Prathmesh Malvi - 38

Aim: To perform Face detection on Video

Objective: Performing face recognition Generating the data for face recognition Recognizing faces preparing the training data Loading the data and recognizing faces.

Theory:

Face Recognition:

Face recognition is a technique for using a person's face to identify or confirm their identification. People can be recognized in real time, on camera, or in pictures using face recognition algorithms. Deep learning, a branch of machine learning that includes teaching artificial neural networks to spot patterns in data, provides the foundation for facial recognition. A big dataset of face photos can be fed to a deep learning model to train it to detect faces. In order to recognize faces in new photographs, the model first learns to recognize patterns in the images, such as the form of the eyes, nose, and mouth. One of the most used algorithms for facial recognition is convolutional neural networks (CNNs).

Generating the data for face recognition:

Creating a dataset of facial pictures from diverse sources, such as photos or video frames, is normally how face recognition data is generated. To guarantee reliable model training, this dataset should include a wide variety of people, expressions, lighting settings, and backgrounds. To boost dataset diversity and enhance model generalization, data augmentation techniques including rotation, scaling, and noise addition may also be used.

Recognizing faces:

The automated method of locating and differentiating human faces in still photos or moving pictures is known as face recognition. This is examining facial features like the eyes, nose, and mouth to categorize people based on traits like age, gender, or emotions or to match them with

known individuals. The use of facial recognition technology for security, authentication, and customization presents privacy and ethical concerns.

Preparing the training data:

The process of acquiring the information you require and transforming it into a machine-readable and intelligible format is known as data preparation. The first stage in every AI or machine learning project is to gather accurate data, which is frequently more difficult and time-consuming than creating the machine learning algorithms themselves.

Data Preparation consists of several steps:

- Problem Formulation
- Data Collection And Discovery
- Data Exploration
- Data Cleansing And Validation
- Data Structuring
- Feature Engineering And Selection

Loading the data and recognizing faces:

Loading the data and recognizing faces involves the process of acquiring and preprocessing image or video data, followed by applying facial detection and recognition algorithms. Various deep learning methods can be used to recognized faces accurately. For loading dataset we usually use .CSV files which can represents large array of input images in dataset.

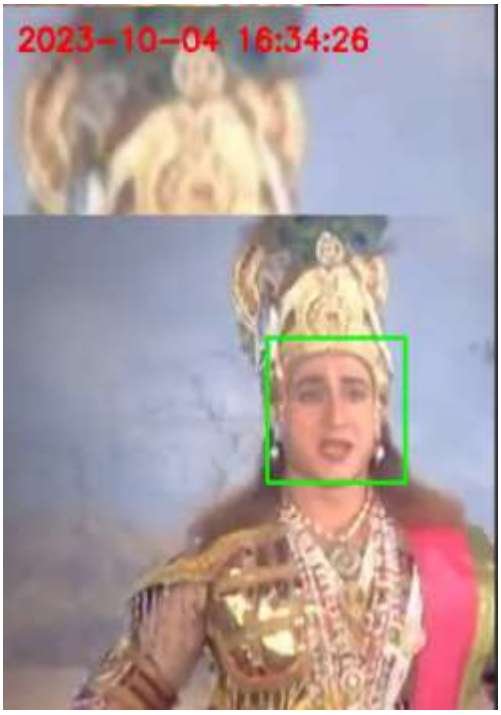
Code:

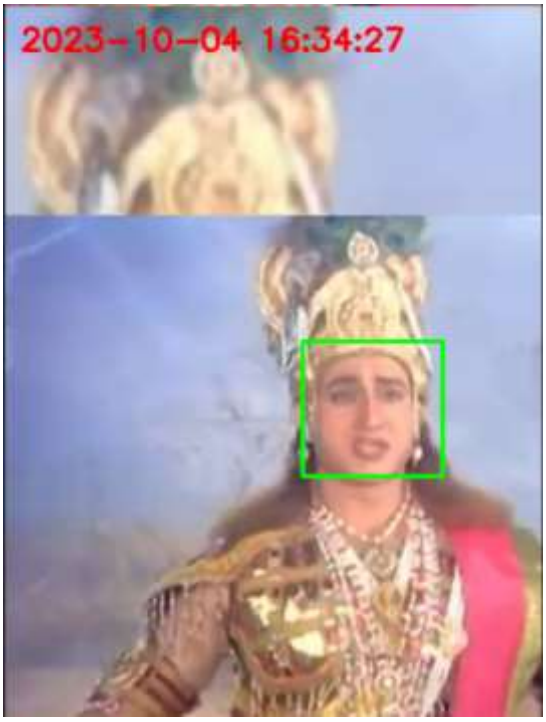
```
import cv2

import datetime

from google.colab.patches import cv2_imshow

face_cascade = cv2.CascadeClassifier(cv2.data.haarcascades +
'haarcascade_frontalface_default.xml')

video_path='/content/sample_data/v.mp4'

cap = cv2.VideoCapture(video_path)

while True:

  ret, frame = cap.read()

  if not ret:

    break

  gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)

  faces = face_cascade.detectMultiScale(gray, scaleFactor=1.3, minNeighbors=5,
minSize=(30,30))

  timestamp = datetime.datetime.now().strftime("%Y-%m-%d %H:%M:%S")

  cv2.putText(frame, timestamp, (10, 30), cv2.FONT_HERSHEY_SIMPLEX, 0.7,(0, 0, 255), 2)

  for (x, y, w, h) in faces:

    cv2.rectangle(frame, (x, y), (x + w, y + h), (0, 255, 0), 2)

    cv2_imshow(frame)

  if cv2.waitKey(1) & 0xFF == ord('q'):

    break
```

Output:


2023-10-04 16:34:24


2023-10-04 16:34:25


2023-10-04 16:34:26


2023-10-04 16:34:27

Conclusion:

Haar Cascade is the simplest method to perform object detection. Haar cascade is an algorithm that can detect objects in video in real time, irrespective of their scale in frame and location. It tries to compute features in every window and classify whether it could be an object.

In this experiment we successfully implemented Haar Cascade method for object detection in video.