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Implement Face Recognition using Machine Learning

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Abstract: ***It also shows the practical implementation of the Face Detection and Face Recognition using OpenCV with Python embedding on both Windows as well as macOS platform. The aim of the project is to implement Facial Recognition on faces that the script can be trained for. The input is taken from a webcam and the recognized faces are displayed along with their name in real time. This project can be implemented on a larger scale to develop a biometric attendance system which can save the time-consuming process of manual attendance system.***
Keyword: Face recognition, image processing.

I. INTRODUCTION

A face recognition system could also be a technology which is very capable of matching a personality's face from a digital image or a video frame which it has or use it as a reference to map and identify against an info of faces. Researchers' area unit presently developing multiple ways throughout that face recognition systems work. the foremost advanced face recognition methodology, that is to boot used to manifest users through ID verification services, works by pinpointing and mensuration countenance from a given image. While at first a kind of laptop application, face recognition systems have seen wider uses in recent times on smartphones and in alternative kinds of technology like artificial intelligence. as a result of computerized face recognition involves the measuring of a human's physiological characteristics face recognition systems area unit classified as bioscience. though the accuracy of face recognition systems as a biometric technology is a smaller amount than iris recognition and fingerprint recognition, it's wide adopted because of its contactless and non-invasive method. Facial recognition systems area unit deployed in advanced human -computer interaction, video police work and automatic compartmentalization of pictures.

II. METHODOLOGY

Let's devise a theoretical methodology for face detection with OpenCV using Python:

1) Set up Your Environment: Install OpenCV with pip to access the computer vision and image processing functions.
2) Set up Your Environment: Install OpenCV with pip to access the computer vision and image processing functions.
3) Load a Pre-Trained Haar Cascade Classifier:
4) OpenCV has pre-trained classifiers such as Haar Cascades, which are used to detect faces and other objects in images or video. They come in XML file formats which have been programmed to identify certain characteristics in image.
5) Capture Video Stream: An external camera or a video file can be used to capture still pictures or moving video. The OpenCV Video Capture () function lets you retrieve frames from your camera or another video source.
6) Convert Frame to Grayscale: Transform the videos frames to shades of grey. Grayscale image face detection technique is performed more precisely than colour images, so the effort on processing is lessened owing to the absence of colour data.
7) Detect Faces: Execute the detection Multiscale () procedure of the Haar Cascade model to find faces on the most basic level of the grayscale frame. This technique provides the boundaries of images where faces were recognized in the given picture.
8) Draw Rectangles Around Faces: With the discovered heads, draw out the rectangles which will border the areas of interest. This is possible by means of OpenCV rectangle () function.
9) Display Output: Show the video capture with borders of going until the user hits a key to cease. faces added in using Ims how (). The video keeps going until the user hit a key of cease.
10) End Process: After face detection is done, release this approach enables you to conduct real-time Face detection with a webcam, with little setup and processing resources.

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III. CONCLUSION

The progress in science and technology has brought about tremendous advancement in face recognition technology though there is still room for improvement in its real-life applications. In the future, advancements can be made with specialized cameras built for face recognition, which could improve image quality and solve problems of image filtering, reconstruction, and denoising. The incorporation of 3D technology could also complement 2D images, thus solving problems of rotation and occlusion making it hard to solve errors or cases of discrimination.

For example, improper use of face recognition data can be used to non-consensually assess a person's sensual orientation, race, or religion. It is very important to consider how algorithms could be made more interpretable so that such discrimination and incomplete information do not result in incorrect judgments. In addition, there should be ongoing debates regarding how to encourage the emergence of new face recognition technologies without compromising public safety and individual rights.

IV. FUTURE WORK

Face recognition technology has found widespread uses in finance and security owing to its ease. As technology advances, the use of face recognition technology is set to increase, bringing a plethora of use cases. However, the technology has inherent technical, legal, and ethical implications. The technology-driven aspect of face recognition may lead to processing of associated data without proper transparency or control, so it can be challenging to rectify mistakes or cases of discrimination. For example, misusing face recognition information may enable non-consensual determinations of a person's sexual orientation, race, or religion. It is essential to investigate the ways to increase the interpretability of algorithms in order to avoid discriminatory practices and incomplete information that could lead to wrongful decisions. Also, debates need to go on as to how to promote the building of new technologies concerning.

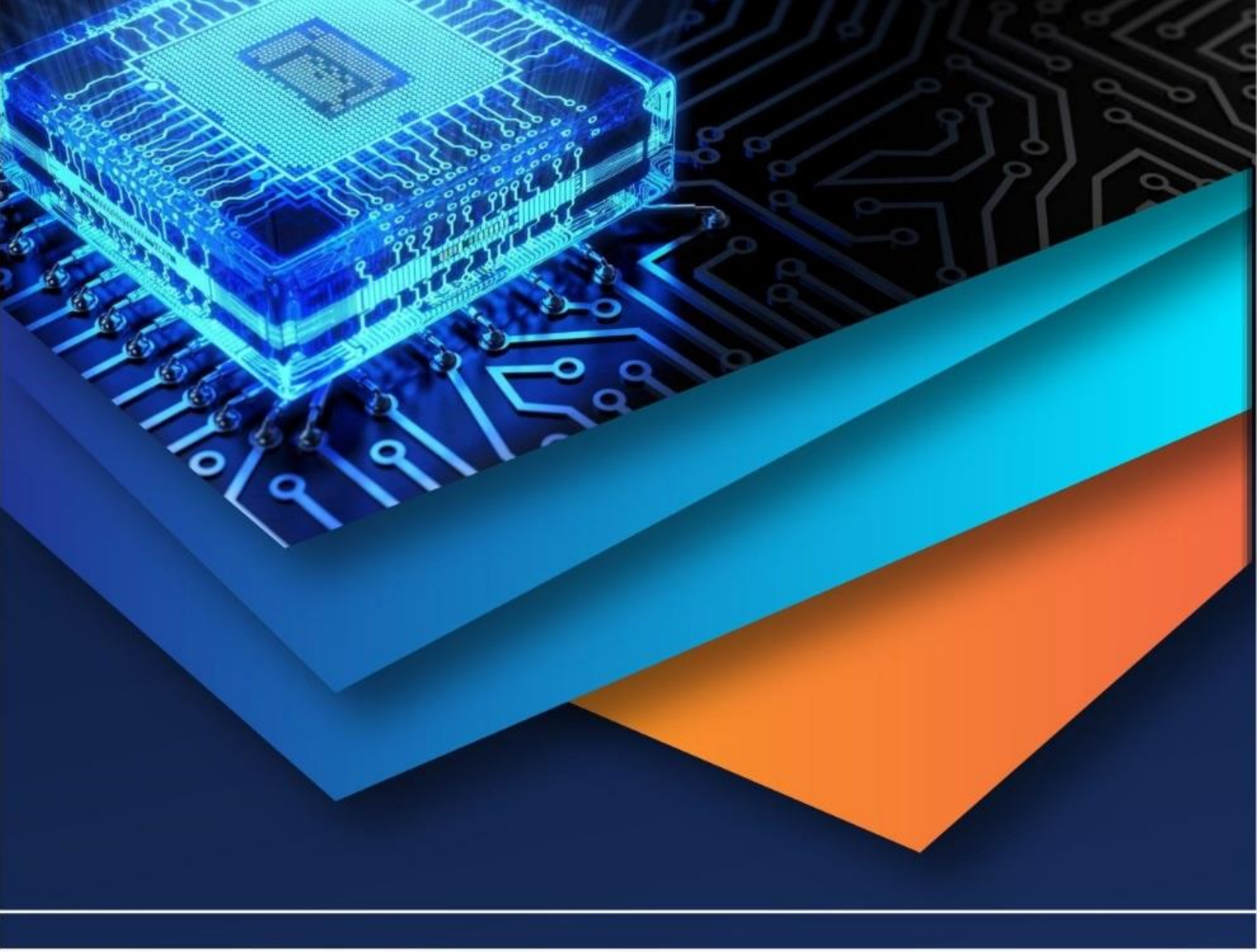
CONFLICTS OF INTEREST The authors affirm that there are no conflicts of interest to disclose.

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