**FIREACH**

**[JITCSISPRo001]**

**Facial Image Reconstruction Using Elliptical Approximation And Convex Hull**

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(7th Semester CSE)

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**What is an SRS?**

A software requirements specification (SRS) is a comprehensive description of the intended purpose and environment for [software](http://searchsoa.techtarget.com/definition/software) under development. The SRS fully describes what the software will do and how it will be expected to perform. A good SRS defines how an [application](http://searchsoftwarequality.techtarget.com/definition/application) will interact with system [hardware](http://searchcio-midmarket.techtarget.com/definition/hardware), other programs and human users in a wide variety of real-world situations.

**Description**

The Stretch of Biometrics’ applications can only be limited by limiting ones’ imagination! Biometrics is the Science and Technology of measuring and analysing biological data for authentication purposes. In addition to verification the guiding force behind biometric verification has been convenience. Face enjoys a prime position in the realm of biometrics because it is very easily accessible when compared to the other biometrics. Efficient accomplishment of Face Recognition confronts innumerable hurdles in the form of variations in lighting conditions during image capture, Occlusions, damage in facial portions due to accidents etc. The application of Facial Image Inpainting also fails when the occlusions or the deformities are present across the boundary of the object of interest (face), since the bounds for the application of the inpainting algorithm is not precisely defined. Hence recovery of the complete picture of a human face from partially occluded images is quite a challenge in Image Processing. The proposed FIREACH algorithm concentrates on the generation of a convex hull and a non-linear elliptical approximation of the depleted and partially visible boundary of the human face, given different parameters to achieve an Efficient Boundary Recovery. The Boundary Recovery Algorithm is a pre-processing step which aids in setting up of a suitable platform for the proficient application of the Facial Image Inpainting.

**Perspective**

From the user’s perspective, this is an application that accepts the image that is captured from any of the device on to database and runs some algorithms to generate the 3D model of the face in the image which might have regenerated the dormant segments of the original image uploaded.

From the programmer’s perspective, this application take image that is provided by the user and compares it with the originals image available in the database by running Eigen Space and Eigen Face algorithms and run background removal algorithm and mark the silhouette on the image and map the 2D image to 3D by reconstruction for dormant or missing segment of the face using elliptical approximation and convex hull.

**Functional Requirements**

* Image Handling Function
* To recognize facial image.
* To detect percentage of occlusion in the image.
* Elliptical Approximation system
* To draw the shape of the occluded part of the image.
* Processor with 1GHz G.A.
* To reconstruct the image.

**Non-Functional Requirements**

* Efficiency -
* In order to analyse statistical process for estimating the relationships among the variables through elliptical approximation.
* Accuracy –
* As with the bonding between elliptical boundary through agile procedure to end up with a final face reconstruction accurately.
* Delay Handling –
* It defer to put off the later time or to postpone, that means to maintain the status until the completion.

**User Characteristics**

With the dramatic increase in types of data and respective formats, the need to integrate and share data across systems has become vital. Digitizing information makes it easier to preserve, access, and share. Main advantage of digitizing information is that record, storage, playback, modification, and editing can be performed without lowering the quality. Virtual, augmented, and mixture reality techniques have recently been popularized, which is based on various technologies as well as computer vision and graphics. For example, past actors and actresses have been reproduced by computer animation. However the cost for accurate human body modeling is still remain expensive, as it requires special equipment to measure the shape and color, and thus designers have to take long time for the modeling.

Texture mapping properties manage texture map projections for selected surfaces, polysurfaces and meshes. Object representation using texture mapping has become a common technique for visualizing complicated color shapes. Reasons for the recent popularity of image-based [14] rendering techniques include the recently increased availability of special hardware architecture for the texture mapping, and its application to both computer vision and graphics. A 3D human body reconstruction method using a generic body model and 2D images [9] has been proposed. This approach is simple and efficient, although it requires a special background when the pictures are taken. Photo cloning [10] is an efficient image-based rendering technique that generates individualized 3D human body models from photographs of people, without the need of any special equipment. Therefore it can easily immerse the virtual world by using photo cloning. The editing operation is the key area of virtual reality technology. A 3D clothes modeling technique based on the photo cloned human body enables the editing operation in the virtual world. For example, extracted clothes models can be replaced in the virtual world, and can be applied for various fields as well as e-commerce.

Human body modeling [3] plays vital roles in various fields, for example, industrial and medical applications as well as computer graphics [16]. Currently image based rendering techniques have been popularized, because the texture mapping gives visually real models. The development of a photo cloning system, which uses front, profile and rear view photographs and generates individual 3D human body/face model based on a generic model is still progressing. The basic concept of the photo cloning is that the lost 3D information on the photographs can be recovered by the correspondence between the photographs and the generic body model. Here is a brief description of the edge detection [2] based novel technique for the human body modeling.

**Constraints**

1. This software can only be used to encrypt bitmap images. It does not work on layered images i.e images of another format.
2. Another constraint is that it needs a specific type of image. Not every image can be encrypted.

**Assumptions and Dependencies**

It is assumed that the user has a database with suitable images that can be used by this program.

The user must have the appropriate software and hardware requirement to run the software.

**User Interface**

The user interface is very minimalistic with a simple dialog box containing a “load/browse” button to load the image from the file system. And it has a “submit” button to submit the selected image as the input to the software.

**Hardware Interface**

The software can be run on any PC, but basically we need:

* Memory
* RAM with Minimum of 2GB
* Photo Capturing Device
* GPU(Graphical Processing Unit)
* Other, basic computer components like mouse, keyboard, etc.

**Software Interface**

The software interface comprises of all basic software built in to the O.S,

Other than that the specific requirements are:

* Image loader[Windows image loader]
* Database[MySQL]
* Image Editors[Photoshop]
* Image Convertors[3D MAX]
* Text Editors[Notepad++]