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REAL TIME FACIAL ANALYSIS USING TENSORFLOWAND OPENCV

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Abstract - *The main objective of this project to develop a real time facial analysis using opencv and tensorflow for artisum people where user can see the facial expression, age and gender of the male and female. Face regonition and analysis from an image and video. Most signal or image processing algorithms should be designed with real time execution in mind.Facial features are considered as one of the important personal characteristics. This can be used in many applications, such as face recognition and age estimation. The value of these applications depends in several areas, such as security applications, law enforcement applications, and attendance systems. In addition, facial features are particularly the key usage in the finding of lost child. Present applications have achieved a high level of accuracy. This paper provides a survey of face recognition, including the age estimation, which was discussed. Moreover, the research outlines several challenges faced in face recognition area that had been explored. The research also provides a landscape mapping based on integrating into a critical and coherent taxonomy. In the methodology sections, the exploration the accomplished via a deep focused in every single article in "Face Recognition", then "Age Estimation", and later in "Facial Features". The "Articles extraction" is mining from diverse sources, such as Web of Science, ACM, IEEE, Science Direct, and Springer databases. The research covers overall 72 articles; 32/72 articles were face recognition. Moreover, 39/72 of the articles were for age estimation. A comparison based on the objectives of the approaches is presented to underline the taxonomy. Ending by research conclusion on face techniques contributes to the understanding of the recognition approaches, which can be used in future researches. The research concluded that face techniques' performance is distinct from one data set to another. This paper contributes to display gaps for other researchers to join this line of research.*

Key Words: Face recognition, age estimation, aging and facial expression

1. INTRODUCTION

There are few facial features used in facial technology. This technology is used to recognize the exterior organs of the body such as mouth, eyes and also gender of a person. The major source of data that is used in this technology is the features extracted from the organs. There are three levels of features used. The foremost factor is to extract in depth micro level features that includes moles on body, birth marks [4]. This technology is widely used in various domain such as stage estimation etc. In most of the models the major process to be considered is as the stage of the person changes from time to time accordingly the appearance of a person change. The major flaw in this technique is wrinkles formed on face as the person grows older. The technology is evolved over a time to specify the age of a person based on the visual appearance even though the birth date of a person is not known. Anyone can calculate the age of a person by knowing the birth date, but this technology is specifically designed to estimate the age of a person based on the facial looks that too mainly if a person face is with wrinkles then there some advantage and disadvantage involved in it [6]. Aging is a common factor that is affecting and irrepressible process in each and every individual life throughout the life span [7]. This type of technology is also used in criminal activities to find out lost children. There are already few major challenges that were enforced. This paper provides clear cut details on the architecture, advantages and limitations of facial recognition technique. There are n number of domains using this type of recognition such as in biology, security purpose and so on. The same technology is also used by human forensics to recognize the late person by collaborating the tissue in face [8]. As the list prolong in the usage of this technique, the one such major application uses this method is in security purpose such as biometric identification [9]. The collection of named data is one such problem faced in this methodology is more complex compared to age detection based on person looks [10], [11]. This paper explains about the disadvantages faced in existing system and how it can be overcome by using proposed system. This paper also provide an edge to the challenges that are experienced in facial recognition, architecture used.

1.1 METHODOLOGY

There are two terminology that are most preferably used in this method such as face and age estimation. This also includes features extraction from face to determine the age of the person that is caused because of ageing scenario that every person has to undergo in his/her lifespan

INFORMATION SOURCES

Even though there are so many existing database were found to get an immense knowledge on the problems that are encountered in the field of facial recognition technology and we have referred to few articles such a Springer, IEEE Xplore, Science Direct database, WoS service, ACM DL and list prolongs.

A. SELECT PAPER

The selection of the paper to get an idea of how existing system work depends two modes: iteration and filtering. During iteration the unwanted and irrelevant paper are removed/hidden similar to the technical word abstraction in technical term. Filtering phase is completely following this stage.

B. ELIGIBILITY CRITERIA

To develop the proposed system as a developers the selection of papers and papers referred are carried from 2010 to 2018.

2. EXISTING SYSTEMS

LINEAR DISCRIMINATE ANALYSIS

LDA is used to minimize features that will be overwhelming and mostly not used in this technique. The resultant obtained is linear classifier. To detect the facial features properly, this analysis requires more number of pixels.

PRINCIPAL COMPONENT ANALYSIS

PCA is a procedure that converts correlated variables into uncorrelated variables. This uncorrelated variables are known as principal components. The first uncorrelated components says about the variation in the data and subsequent components says about other variations that can be expected. PCA is widely used to develop predictive models and so on. With the help of PCA the Eigen value decomposition is performed. By skimpy the internal structure of the data the variance present in it is known.

HIDDEN MARKOV MODEL

HMM is a statistical model that describes the event that are not directly observable, but the events are depending interior factors. The observed event is called as a 'symbol' and the factor underlying the observation is a 'state'. This type of model is preferably used in bioinformatics, biological sequence analysis.

3. PROPOSED SYSTEM AND TECHNIQUE

System accuracy is influenced by different factors in that one such pattern is number of pixels combined to a form an image. Before supplying any image to face recognition system the foremost attention should be taken by applying all pre-processing techniques. Depending upon how the algorithm is trained the face recognition system works. Consider if an algorithm is trained to detect a person in a bright room then it is impossible for a person to be detected in a dark room. There are various other kinds of problems be faced in this method such as all the pixel coordinate should be same. Hence a proper preprocessing filter is recommended. The proposed system uses Eigen values using grayscale images. Histogram is applied after conversion of image to grayscale is done. The more of preprocessing techniques applied, the more the clarity of image is found and thus results obtained is also less error prone. The image that is sent via file or video is classified to detect the faces. The classification is done faster and with a good efficiency.

4. SAMPLE CODE

A. Training Set

```
Def assure_path_exists(path):

dir = os.path.dirname(path)

if not os.path.exists(dir):

os.makedirs(dir)

recognizer = cv2.face.LBPHFaceRecognizer_create()
Detector=cv2.CascadeClassifier("haarcascade_frontalface_
de fault.xml");

def getImagesAndLabels(path):

imagePaths = [os.path.join(path,f)

for f in os.listdir(path)]

faceSamples=[]

ids = []

for imagePath in imagePaths:

PIL_img = Image.open(imagePath).convert('L')

img_numpy = np.array(PIL_img,'uint8')

id = int(os.path.split(imagePath)[-1].split(".")[1])

faces = detector.detectMultiScale(img_numpy)

for (x,y,w,h) in faces:
faceSamples.append(img_numpy[y:y+h,x:x+w])
ids.append(id)

return

faceSamples,ids faces,ids = getImagesAndLabels('dataset')
recognizer.train(faces, np.array(ids))
assure_path_exists('trainer/')
recognizer.save('trainer/trainer.yml')
```

B. Face Datasets

```
def assure_path_exists(path):

dir = os.path.dirname(path)

if not os.path.exists(dir):
```

```
os.makedirs(dir)

vid_cam = cv2.VideoCapture(0)


face_detector=cv2.CascadeClassifier('haarcascade_frontalf
ace_default.xm l')

face_id = 1 count = 0

assure_path_exists("dataset/")

while(True): _,

image_frame = vid_cam.read()

gray=cv2.cvtColor(image_frame, cv2.COLOR_BGR2GRAY)
faces = face_detector.detectMultiScale(gray, 1.3, 5)

for (x,y,w,h) in faces: cv2.rectangle(image_frame, (x,y),
(x+w,y+h), (255,0,0), 2)

count += 1 cv2.imwrite("dataset/User." + str(face_id) +
str(count) + ".jpg", gray[y:y+h,x:x+w])
cv2.imshow('frame', image_frame)

if cv2.waitKey(100) & 0xFF == ord('q'):

break

elif

count>100:

break

vid_cam.release()

cv2.destroyAllWindows()
```

C. Face Detection

```
def assure_path_exists(path):

dir = os.path.dirname(path)

if not os.path.exists(dir):

os.makedirs(dir)

recognizer = cv2.face.LBPHFaceRecognizer_create()
assure_path_exists("trainer/")
recognizer.read('trainer/trainer.yml')

cascadePath = "haarcascade_frontalface_default.xml"
faceCascade = cv2.CascadeClassifier(cascadePath);

font = cv2.FONT_HERSHEY_SIMPLEX

cam = cv2.VideoCapture(0)

while True:ret,

im=cam.read()

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

faces = faceCascade.detectMultiScale(gray, 1.2,5)
for(x,y,w,h) in faces: cv2.rectangle(im, (x-20,y-20),
(x+w+20,y+h+20), (0,255,0), 4) Id, confidence =
recognizer.predict(gray[y:y+h,x:x+w])

if(Id == 1):

Id = "ARJUN {0:.2f}%".format(round(100 - confidence, 2))

cv2.rectangle(im, (x-22,y-90), (x+w+22, y-22), (0,255,0),
1) cv2.putText(im, str(Id), (x,y-40), font, 1, (255,255,255),
3) cv2.imshow('im',im)

if cv2.waitKey(10) & 0xFF == ord('q'): break
cam.release() cv2.destroyAllWindows()
```

5. CONCLUSION

In this paper, by using opencv as a set of library programming functions a system is developed to estimate the age of a person by extracting the features in face. A dataset that contains a set of images are defined and trained before recognizing process proceeds. Haar cascade algorithm is used for detection. In upcoming generations few more features are included to enhance the changes for a proper recognition by overcoming the problems such as wrinkles on a face etc.

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