

Video Classification using Image Processing & Deep Learning Techniques

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Abstract—Today's rapidly growing internet era has also increased the data in a very large amount for which the classification of the data has become more important than ever before. As daily millions of video are been uploaded on the internet usually it is been classified based on the title of the video, which is not enough as the content of the video may be different than that of the title. Thus, this research paper highlights a system that would classify the video based on real-time data which takes the content of the video as the input and accordingly it gives the output. The major crux of this system is the usage of deep learning, in which the collection of the image is been taken from the video and compared with the pre-trained model and accordingly the result showed.

I.

II. INTRODUCTION.

Video classification refers to the technique of classifying the video based on image extraction from the video. Usually, the video playing software is more likely to show the content of the video based on the title of the video not based on the content of the video, which usually video player software doesn't do. Without any classification of the content of the video playing on the screen due to which any malfunction is done on the content of the video can't be recognized. In this proposed system video will be taken as input via a camera of the system and live output will be generated.

The concept of video classification is the process by which a computer program creates a collection of data that is in the image format and it is compared with the pre-trained model of the data set which is the collection of the data for the present data. The algorithm used in the system is detectMultiScale which from the library of the OpenCV which is been coded in python.

The process of video classification is done using the OpenCV library which converts an image into a single value by subtracting the sum of pixels. The main aim of this project is to classify the content of the video based on the gender, age using the facial node as the reference. Paul Viola provides the paper in which Rapid Object Detection using a Boosted Cascade is done for reference.

III. NEED OF STUDY.

Increased upload of data on the internet has made the classification of the data in a very systematic way made very necessary. Classifying the video based on a facial image has encroached the facial lock in the mobile phone for the lock as a security purpose. There is numerous way to secure the mobile by keeping the phone lock by alphabet pin, numeric pin, pattern lock system but all of them take quite a bit of time but the facial lock recognize the face

faster and it is much faster than any of the locking system. Hence, this paper highlights a system that would classify the gender and predicate the age of the person, which can be further updated to full-length video as an input in the system. This would save one's time required for checking the entire video.

IV. LITERATURE SURVEY.

Rasha Ragheb Atallah, Amirrudin Kamsin, Maizatul Akmar Ismail, Sherin Ali Abdelrahman [1] "Face Recognition and Age Estimation Implications of Changes in Facial Features: A Critical Review Study". In this paper, we learned the important nodes in the face which connect the all the key point in the face which includes wrinkles, forehead hair length along with the basic node eyes, nose, mouth, ears. Detecting facial expression by a change in the moment of the following key nodes of the face. Changing the shape of the face based on the moment of the face.

Xingfang Yuan, Tony X.Han, Zhenbing Zhao, Baogang, Ce Gao, Miao Sun [2] "Age Group and Gender Estimation in the Wild With Deep RoR Architecture". In this paper, they have proposed the CNN-based method which would classify the person on the age group of particular range and prediction of age is done leveraging residual networks of residual networks (RoR).

Jiale Chen, Sen Liu, Zhibo Chen [3] "Gender Classification In Live Video" Nowadays the majority of time video or image is a capture from a mobile device rather than that of professional camera equipment, so in this paper, they have explained the fetching of data from camera and processing in the real-time so as the get the output immediately. In this paper, they have used the CNN technology which collects the image frame by frame from the video and compares it with the dataset and makes the following result.

Gil Levi and Tal Hassner [4] "Age and Gender Classification using Convolutional Neural Networks" This convolutional technology has referred to the use of deep-convolutional neural network (CNN).

Filex Anda [5] "Evaluating Automated Facial Age Estimation Techniques for Digital Forensics" This paper documents cognitive age prediction in which it helps the police, detectives and investigators to identify the undignified person which are involved in the child abuse. In this case the change in the facial shape in one of the major key which is taken into consideration in this document using various automated machine learning-based techniques.

V.METHODOLOGY

Following is the step by which the video classification will take place: -

Methods are used for age estimation are based on calculating ratios between different measurements of the facial features. Once facial features for example eyes, nose, chin, mouth, etc. are localized and their sizes and distances are measured, then ratios between them are calculated and it is used for classifying the faces into different age categories.

The system is divided into smaller modules. The modules are as follows:

1) *Capturing face images*

The first module involves capturing face images with the help of live camera. We can capture multiple face at a time.

2) *Extracting relevant features*

This module implements various image processing algorithms on the captured images using LiClipse, OpenCV2 and Spider in Python language. Features like eyes, nose, chin, mouth etc. These features were then stored into a csv file for further processing.

3) *Applying machine learning algorithms*

Machine Learning algorithms like Haar Cascade classifier, convolutional neural networks(CNN), Deep CNN Algorithms were applied to the obtained data set.

4) *Classifying faces according to their age and gender*

The results of the machine learning algorithms were then used to classify human faces according to their age and gender.

VI.DESIGN & MODELING

Figure 1 represents the flow diagram for video classification. In the first phase, the image within the video is been capture via camera in which the face is detected and feature extraction happen by which it compare it with the data set of the following data.

Following machine learning algorithm is applied in the image which is extracted from the video and also the image which is loaded in the data is compared continuously in the back end of the system.

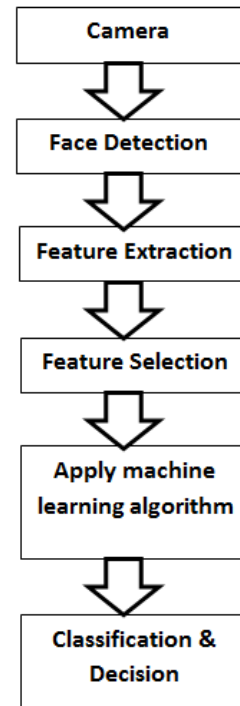


Figure 1:Flow Diagram for video classification

1) Deep convolutional neural networks

In machine learning, convolutional neural network CNN is a subclass of deep neural network of machine learning. For analysing the visual images the deep convolutional network is used. This convolutional network are indicated that network employs the mathematical called the convolution. The convolutional neural network consist of different types of layers like input layer and output layer as well as it consist of multiple hidden layers I it.

2) A CNN for age and gender estimation

The convolutional neural network that is CNN is a machine learning algorithm and it having different convolutional layers that are input and output layers and many hidden layers that are used for image classification, image processing, other different auto correlated data and also for segmentation. The CNN convolutional neural network is commonly used for image or video classification.

3) Haar Cascade algorithm

Haar cascade algorithm is a machine learning approach that is used to detect the objects for example from the images, videos and live videos etc. from that haar cascade algorithm detects faces of humans or any objects that we want. For that the cascade functions are first trained from different

types of positive images and negative images. Haar cascade is a classifier method for detecting the object and it is very efficient object detection method used in machine learning. After functions are trained then we use this method for extracting the different features from images or videos. For extraction of features we can use edges, line or many types of cascade features. In that weak learners are there on each stage of feature extraction. The weak classifier is a simple classifier is also called as decision stumps. Boosting is a technique where each stage is trained using these technique. By using boosting we train highly accurate classifier.

TECHNOLOGY STATUS

Software

1. Numpy
2. Keras
3. Opencv
4. Python

Hardware Requirements

1. Intel i5 8th Gen & Above
2. Storage

RESULTS

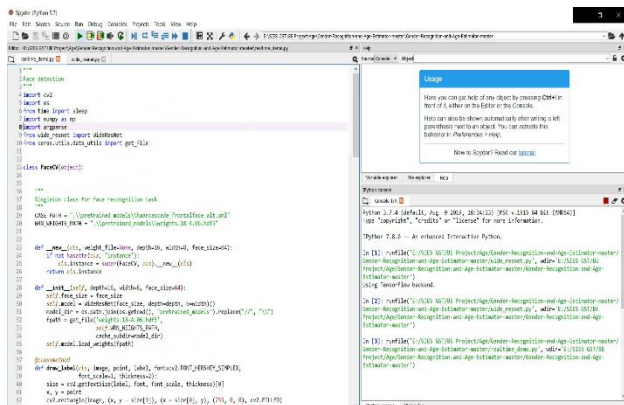


Figure 2: Run the code

Here one can run the code by which the console will run opening the camera using Kersa Faces it will be capturing the live video from the camera and on the live video it will be detecting the gender and predicting the age.

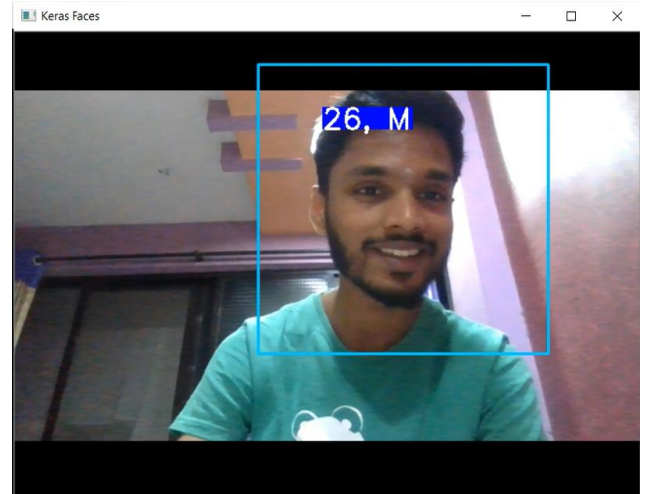


Figure 3: Video Classification

This Screenshot shows the video classification output of a live video captured by the camera which classify the gender and predicts the age.

CONCLUSION

In this paper, we have discussed about video classification and how one can implement video classification using Image Processing & Machine Learning Techniques, how classification is useful for security purpose for identifying the person and in the attendance management in corporate as well as educational institution.

FUTURE SCOPE

For future work, we can use this age and gender database for different types of prediction like ethnic prediction. according to the result of methods that we applied on age and gender prediction problem, similar methods can be used for improving ethnic prediction. For ethnic prediction instead of using age and gender database, the solution for ethnic prediction to use the ethnic database for it. By using an ethnic database it could give the best characteristic information. As like ethnic prediction another idea we can suggest is mood estimation problem. By applying this age and gender prediction methods we can increase the mood estimation problem performance. In ethnic prediction we use an ethnic database like in the mood estimation problem we apply the emotional expression of face database, this is one of the possible solutions to this problem. Emotional expression database can offer the best distinguish characteristic human face emotional expressions. Expressions like sad, happy, anger, surprising, shocking, annoying, etc.

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