FACE DETECTION AND RECOGNITION USING NAIVE BAYES ALGORITHM

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Abstract

This undertaking presents a structure for face acknowledgment framework dependent on facial highlights and its activities. With the coming of picture preparing programmed face acknowledgment turned into a well-known research theme. The face acknowledgment is finished with the assistance of key highlights of the face. Right now, executing in calculations it would contribute in a few territories of recognizable proof, mental looks into and numerous continuous issues. There are numerous procedures, beginning from straightforward edge location strategies to cutting edge systems, for example, using design acknowledgment draws near. This paper shows the strategy for face recognition, similar to Eigen face highlights dependent on location hit rate and discovery speed. AI calculations is utilized for acknowledgment and characterization of various classes of face feelings via preparing on various arrangement of images.Open CV and Python are utilized for actualizing Innocent Bayes calculation.

Keywords- Statistical features, Genetic algorithm, Root Mean Square Error, Naive Bayes.

I. INTRODUCTION

A facial acknowledgment framework is a method fit for distinguishing or checking an individual from a computerized picture or a video source. There are different procedures in which facial acknowledgment frameworks work, yet as a rule, they work by looking at chosen facial highlights from given picture with faces inside a database. In view of uses it can interestingly recognizes an individual by breaking down examples relying upon the individual's outward appearances and highlights. The first step is that set of images are collected and stored in the database. The images are stored with first name of the person separated by a underscore and an underscore along with image number. Here the database is a collection of data which are stored and accessed electronically. Face acknowledgment gadget examines the human face and it coordinates the recognized picture against the spared picture.Sometimes large and more images can be stored for longer period of time. After the images are stored in the database the images are processed.

In order to process the facial images they must first be preprocessed using the technique to standardize the results. The test preprocessing methods including blurring, edge detection, sharpening smoothing and more in order to find the method that results in the most accurate matches Here the algorithm Eigen face is computed for preprocessing the images and then implement a testing method which results in the most correct detection. Standardization is required to makes the pictures stable under various lighting conditions. This is cultivated by picture change or orchestrating another picture from the given picture into standardized structure. These pictures are then utilized for face acknowledgment.

Then the face recognizer is trained to recognize the faces. It is trained using machine learning algorithms. After training the recognizer, we test it to check the results. Eigen face recognizer is used in open CV face recognizer. It will in general view at all the preparation pictures with its characters as mind boggling and it attempts to conclude the parts. These components are necessary and more helpful. It discard rest of the images and it not only extract

the essential elements from the training data but also saves the memory by rejecting the less critical segments. Human faces are detected using Eigen face algorithm. In face detection the image is captured and then validates the eyes position and distance. After the detection of eyes, the face is cropped and resized then the image is rotated and gray scale the face. Here the Eigen face is computed and the face is detected after the detection of image the identification is done using the python coding.ln order to perform face recognition with python and open CV need to install additional libraries. Face recognition library in python helps to find all the faces in a given image and manipulate features in an image for real time face recognition. At last the face recognition is done by using Naive Bayes algorithm with the help of python coding.

A great deal of elements as centers on an organized non-cyclic diagram (DAG). It maps the prohibitive independencies of elements. It brings four central focuses as a data showing gadget [20-22-24]. At first, Bayesian frameworks prepared to manage lacking or boisterous data in picture examination. Second, Bayesian frameworks can make causal associations through unforeseen independencies, allowing the associations between factors. The last favored position is Bayesian frameworks can solidify existing data, allowing dynamically accurateresults.

the standard form of granting entry, but with advancing technologies in computers along with more refined algorithms, facial recognition is gaining some traction in replacing passwords and fingerprint scanners. In places such as airports and border crossings where identification of verification is necessary, face recognition systems have the ability to mitigate the risk and ultimately prevent future attacks from reoccurring. Surveillance cameras with face recognition abilities can help in finding these individuals. Alternatively, surveillance systems can also help to identify the details of missing persons. This is dependent on robust facial recognition algorithms as well as a fully developed database of faces. And lastly, facial recognition has surfaced in social media applications on platforms such as Facebook and Instagram which suggest users to tag friends who are identified in pictures uploaded. It is clear that there are many applications that uses the facial recognition systems.
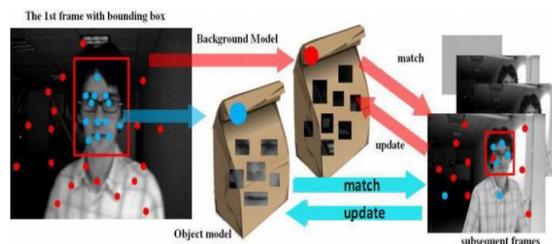
II. BAYESIAN NETWORK

A) *Definition*

A lot of factors as hubs on a coordinated non-cyclic chart (DAG). It maps the restrictive independencies of factors. It brings four focal points as an information displaying device [20-22-24]. Initially, Bayesian systems ready to deal with inadequate or loud information in picture investigation. Second, Bayesian systems can make causal connections through contingent independencies, permitting the connections between factors. The last preferred position is Bayesian systems can consolidate existing information, permitting progressively exact outcomes.

Bayesian network is defined by:
• A coordinated non-cyclic diagram (DAG) G= (V, E), where V is a lot of hubs of G, and E of G ;
• A limited probabilistic space $(\Omega, \underline{Z}, \dot{p})$;
• A lot of irregular factors related with diagram hubs and characterized on $(\Omega, \underline{z}, \dot{p})$ as :

Where C (Vi) is a set causes (guardians) Viin chart G.

B) *Inference in Bayesian system*

On the off chance that we have a Bayesian system characterized by a chart and the likelihood dispersion with (G, P). Assume that diagram is made out of n hubs, signified by X = {X1, X2,… .,Xn} . The general issue of derivation is to figure p(Xi |Y) where Y X and Xi Y . To compute contingent probabilities we can utilize techniques for correct or surmised inductions. The primary gives a precise outcome, yet it is expensive in time and memory. The second, requires less assets yet the outcome is estimation of the specific arrangement.

To ascertain restrictive probabilities we can utilize strategies for correct or rough derivations. The principal gives an exact outcome, however is amazingly exorbitant in time and memory. The second requires less assets yet the outcome is a guess of precise arrangement. A BN is changed into a decomposable Markov arrange [59] for derivation. During this change, two graphical activities are performed on the DAG of a BN, to be specific, lecture and triangulation.

C) *Parameters learning*

Right now structure is totally known as priori and all factors are recognizable from the information, the learning of restrictive probabilities related with factors might be from an arbitrarily or by Bayesian methodology.

D) *Bayesian organize as a classifier*

A variation of Bayesian System is called Innocent Bayes. Guileless Bayes is best and effective arrangement calculations.
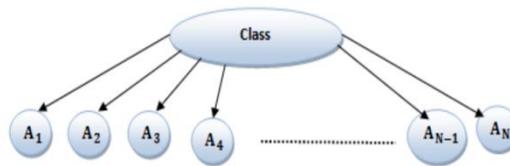
The contingent autonomy supposition in innocent Bayes is once in a while valid truly. Gullible Bayes work ineffectively for relapse issues (Straightforward et al., 2000), and produces poor likelihood gauges (Bennett, 2000). One approach to reduce the restrictive autonomy supposition that is to broaden the structure of credulous Bayes to speak to expressly property conditions by including bends between traits.

III. PROPOSED ALGORITHM

This innovation of facial acknowledgment is equipped for recognizing or checking an individual from an advanced picture or a video outline. Were multi strategies are utilized in facial acknowledgment framework, when all is said in done they work by various facial highlights on the given pictures. This was done inside database. In view of utilization that can exceptionally distinguish certain individual through breaking down examples dependent on the individual's facial surfaces and shape. Where the set of images are collected and stored in the database then label the images with first name of the person separated by an underscore and followed by an underscore and the image number. Where a database is an organized collection of images, it is

stored and accessed electronically. At the point when a face acknowledgment gadget examines face of human, at that point it coordinates the distinguished picture against the enlisted picture that is put away in face acknowledgment database. Were Sometimes large and more images can be stored for longer period of time. After the images stored in database the images are preprocessed.

A.   *Flow Chart Description*

I n order to process the facial images they must first be preprocessed using the techniques to standardize the results. The test preprocessing methods including blurring, edge detection, sharpening smoothing and more in order to find the method that result in the most accurate matches. Here the algorithm Eigen face is computed for preprocessing the images and then implement a testing method which results in the most correct detection. There was some variety so as to cause the pictures to seem stable under various helping conditions. This is practiced either by pictures change or by orchestrating another picture from the given picture in some standardized structure; at that point the standardized pictures are utilized for acknowledgment.

B.   *Face Recognition*

Recognize the faces by training the face recognizer. Such face recognizer is trained using machine learning algorithm. Test the recognizer to see the outcomes, in the wake of educating the recognizer. In open CV for face recognizer, then here eigenfaces for face recognizer is used. It attempts to derive the segments by review all the preparation pictures of the considerable number of characters as a complex. These parts are important and helpful and it dispose of the remainder of the pictures, along these lines it not just concentrate the basic components from the preparation information yet in addition spares memory by dismissing the less basic fragments. by Here the human faces are detected using the eigenface algorithm. In face detection the image is captured and then validate the eyes position and distance. After the detection of eyes, the face is cropped and resized then the image is rotated and gray scale the face. Here the eigenface is computed and face is detected. After the detection of image, the identification is done using the python coding. In order to perform face recognition with python and open CV need to install additional libraries. Python in face recognition can perform certain tasks like, to find all faces in a given image, find and manipulate facial features in certain image, it identify faces in images, real time face recognition process. At last recognize the face by Naive Bayes algorithm using python coding.

IV. CONCLUSION

Thus we have used the proposed Naive Bayes algorithm for face identification and recognition of faces for the given input face image. The dataset we used for our proposed system is AT&T dataset which is available in the internet. Eigen face method used to extract the facial features from the faces using dataset. Then our proposed algorithm Naive Bayes classifier is used to train the model. The obtained trained average accuracy of our model is 73.0%. The trained system will produce a trained model which will use to identify the face from the user input. The language we choose to do image processing is python, which is an open source programming language. Our proposed system is used to identify the criminal face and shows the criminal ID and his name that are specified in the dataset. Further it can be implemented as the real time criminal identification system and also add some more methods to increase the accuracy of the system.

V. RESULTS

We have chosen Naive Bayes Classifier to train the image data and we have chosen AT&T dataset for training the images. By using Eigen face method we extract the feature of the face image from the dataset we have chosen. Finally we train the AT&T dataset using Naive Bayes classifier in

order to match the template of face in the trained model. We used 400 images of 40 samples for training and we obtained 73.0% of accuracy. Mainly we focused on identifying criminals to display their database by giving a sample input image. The exactness of frontal view showed for all intents and purposes in face location framework is great. Thus the analyst's feeling is no need of any further activity right now. The manual information face identification and acknowledgment framework was insufficient to accomplish exactness on a high acknowledgment. The just one explanation behind such face acknowledgment subsystem didn't show even a slight level of invariance to scale, turn or move blunders of the divided face picture.
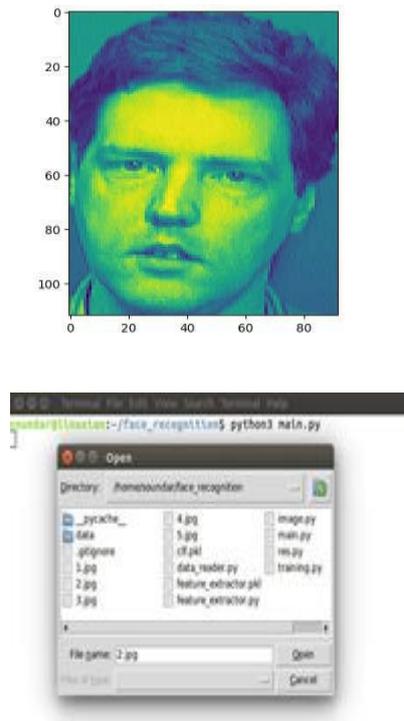

Figure: Screenshot of the input data

Figure shows the way to give input to the system. Tkinter a python library used to create the file reading GUI to get input image from the user side.
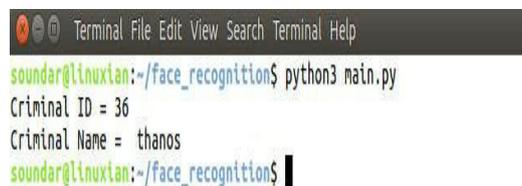

Figure: Output - Image identification

Figure: shows the correct identification of the face input. It displays the criminal ID and his name that is predefined in the database. Set of ID and name that are already stored in the database to all the images respectively.

Figure: Resultant image and the dataset image

Figure shows the two images that are displayed as output of the face recognition and identification system. The first image is the image that is given as a input to the system and the second one is that image that is present at the dataset used for identification .Perfect accuracy is displayed in frontal view face detection and then the researcher's decided that further work need not be conducted in this area .To achieve a high recognition accuracy the both manual input face detection and recognition system was not enough. Even a slight degree of invariance to scale, rotation or shift errors of the segmented face image it does not display, this was the only reason for the face recognition sub system.

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