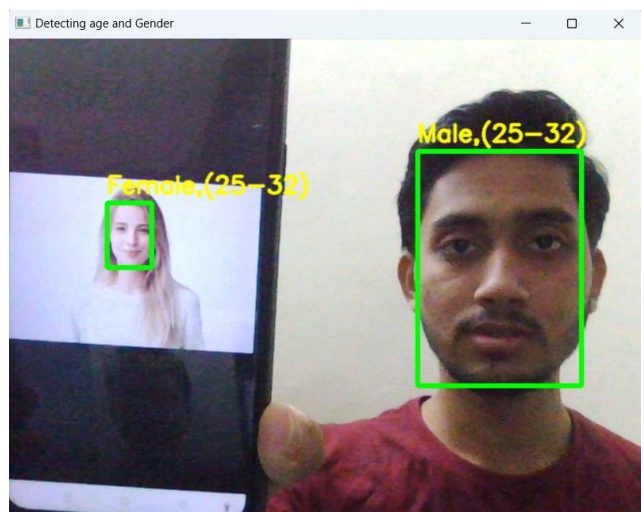


Fig 02. Image test 2

IX. CONCLUSION

In order to reliably identify the gender and age range of a person from a single image of their face, deep learning and convolutional neural networks will be used in this Prototype moving forward. The image might be a part of a certain dataset, it might be parsed once through the prototype, or it might even be real-time if no arguments are parsed. The expected age may fall within one of the following ranges, and the predicted gender is binary, falling into the categories of "Male" and "Female" (0-2). (4- 6). (8-12). (15-20), (21-24), (25-32), (38-43), (48-53), (60-100).

REFERENCES

- [1]. B.Abirami, T.S.Subashini, V.Mahavaishnavi,"Gender and age prediction from real time facial images using CNN",Selection and peer-review under responsibility of the scientific committee of the International Conference on Nanotechnology: Ideas, Innovation and Industries , Volume 33, Part 7, 2020, Pages 4708-4712
- [2]. Vaibhav Malik¹, Vanshaj Rathi², Vanshika Jaiswal³, Anil Kumar Dubey⁴, "Compute Age and Gender of Person through ML" , International Research Journal of Engineering and Technology (IRJET),Volume: 07 Issue: 06 | June 2020
- [3]. Sai Teja Challa, Sowjanya Jindam, Ruchitha Reddy Reddy, Kalathila Uthej , " Age and Gender Prediction using Face Recognition , International Journal of Engineering and Advanced Technology (IJEAT) Volume-11 Issue-2, December 2021,
- [4]. Use-case:<https://www.cameralyze.co/blog/age-gender-detection-top-use-cases#:~:text=Age%20and%20gender%20detection%20is,but%20few%20solutions%20were%20available.>