# Human Detection using Morphological Analysis and Image Parsing Technique

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# Introduction

- Most searched content.
- Use to bring out various émotions and myriade of human feelings and moments.
- Images in the web are stored in the form of table or tables.
- Image search accuracy is fairly low.
- First step in many surveillance systems.

Abhishek Maity, Sayan Dasgupta, and Debjit Paul. "A Novel Approach to Face Detection using Image Parsing and Morphological Analysis." International Journal of Computer Trends and Technology (IJCTT) 23: 155-161.

# Overview of Work

- Two steps are usually followed for the searching of images

    - Query Building

        Formation of the search query for searching the images.
    - Information Retrieval

        Displaying of the images based on the matched results.

- Here using ***Morphological Analysis*** and ***Parsing*** of a given image, we tend to bring out the human present in the picture.

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# Morphological Analysis

- Identification, analysis, and description of the structure of the smallest unit of words
- Theory and technique for the analysis and processing of geometric structures

  - *Based on set theory, lattice theory, topology, and random functions*
  - *Extract image components useful in the representation and description of region shape such as boundaries, skeletons, and convex hull*
  - *Input in the form of images, output in the form of attributes extracted from those images*
  - *Attempt to extract the meaning of the images*

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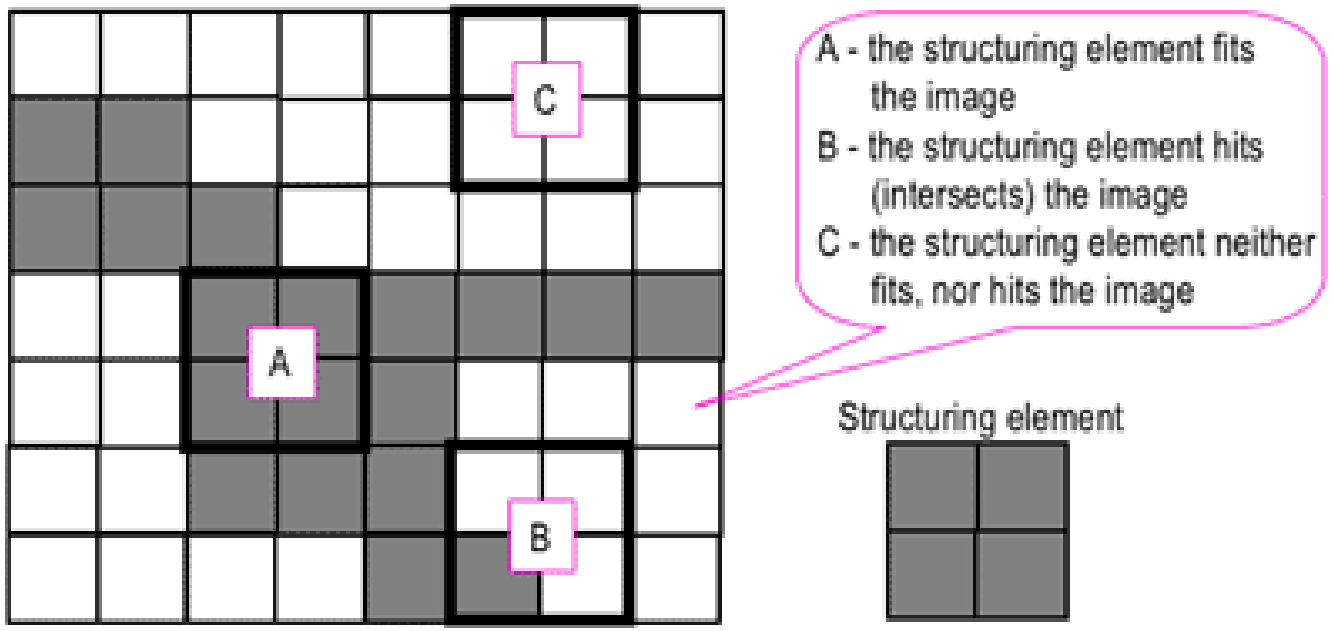
*Morphological techniques probe an image with a small shape or template called a **structuring element**.*

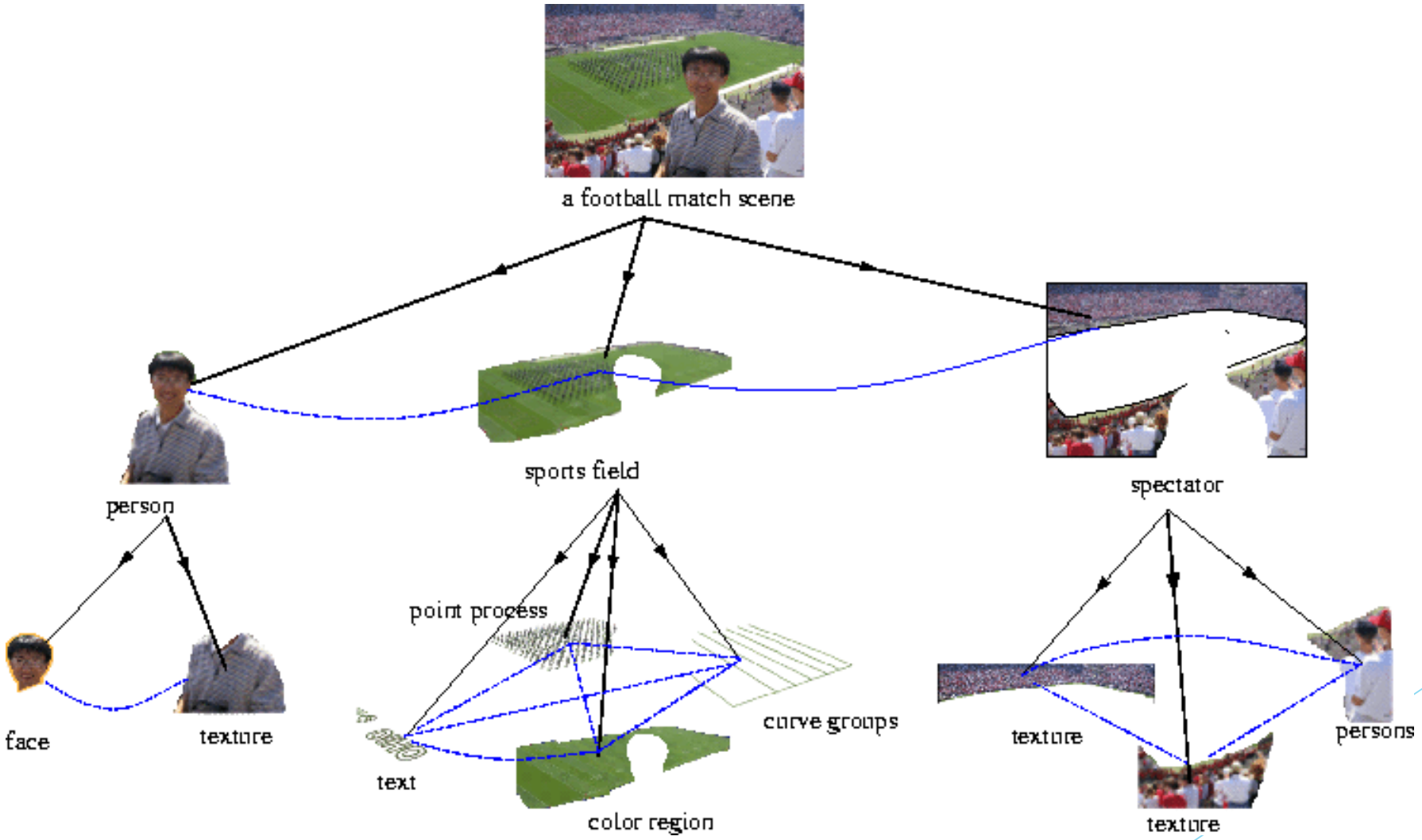



Probing of an image with a structuring element
(white and grey pixels have zero and non-zero values, respectively).

*A morphological operation on a binary image creates a new binary image in which the pixel has a non-zero value only if the test is successful at that location in the input image.*

# Image Parsing

- The objective of image understanding is to parse an input image into its constituent patterns.



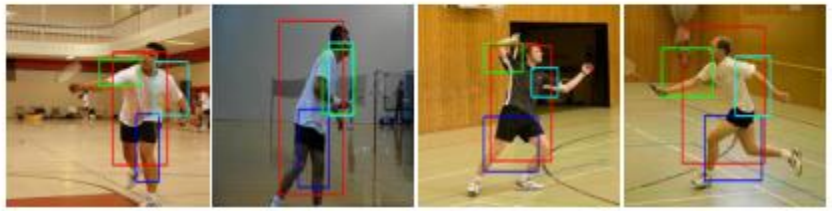


*Figure 6:* Examples of other information produced by our model. On each image, we show bounding boxes corresponding to the whole body, left arm, right arm and legs. The size of each bounding box is estimated from its corresponding poselet cluster.

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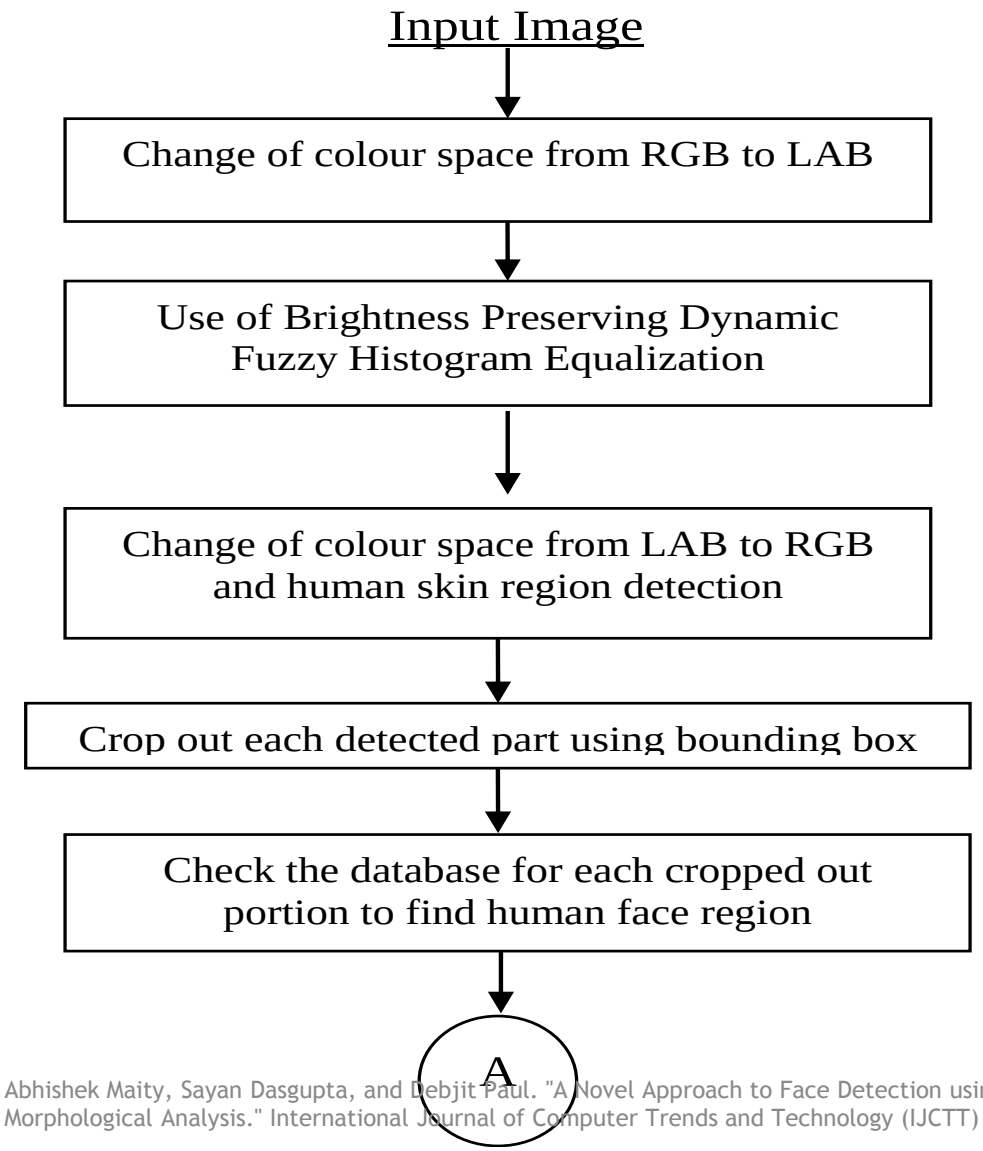
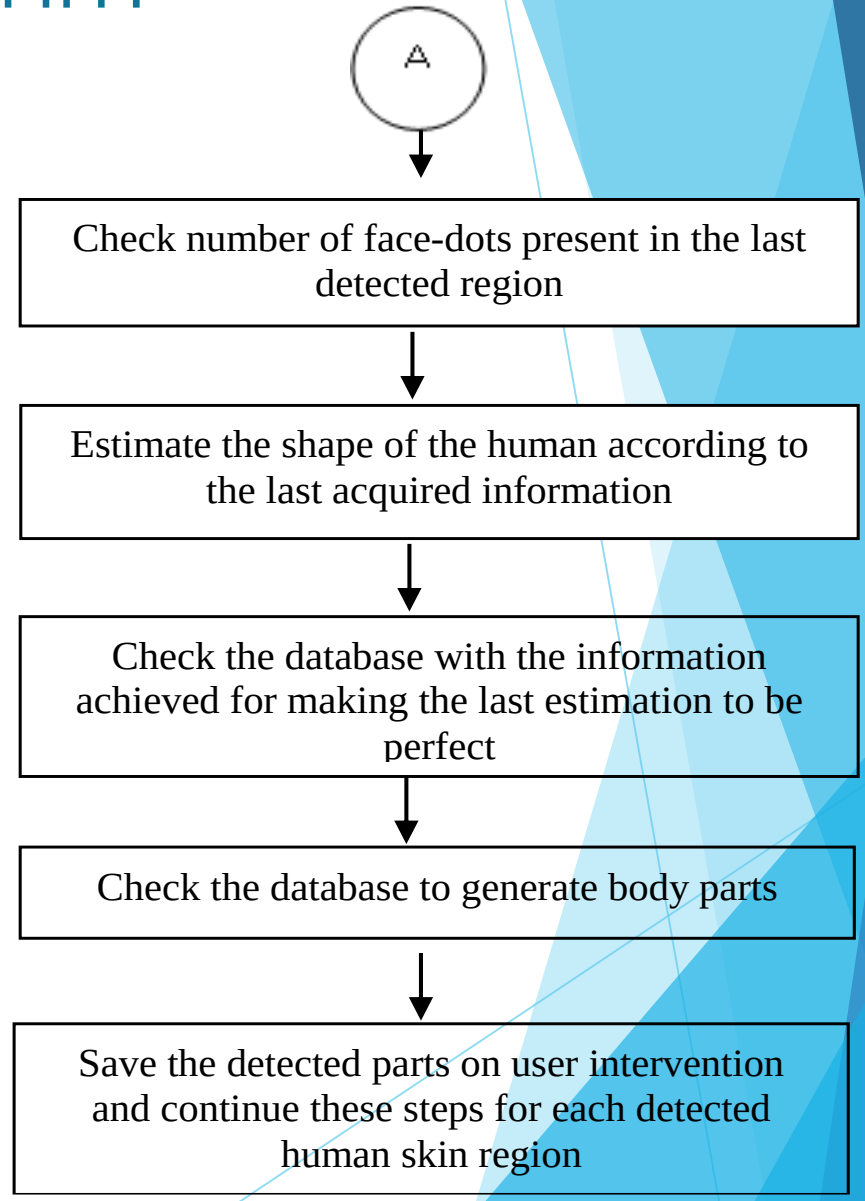
# Proposed Algorithm

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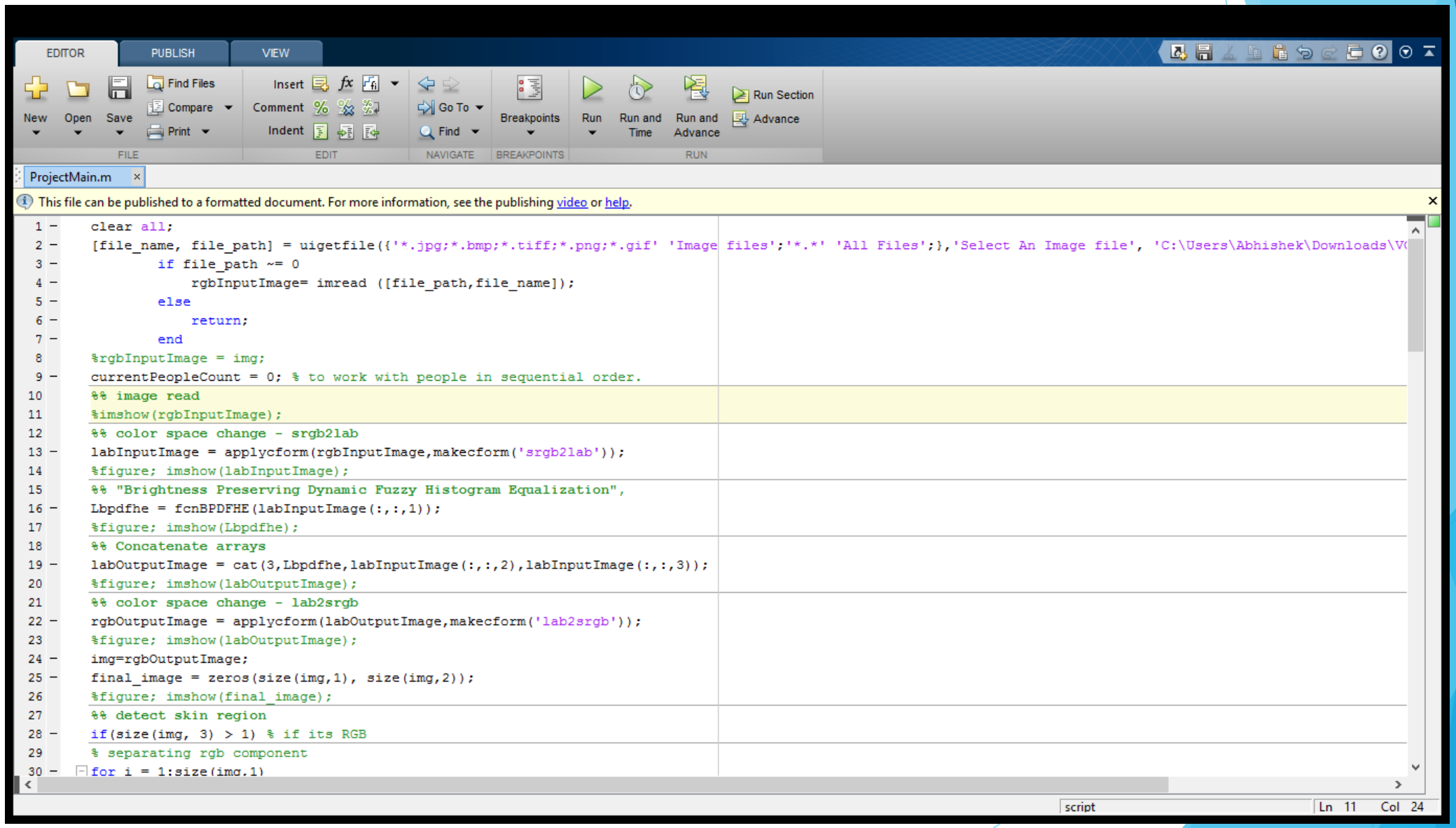
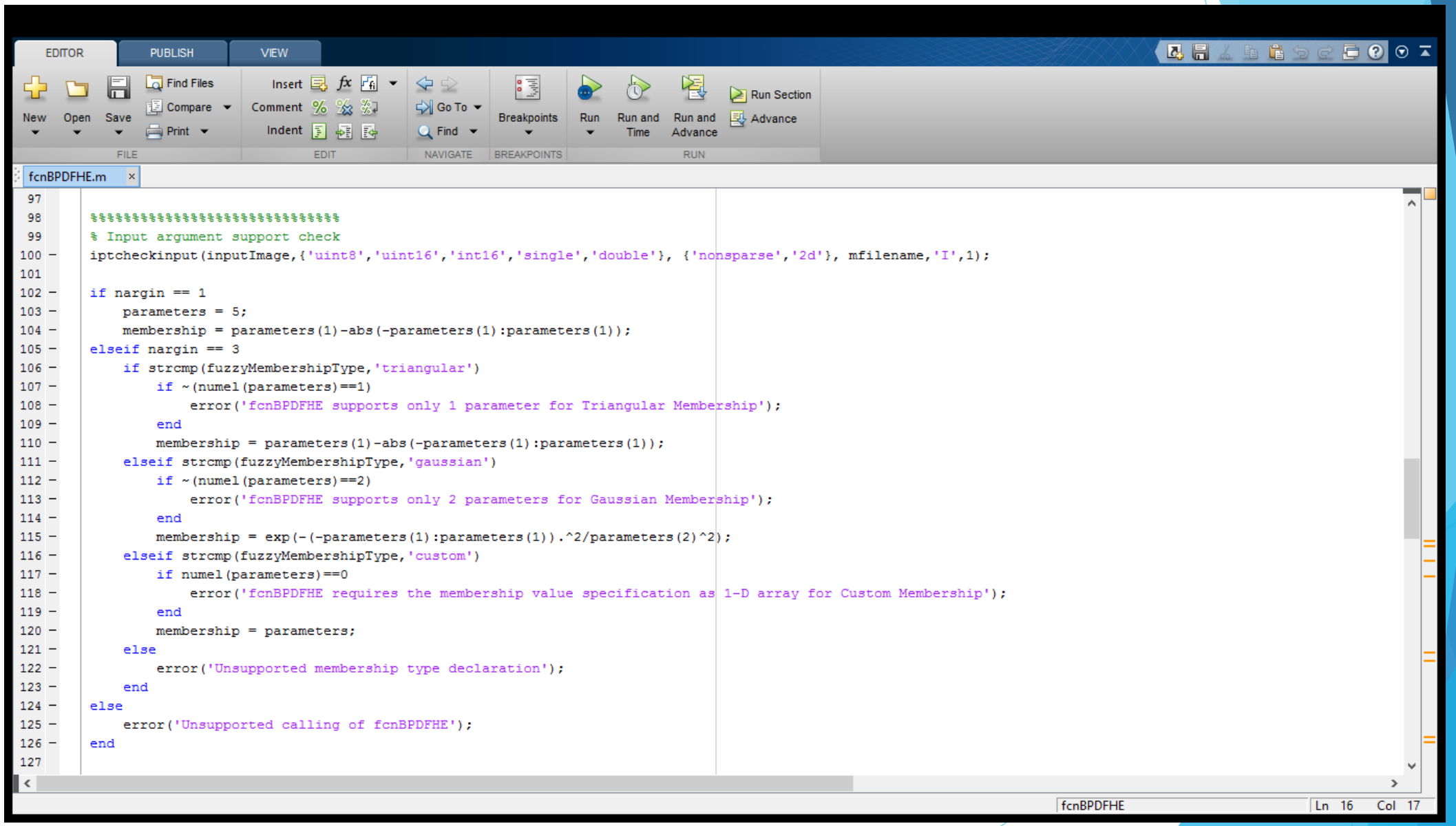
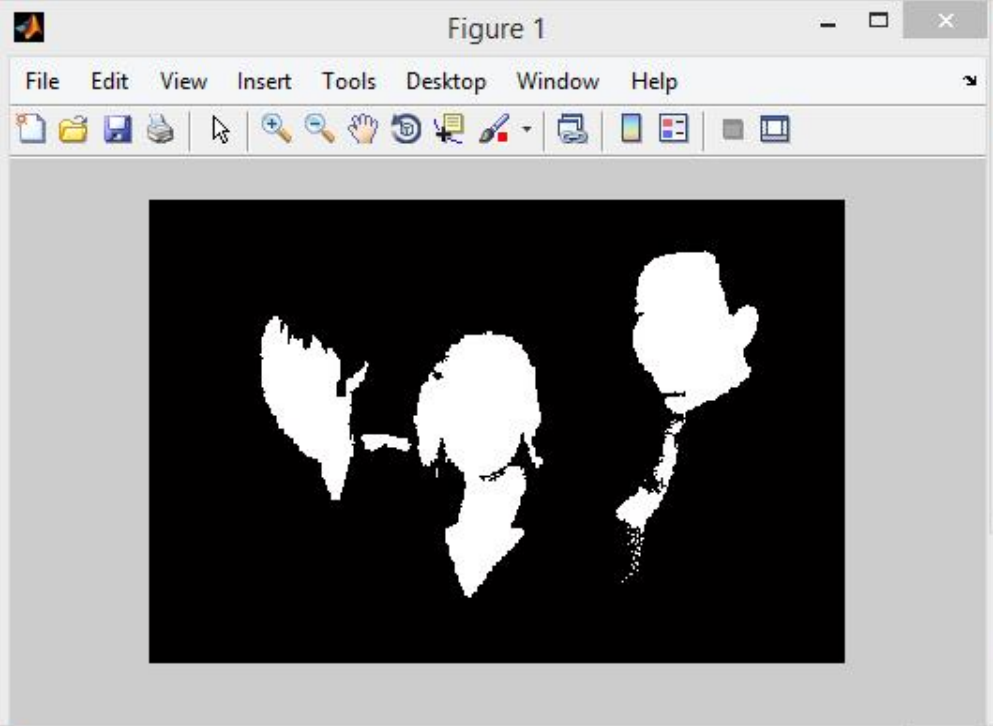
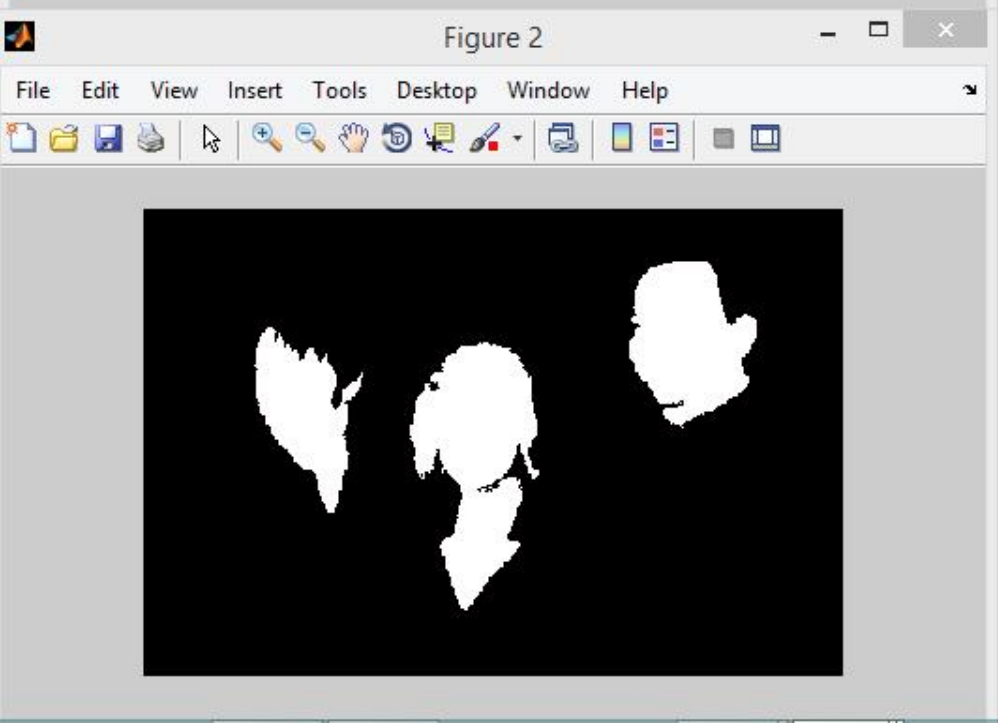
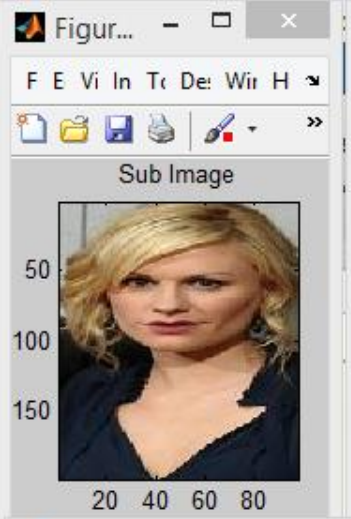
# Code Snippet




EDITOR
PUBLISH
VIEW
New
Open
Save
Find Files
Compare
Print
Insert
Comment
Indent
Go To
Find
Breakpoints
Run
Run and Time
Run and Advance
Run Section
Advance
FILE
EDIT
NAVIGATE
BREAKPOINTS
RUN
fcnBPDFHE.m
97
98 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
99 % Input argument support check
100 iptcheckinput(inputImage,{'uint8','uint16','int16','single','double'}, {'nonsparse','2d'}, mfilename,'I',1);
101
102 if nargin == 1
103 parameters = 5;
104 membership = parameters(1)-abs(-parameters(1):parameters(1));
105 elseif nargin == 3
106 if strcmp(fuzzyMembershipType,'triangular')
107 if ~(numel(parameters)==1)
108 error('fcnBPDFHE supports only 1 parameter for Triangular Membership');
109 end
110 membership = parameters(1)-abs(-parameters(1):parameters(1));
111 elseif strcmp(fuzzyMembershipType,'gaussian')
112 if ~(numel(parameters)==2)
113 error('fcnBPDFHE supports only 2 parameters for Gaussian Membership');
114 end
115 membership = exp(-(-parameters(1):parameters(1)).^2/parameters(2)^2);
116 elseif strcmp(fuzzyMembershipType,'custom')
117 if numel(parameters)==0
118 error('fcnBPDFHE requires the membership value specification as 1-D array for Custom Membership');
119 end
120 membership = parameters;
121 else
122 error('Unsupported membership type declaration');
123 end
124 else
125 error('Unsupported calling of fcnBPDFHE');
126 end
127
fcnBPDFHE
Ln 16 Col 17

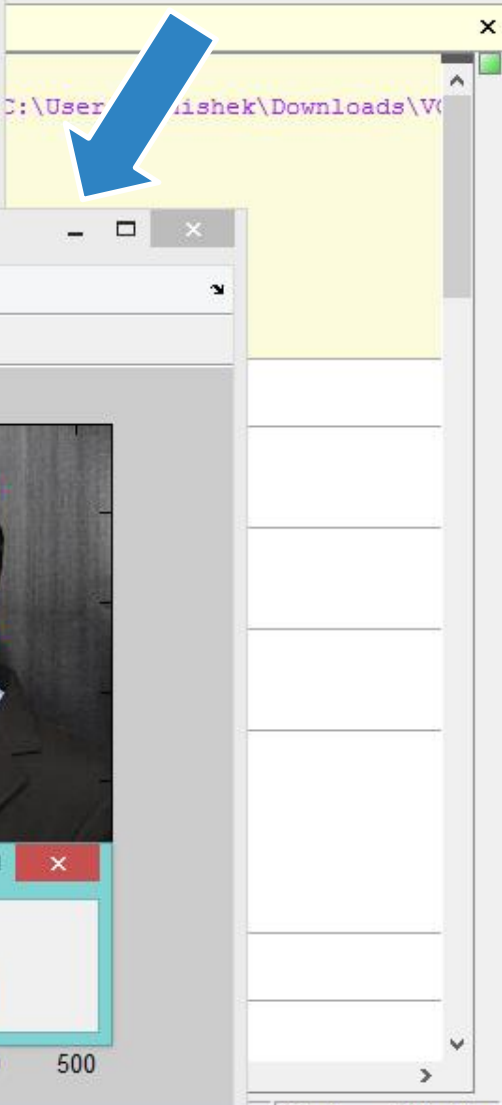





Successful Detection



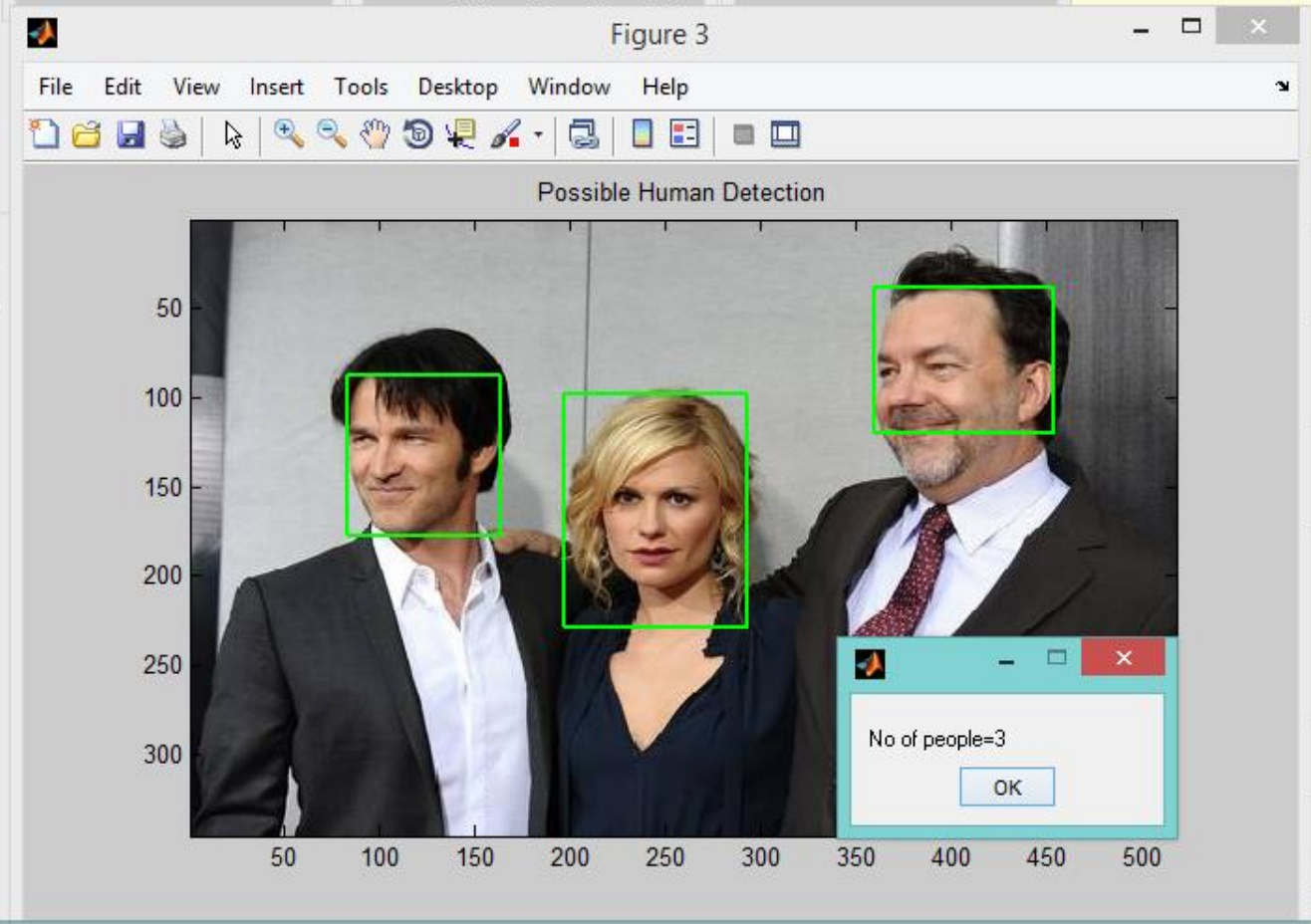



Figure 1

File Edit View Insert Tools Desktop Window Help

\Abhishek\Downloads\Cc

Run and Time | Run and Advance | Run Sectio | Advance

RUN

gif' 'Image files';'*.

No of people=5

OK

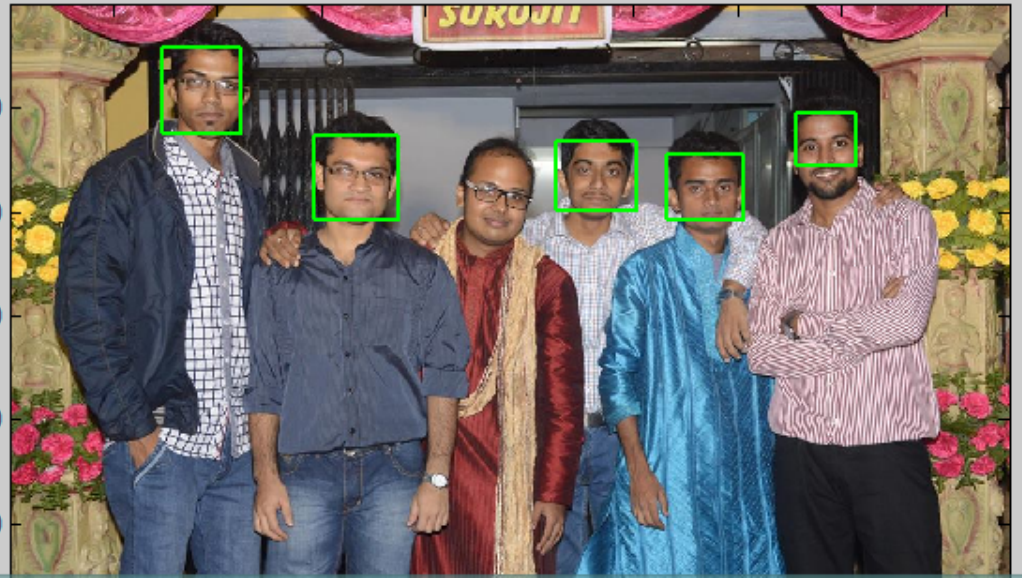
Figure 2

File Edit View Insert Tools Desktop Window Help

Figure 3

File Edit View Insert Tools Desktop Window Help

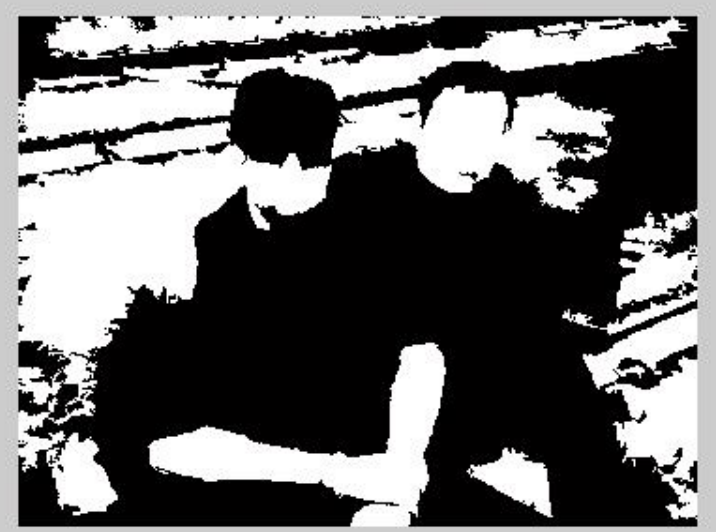
Possible Human Detection



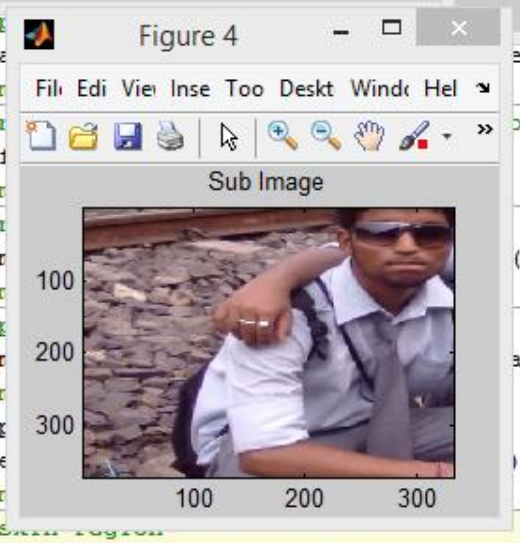

```
14    %figure; imshow(labInputImage);
15    %% "Brightness Preserving Dynamic
16 -  Lbpdfhe = fcnBPDFHE(labInputImage(
17    %figure; imshow(Lbpdfhe);
18    %% Concatenate arrays
19 -  labOutputImage = cat(3,Lbpdfhe,lab
20    %figure; imshow(labOutputImage);
21    %% color space change - lab2srgb
22 -  rgbOutputImage = applycform(labOut
23    %figure; imshow(labOutputImage);
24 -  img=rgbOutputImage;
25 -  final_image = zeros(size(img,1), s
26    %figure; imshow(final_image);
27    %% detect skin region
28 -  if(size(img, 3) > 1) % if its RGB
29    % separating rgb component
30 -  for i = 1:size(img,1)
```

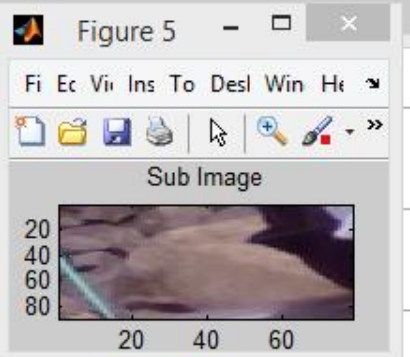
**Partial Detection**

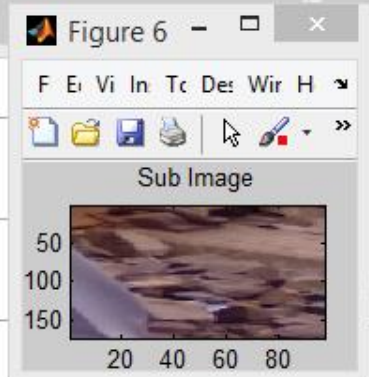
Ln 1 Col 1







**Erroneous Human Detection**

```
%% color sp
labInputIma
%figure; ir
%% "Brightn
Lbpdfhe = i
%figure; ir
%% Concater
labOutputIr
%figure; ir
%% color sp
rgbOutputIr
%figure; ir
img=rgbOutp
final_image
%figure; ir
%% detect skin region
if(size(img, 3) > 1) % if its RGB
% separating rgb component
for i = 1:size(img,1)
```

script Ln 28 Col 35

# Result & Analysis

Accuracy $\boldsymbol{\eta}$ (in terms of percentage)

Where successful test files=16,total no. test files=21

$$\boldsymbol{\eta} = \frac{Successful\ test\ files}{Total\ no.of\ test\ files} \times 100 = \boldsymbol{76.19\%}$$

- There has been a significant progress in the process of object identification in the input test image file.
- Humans can be extracted easily from a wide variety of objects from a set of images

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# Limitations

- Full frontal face is necessary for the detection.
- The training has been done mainly on living organism. The training for the inanimate objects are yet to be incorporated into the system.
- Finally though since it is the field of image searching and recognition a hundred percent accurate output is not possible.

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# Future Scope

- Since we are working on the field of image searching and recognition a hundred percent accurate output is not possible.

- So in our future work we plan to improve on this accuracy. In this improvement work we plan to implement some more advanced features such as the Watershed algorithm, the SUSAN operator technique etc.

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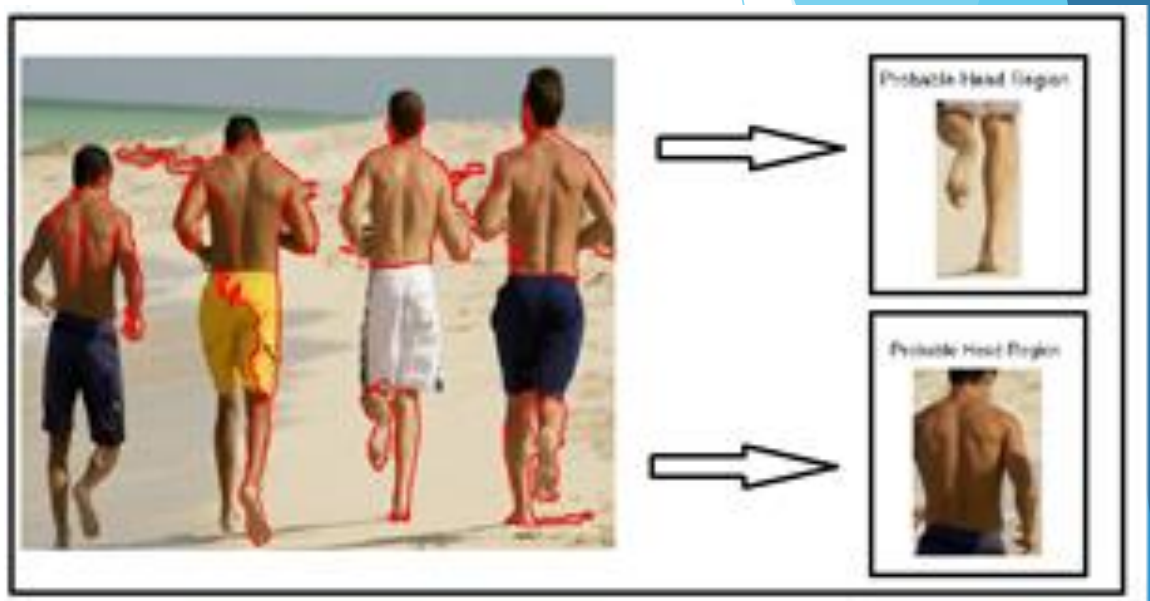
Now as we know a full frontal face is necessary to have. That means if there is a human present in an image and it is showing the back only then the above approach has to be modified [***Figure beside***]. Furthermore the training has been done mainly on human being, so in our future work we plan to train our system more accurately on other living organisms and non-living as well and even plan to incorporate the training of inanimate objects in our system.



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# Thank You