

Face Recognition in pictures using KNN and exploring face recognition in video files

Anonymous CVPR submission

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Abstract

Face recognition has got many applications in the current era and there are many techniques available for face recognition. face identification has been widely applied for security on gadgets, smart home security, and others. Face dominates as a biometric which is most increase in the next few years. Face is used for biometric identification which is considered successful among several other types of biometrics and accurate results. Face recognition utilizes facial features for security purposes.

In this project we explore few ways of face recognition ie on pictures using k-nearest neighbours and image recognition in videos

1. Introduction

Along with the rapid development of technology, it needs to be balanced with appropriate security enhancements so that users are comfortable with the personal information on the technology. Face is one of the most popular types of biometrics at the moment. The face dominates as biometrics which is most increase in the next few years, which is 38 percent, followed by multimodal (22), iris (11), and fingerprint 9 [1].

The face is one of the biometrics that is very easily acquired, namely using a camera. This paper develops face identification using the K-Nearest Neighbor classification method. We also look at how to identify images in running videos

1.1. Language

All manuscripts must be in English.

1.2. Face Recognition using knn

We have used face recognition pyapi library which is a lightweight python library used for face recognition tasks and has many built in features and methods available. The application of face identification KNN as a classification

has been done before, so that it becomes a reference for making a system that can do more activities than the previous system

Data Source: The training images contain various images of five different celebrities.

Method: Loop through each person in the training set

Loop through each training image for the current person
If there are no people (or too many people) in a training image, skip the image.

Add face encoding for current image to the training set

Determine how many neighbors to use for weighting in the KNN classifier

Create and train the KNN classifier

Save the trained KNN classifier

Load a trained KNN model (if one was passed in)

Load image file and find face locations

If no faces are found in the image, return an empty result.

Find encodings for faces in the test iamge

Use the KNN model to find the best matches for the test face

Predict classes and remove classifications that aren't within the threshold

Draw a box around the face using the Pillow module

There's a bug in Pillow where it blows up with non-UTF-8 text When using the default bitmap font

Draw a label with a name below the face

Remove the drawing library from memory as per the Pillow docs

Display the resulting image

Train the KNN classifier and save it to disk

Once the model is trained and saved, you can skip this step next time.

Using the trained classifier, make predictions for unknown images

Find all people in the image using a trained classifier model

Display results overlaid on an image

1.3. Face recognition in video

The face recognition library can be used to also perform face recognition in a video for eg from an mp4 file.

Method:

Loading video for face detection

Grab a single frame of video

Bail out when the video file ends

Search face in every 15 frames to speed up process.

Display video frame

Find all the faces and face encodings in the current frame of video

Show frame and hold it until a new frame appears

2. Summary

In this paper we have presented an experiment for face identification using the KNN method. KNN is one of the simplest algorithms that can be used for classification. The sources of data come from manual shooting. The face identification using the KNN method consists of two stages, such as the training phase and the testing phase. We also saw how to perform face recognition in a video

2.1. Inference

Based on the results by changing the parameter k value obtained results are different for each parameter. The results give accuracy 81 percent for k=1, give accuracy 53 percent for k=2, give accuracy 47 percent for k=3. From the results, it shows that the value of k greatly affects the level of accuracy of the system. The parameter k value and accuracy are inversely proportional, the greater k value gives the smaller accuracy of the identification system. From this research can be concluded that the higher k value is the smaller accuracy that we get for face identification using KNN.

References

<https://pypi.org/project/face-recognition/>