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# A Novel Face Erection and Detection through Fuzzy Grammar

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***Abstract***: *This paper presents a structural face construction and detection system. The proposed system consist of the different lightning, rotated facial image, skin color etc. These systems only deal with facial recognition method. The Practical limitations are present in this method. These methods only detect the face when the inputs are full face image. In our method there is no need to show full face of user. We only handle the side view face image. Depending on the face view compare the template face image and fix in which side extract the face up to nose. And construct mirror of the remaining side. Now appropriate face has to be constructed. These formulated face image then compare with original image with local binary pattern.*

## I. INTRODUCTION

Face recognition has discussed by many researchers. Although human face components are eyes, nose, mouth, skin color and different lighting. Depends on this Components face detection is developed the researches. Among the exacting face detection automation method [1],[2] the full face of input only given to recognition. But the problem is if the image having side view of the face then these systems cannot detect.

The human face having most of meaningful information. Among that the face expression is popular for researchers. There are many method to implement knowledge based system. The location of the face in an image is difficult for face automation system. Feature-based face recognition[3] technique have demonstrated the facial variation. But this process, a large amount of dependency in neighboring pixels. Similarly skin color is not enough to track the face[4].There can be localized. Illumination variations, objects like skin can appear. It can only work well when prior assumptions are satisfied.

In our method we first detect the edges of the face for that image we segment only the face part and remove the hair and ear. Next we check whether input image are left side view or right side view using already stored template. This resulted image primitive extracted up to half model of human face[1] using fuzzy grammar. And mirror of partial result will placed in remaining half appropriate human face. This constructed image can iteration and the resulted image have appropriate face model. This will be recognized with local binary pattern under different lightning condition[2].

## II. FACE ERECTION

### 2.1 EDGE DETECTION

The face construction model block diagram is given below. In this model first we detect edges for facial image. And compare with the template face image model this will be given a which side view the image are present. To find the face localization [5].In this localization this will measure the various pattern localized. Roberts mask are convolved low pass filter to evaluate horizontal and vertical gradient of the image.

$I_X = I_{filtered} Ó[I-1]$, $I_y = I_{filtered} Ó[I-1]$ (1)

The global threshold is applied for whole input image. So 20% inputs pixels are regarded as edges.

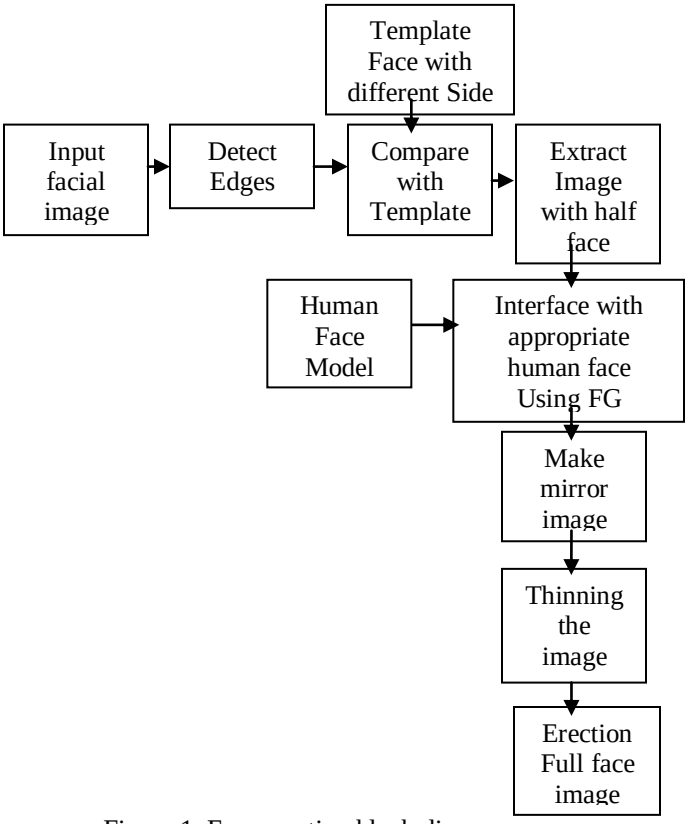


Figure 1. Face erection block diagram.

### 2.2 EXTRACTION IMAGE USING FUZZY GRAMMAR

Fuzzy Grammar are constructed used in recognition pattern. Fuzzy grammar application are the production rules and the membership values are predefined [1].For our application the human face model has predefined. And just extract the image depends on the face angle variation. A generic algorithm has used for this purpose.

### 2.3 FUZZY GRAMMARS

A fuzzy grammar (FG) is a 6-tuple (VN, VT,~ S,J,p) where VN is a set of non-terminals, VT is a set of terminals, P is a set of production rules, S is a starting point, J = {pi I i = 1,. ..,n, n = cardinality of P} is the set of labels for production rules, and p is a mapping p : J

+ [0,1].

FG generates a fuzzy language (L(FG)) as follows. A string 2 E V$ is in L(FG) if it is derivable from S, and its grade of membership p~(~c)(x= maxllklm [minll;ll,p(r:)] in L(FG) is > 0, where m is the number of $k^{th}$ derivations that x has in FG; lk is the length of the derivation chain, and rf is the label of the $i^{th}$ production used in the $k^{th}$ derivation chain, i = 1,. . . , lk. If a production Q + /3 is visualized as a chain link of strength p(~), where T is the label of Q ---+ /3, then the strength of a derivation chain is the strength of its weakest link, and there- fore ~L(FG)(x) = strength of the strongest derivation S to 1: for all 2 E V;. chain from[1]

In face components extraction there will used primitive Extraction. Octal chain code use to detect edges of the image. First scan the pixels and find the edges, Octal code is then produced for each edges. Here each pair replaced by digit[1].

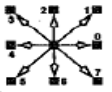

Figure.2. Octal chain Code

Figure.3. Input image and preprocessing result

The extraction primitives for pupil are

O5 7 O3 7 0 0 7 0 (0 7)12 0 6 6 5 4 43 (5 4 4)3 5 i5 4 4 5 4 4 5 43 5 410 3 44 (3 4 417 (3 4)3 (2 4)3 24 1 1 (0 113 001 04 io6 1011.[1]

For every face component there was defined fuzzy grammar. Both production and membership values of face companents.In face detection, present pattern and noise has to be measured and reject that noise to compare external template..

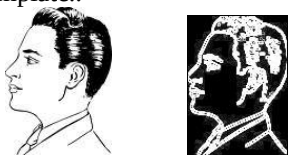

Figure.4. Input side view and edge detected output

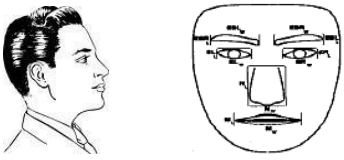

Figure.5. Mirror of input image and human face model.

These input images are used to extract the image with human face model. The pixel are replaced with human model and Extract up to half rang of human face.

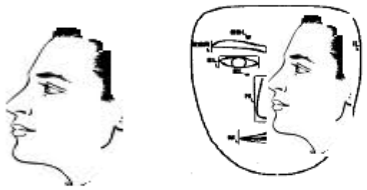

Figure.6. Face data and compare with template data

Figure.7.Constracted face

In this stage, the face components are extracted from the constructed face image like eyebrows, eyes, nose, mouth and face edges.

### 2.4 MERGER

Several overlap occur in face detection. The merger have two step. First position has 3x3 combining filter. The second filter has same work but 20x20 size filter[5].

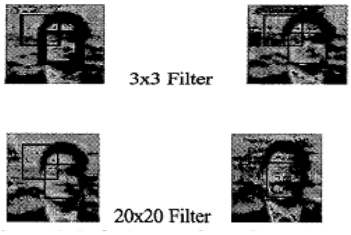


Figure.8 merge the image with 3x3 and 20x20 filter

## III. Recognition

We verify the face using facial extraction. First detect the boundary value of the image and extract two region containing eye and eyebrows[3].The face verification is carry by filtering RFM to extract eye and nose-mouth part. The face locator is first trained up to acceptable error level. And note the important points like eye, nose, mouth. This training method is repeat until the acceptable error level [5].

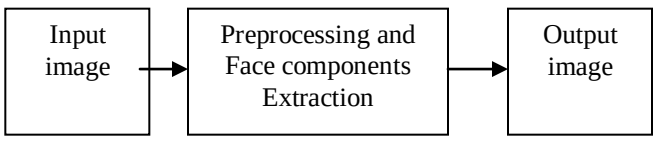


Figure.9. Recognition block diagram.

## IV. Experimental Result

In this method we construct a appropriate face model for the given input. This result will testing with windows Microsoft XP on a dual core. The compiler used in IDL 6.3.These will be color and also be grayscale images. In

color image first convert into grayscale and do the face construction. And finally make the recognition. The experimental result show that the implementation of face components extraction stage will consider. in order to overcome consider the light variation and face components variation should be consider.

## V. CONCLUSIONS AND FUTURE WORK

A system has been proposed in this paper for facial construction and detection. An input image edges detected first and for that result we fix which side extract the image. The fuzzy Grammar has to use to construct the half face. Next to compare with human face model and construct particular face component. Now the result will appropriate face for particular image. This image then preprocessing and noise are removed then compare with stored image using local binary pattern recognition. The possess about human faces, and makes the final decision. Together with each detected face, a value is produced to denote the degree of membership of the face within the face class.

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