A Survey for Detecting Depth of Wrinkle Detection

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Abstract- Wrinkles play an important role in the face-based analysis. They have been widely used in applications, such as facial retouching, facial expression recognition, and face age estimation. Although a few techniques for a wrinkle analysis have been explored in the literature, poor detection limits the accuracy and reliability of wrinkle segmentation. Wrinkles present 3D form of skin and appear as skillful discontinuities or cracks in surrounding skin texture. There are different techniques present for facial wrinkles detection.

I. INTRODUCTION

Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects of a certain class in digital images and videos. Well-researched domains of object detection include face detection and pedestrian detection. Object detection has applications in many areas of computer vision, including image retrieval and video surveillance.

Object recognition is task of finding and identifying objects in an image or video sequence. Humans recognize a multitude of objects in images with little effort, despite the fact that the image of the objects may vary somewhat in different view-points, in many different sizes and scales or even when they are translated or rotated. Objects can even be recognized when they are partially obstructed from view.

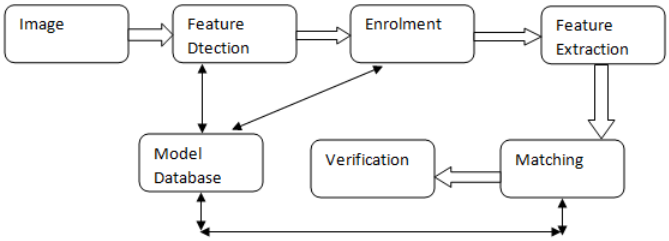

Fig.1: Object Recognition System

To perform a specific task, associate degree seeing system should have some method parts as-:

1. Input image
2. Database
3. entrance method
4. Feature detection
5. Feature extraction
6. Matching method
7. Verification method

The higher than diagram shows the interactions among the parts and therefore the flow of data among them. The info is consists of the whole models that square measure renowned to the system. [2] This model or info is truly consists of the knowledge supported the popularity technique and approach applied. If the tactic for seeing relies on options then it should consists the techniques of determinant the dimensions, shape, color etc. it's undecided that the system forever uses constant techniques however it depends on the sort of object that has got to be recorded in a picture. [3] thus associate degree applicable tools and techniques should be elite by the system for the article recognition.

1) info or Model Representation: The terribly basic conception here is that however the article ought to be bestowed within the info. It all depends on the necessary attributes and options of the article within the image. In some pictures color may be the simplest feature, for a few size would be the simplest one, for a few form would be the simplest one some on.

2) Feature Detection: it's merely associated with the conception of finding a number of the attention-grabbing points or we are able to say options in a picture and on the premise of that we are able to create native choices at the purpose of each image.

3) Feature extraction: It deals with the illustration of the attention-grabbing purposes for the aim of comparison then thereupon of the opposite attention-grabbing point in a picture.

4) Matching Process: Once the image is captured, the options of the article in a picture square measure detected and extracted; currently we've to acknowledge the particular object gift within the image. For this, the method is finished that's matching. currently the attention-grabbing points or the options that has been extracted square measure matched with the info model.

5) Verification: The results of matching method is verification. If the attention-grabbing points square measure matched then the output is verified image.

Example: face recognition, tissue layer recognition, finger print etc. The conception of such recognitions is truly a bio-matrix authentication. If the finger print is matched then the person is verified and thus has the authentication for accessing the knowledge etc.

II. PRE PROCESSING

The image before it is actually processed needs pre-processing. The image taken from a camera includes noise which introduces some distortions in the image which is needed to be eliminated; so we use some filtering techniques like low-pass filtering for Gaussian noise, median filtering for salt-pepper noise, notch filtering for periodic noise etc. The next step is to convert the RGB image to gray scale image; after that the gray scale image is converted to binary image by use of thresholding technique. The process of filtering out the noise involves deriving the properties of the noise i.e. to determine what kind of noise is present in the image. One way of determining the property of noise is to take Fourier transform of the image and then study the spectra. Noises present in the image in general have higher frequency than that of original image. There are different types of noises that distort an image which classified according to their probability density function. Although the salt and pepper noise is present

almost in every image acquisition systems. The process of converting of gray scale to binary image is also important as it depends upon the application i.e. which type of image is being converted to binary; whether it only a certain amount of pixels which are higher gray level to be segmented or a significant amount of pixels which are high gray levels but with variable intensity in different areas of the image. For the first case we can use global thresholding and for the second we can use adaptive thresholding by processing blocks by blocks in the thresholding operation in the image.

III. WRINKLE DETECTION

The wrinkle is a small furrow or crease in the skin, especially of the face, caused by aging [1] or expression [2]. In 2D skin images, the process of wrinkling often creates deep creases and causes curvature in the surrounding skin. The resulting skin curvature causes specific intensity gradients in images which are perceived as discontinuities and arbitrary patterns in surrounding skin textures [3]. The quantitative assessment of skin condition has been an area of quite intense study. There is great interest in supplementing the dermatologist's diagnostic visual assessment of skin with objective measures. These techniques are also valuable for the efficient development of effective pharmaceutical treatments [4]. Many skin assessment methods have been developed over the past few years. For example, analysis of the skin surface around pores on the face [5], evaluation of facial wrinkles' development over lifetime [6], and assessment of facial wrinkles using automatic detection and quantification methods [7]. Most of these studies were based on clinical judgements (subjective assessment) rather than computer vision (objective assessment). Clinicians' perspectives are typically focussed on the level of wrinkle severity, which is assessed using either descriptive scales or is photographically-calibrated [8]. In contrast, in computer vision, the concern is how precisely a wrinkle is located relative to the ground truth. The well-known shortcomings of subjective assessment, such as human errors, inconsistency of annotation and the large amount of time consumed by it limit the scientic study of the treatment and progression of skin aging. Therefore, this work highlights how to detect wrinkles accurately by assessing how closely a
wrinkle is located through the Jaccard Similarity Index (JSI).

Fig.2: Examples of the forehead wrinkle

Quantitative assessment of skin condition has been an area of intense activity. There is a great interest in supplementing the dermatologist's diagnostic visual assessment of skin with objective measures [1]. These techniques are also valuable for the efficient development of effective pharmaceutical treatments. Many skin assessments have been developed over the past few years. For example, analysis of the skin surface around pores on the face [2], evaluation of facial wrinkle development over the lifetime [3], assessing facial wrinkles using automatic detection and quantification method [4]. Most of these assessments were based on clinician perspective (subjective assessment) instead of computer vision (objective assessment). Judgements are typically made on neutral-expression images. Clinician perspective focuses on the level of wrinkle severity which is assessed using either descriptive or photographically-calibrated scales, but in computer vision, the concern is on how a wrinkle is located correctly against the ground truth. The well-known shortcomings of subjective assessment limit the scientific study of treatment and environmental effects on skin aging. Therefore, this work may result as an additional tool for them. Assume a 2D forehead image consists of four observed wrinkles as shown in Fig. 1, but an automated method might estimate less or more than that, it will lead to false detection. This will highly influence the processes such as age estimation and clinician score assessment.

Hessian Line Tracking, for wrinkle detection, began with a group of seeds, extracted from the ridge area of the Hessian matrix. Then, a multi-scale tracking system is applied recursively to all seeds. Once completed, each pixel confidence is validated over the scales to produce an initial wrinkle map. Finally, post-processing includes median filtering, directional filtering and area thresholding for noise reduction.

IV. RELATED STUDY

CHOON-CHING NG et al. (2015) [1] proposed Hessian line tracking (HLT) to overcome the detection problem. HLT is composed of Hessian seeding and directional line tracking. It is an extension of a Hessian filter; however, it significantly increases the accuracy of wrinkle localization when compared with existing methods. Although a few techniques for a wrinkle analysis have been explored in the literature, poor detection limits the accuracy and reliability of wrinkle segmentation. Therefore, an automated wrinkle detection method is crucial to maintain consistency and reduce human error.

Ranjan Jana et al. (2015) [2] provided a methodology to estimate the real age of a human by analyzing wrinkle area of face images. Wrinkle geography areas are detected and wrinkle features are extracted from face image. Depend on wrinkle features, each face image is clustered using fuzzy c-means clustering algorithm. Then, estimated age is calculated using their clustering membership value and average age of each cluster. The obtained results are significant and remarkable.

Ashwini Mawale and Archana Chaugule (2015) [3] presented the study and review of various techniques used in wrinkle detection. This paper is motivated by need of fast and robust algorithm for detection and classification of human age and facial retouching. Wrinkles play an essential role in age estimation. They have been commonly used in applications, such as face age estimation, facial retouching and facial expression recognition. Facial wrinkles present 3D form of skin and appear as skillful discontinuities or cracks in

surrounding skin texture. There are different techniques present for facial wrinkles detection.

G. O. Cula (2015) [4] defined that skin wrinkles are perceived as important cues in communicating information about the age of the person. Nowadays, documenting the facial appearance through imaging is prevalent in skin research, therefore detection and quantitative assessment of the degree of facial wrinkling can be a useful tool for establishing an objective baseline and for assessing benefits to facial appearance due to various dermatological treatments. However, few image-based algorithms for computationally assessing facial wrinkles are present in the literature, and those that exist have limited reliability.

Sukhwinder Kaur and Hari Singh (2015) [5] done this research work because of disabled persons who are unable to move their body parts except eyes. The process of blink detection is divided into three parts viz.face localization, eye pair localization and template matching method. In method 1, YCbCr color model and morphological operations are used for the face and eyes localization. In method 2 face and eyes pair localization is performed by using Viola Jones method. After eye pair localization, the concept of template matching is applied for blink detection, in both the methods. A performance comparison is made for both the methods based upon detection accuracy and processing time. It is observed that method 1, gives better accuracy (80.75%) with low processing time (0.38sec.). The overall success rate of method 1 and method 2 is 71% and55% respectively.

Rupali S. Parte et al. (2015) [6] presented a survey for eye tracking and eye detection methods proposed in literature. Examples of different fields of applications for both technologies, such as human computer interaction, Biometric Security, Eye gaze tracking, Driving assisting systems, and assistive technologies are also investigated. Generally, an eye tracking and detection system can be divided into four steps: Face detection, eye region detection, pupil detection and eye tracking. One common problem with many eye tracking methods proposed so far is their sensitivity to change in lighting condition. Under changing lightning conditions and because of poor resolution cameras the captured images are of poor quality. Eye detection with blurry and poor quality images increases complexity and sometimes reduces the accuracy. Despite the amount of research done on both eye tracking and eye detection, researchers are still trying to find robust methods to use effectively in various applications.

Manpreet Kaur and Mandeep Kaur (2015) [7] proposed a hybrid approach is proposed for automatic detection of exudates from eye fundus images. In this approach, unsharp masking is used for preprocessing, region based segmentation is used for candidate detection and then pixel based classification is used to determine the severity level of the disease. It is important to automatically detect the DR lesions at early stage in order to prevent the further vision loss. Exudates are bright lesions that are considered as primary sign of this disease.

Syed Akhter Hussain and Holambe A. N (2015) [8] proposed a computerized aid diagnosis system to help specialists by displaying useful information such as the location of abnormalities in fundus images This paper is a survey of techniques for Automatic detection of retina image now a days it is plying a vital role in screening tool. This procedure helps to detect various kind of risks and diseases of eyes. Identification of Glaucoma using fundus images involves the measurement of the size, shape of the Optic cup and Neuroretinal rim One of the most common diseases which cause blindness is glaucoma. Early detection of this disease is essential to prevent the permanent blindness. Screenings of glaucoma based on digital images of the retina have been performed in the past few years. Several techniques are there to detect the anomaly of retina due to glaucoma.

Apeksha R. Padaria and Bhailal Limbasiya (2015) [9] provided overview of the different methods for optic cup and optic disc detection from retinal image. Glaucoma is a chronic eye disease, which can be controlled but cannot be cured. If left untreated, loss of vision occurs gradually and even become blind. The detection and diagnosis of glaucoma is important. In glaucoma, Optic Cup (OC) is dependent on the type of glaucoma and the level of intra ocular pressure. Localization of Optic Disc (OD) simplifies the segmentation. OD and OC detection is a primary step in developing an automated algorithm for glaucoma detection.

V. CONCLUSION

This paper presents the different techniques for wrinkles detection, advantages and disadvantages of existing method/algorithm. Wrinkles played an imperative part in the face-based investigation. They have been broadly utilized as a part of uses, for example, facial correcting, outward appearance acknowledgment, and face age estimation. In spite of the fact that a couple of strategies for a wrinkle investigation have been investigated in the writing, poor recognition confines the precision and dependability of wrinkle division. Wrinkles display 3D type of skin and show up as dexterous discontinuities or splits in encompassing skin surface. There are diverse strategies show for facial wrinkles discovery.

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