

An Analytic Approach 3D Shape Descriptor for Face Recognition

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Abstract: *Shape matching and object recognition is one of the challenging tasks in computer vision. Now a day's many techniques are available for recognizing object efficiently. Still a lot of research going on for enhancing the recognition techniques for 3D images and 3D face recognition. 3D shape descriptor has been extensively used in object retrieval and face recognition. To increase performance of object recognition and shape matching lot of advanced algorithm and techniques used. Identification of object will lead to convexing of the shape in the different environment and it requires more precise identification techniques so that the convergence factor is high and error is low. Object recognition has broad range of applications like in handwriting mapping, fingerprint analysis, robotics, remote sensors, and face recognition. In this paper we compare common 3D shape descriptors for shape matching and object recognition for recognizing faces using the concept of Viola Jones object detector framework.*

Keywords: *3D Shape Descriptor, Face Recognition, Object Recognition, Shape Matching, Viola Jones Detector.*

I. INTRODUCTION

Although a remarkable progress is observed in the area of image processing for recognizing shapes. Still it is a challenging task for recognizing 3D shapes or objects. Shape is one of the most important features in computer vision for recognizing objects [6] [7]. The shape of an object is a group of pixel which is used to refer an image.

There are various techniques for recognizing 3D shapes are available like features, color and texture. A shape can be recognized with the help of following three steps:

- 1) Obtaining the structural feature of the shape.
- 2) Establishing a feature space for distinguishing
- 3) Recognition of Object

We consider those recognition algorithm effective which are less complicated and more accurate. There are many techniques available for recognizing 3D shapes for example Curvature scale space (CSS), dynamic programming, shape context, Fourier descriptor, thin plate spline, fuzzy neural network, V-descriptor, HSV color space, Modified shape context(MSC), Image compression using Huffman coding and Run Length Encoding, Novel Recursive Clustering Algorithm(NCRA) retrieving

trademark images with the help of local features and global features, Principal Component Analysis (PCA), Haar classifier is used for two dimensional shapes of an object like rectangle, triangle, circle and their colors and wavelet descriptor [1][8]. Shape descriptors should be strong enough in order to assure intra-class closeness and inter-class separability even in the presence of distortion. Shape recognition methods, analyzes the objects in various ways based on features, colour and texture. A 3D shape description procedure method creates a shape descriptor vector from a given shape and the descriptor helps in finding the recognition rate of an object. To design a powerful recognition system, alert notice to the definition of feature extraction, pattern classes, pattern representation, sensing environment, selection, cluster analysis, classifier design, selection of training and test samples and performance evaluation is unavoidable. There are two techniques which are used for shape recognition structural or syntactic approach because it uses primary patterns to represent regular and irregular shapes.

II. ANALYTICAL APPROACH FOR FACE RECOGNITION

Object recognition is recognizing a specified object class such as cars, faces, plates etc. in a given image or a video sequence [15]. Object recognition and shape matching has many applications in computer vision such as in fingerprint recognition, handwriting recognition, face recognition, remote sensor, robotics, and many others. Let us focus on 2D and 3D face recognition and its challenges. The face is the main centre of attraction in the society [5]. They are natural to human interaction, plays very important role in communicating identity and emotions. A human can recall thousand of faces whole life and recognize known faces possibly even after long duration. This skill is quite powerful, even though large changes in the physical appearance, expressions, aging and confusion such as glasses, beards or changes in hair style [1] [2]. A facial recognition system is applied for recognizing or verifying a person from a digital image [3]. Facial recognition system is already used in day to day authentication application for example passport identification, booking stations, surveillance operations, health- card system, driving license system, ATM,. It can be compared to other biometrics like fingerprint or eye iris recognition system [4] [10]. There are various

biometric features which can be used to identify human like fingerprint, palm print, hand geometry, iris, face, speech, gaits, signature etc. But the main issue was they require active cooperation of person whereas face recognition is a process that does not require any active cooperation of person. Therefore, we can say that face recognition is much more beneficial as compared to the other biometrics. Face recognition has a high identification or recognition rate of greater than 90% for large face databases [9][11].

III. PROPOSED METHODOLOGY

For object detection and shape matching Paul Viola and Michael Jones was the first who introduced a framework “Viola- Jones Object detection framework to increase the object detection rate in real time images [12][13]. In this paper we consider the problem of 3D face detection and recognition using Viola Jones algorithm because it is robust, real time and efficient .It focus on feature selection, creating integral image, training image and cascading classifiers. It is divided into four sub steps:

- Face Feature Extraction using Viola-Jones algorithm & Genetic Algorithm Vision. Cascade Object Detector System object Package: vision Detect objects using the Viola-Jones algorithm Description .The cascade object detector uses the Viola-Jones algorithm to detect people's faces, noses, eyes, mouth, or upper body[13][14].
- System object, detector, configured to detect objects defined by the input string, MODEL. The MODEL input describes the type of object to detect [12]. There are several valid MODEL strings, such as 'Frontal Face CART', 'Upper Body', and 'Profile Face'.
- Face feature extraction optimization is a process of finding better value in any process by the set of inputs to process and output condition.
- Genetic Algorithms (GAs) are search based algorithms which is fully based on concepts of natural selection and its own genetics. Genetic Algorithm is a subset of a bigger branch of computation known as Evolutionary Computation Mutation. We take an input image; Process system based on genetic algorithm and receives the output image. Face recognition using genetic algorithm is shown in figure 1.

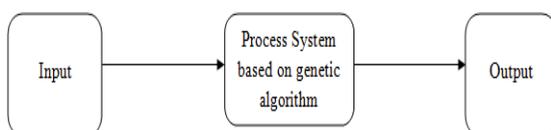


Fig. 1 Face Recognition using Genetic Algorithm

IV. CONCLUSIONS AND FUTURE WORK

3D Face recognition is one of the challenging tasks in the field of computer vision. In this paper we discussed various methodologies used for shape matching and object recognition like face recognition. We introduced 3D face detection and recognition using Viola- Jones algorithm and genetic algorithm either in still images or video images. The technique is faster and efficient than any other previous techniques. In future these algorithms can be applied to improve the efficiency and performance of the face recognition algorithm. We proposed an algorithm for face recognition for 3D images which is applicable in a variety of application areas like passport identification, surveillance operation like CCTV in public places, ATM, health card system, driving license system etc.

V. REFERENCES

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