

# **TNM087 - Image Processing and Analysis**

## **Task 3 – Elliptic Mask**

### **Background:**

For two vectors `rvec` and `cvec` the command `meshgrid` generates a grid where the coordinates of the grid points are given by `(rvec(k), cvec(l))`. Read the documentation of `meshgrid`

Three points define an ellipse: two points specify the longer (major) axis and one point (together with the midpoint of the major axis) defines the minor axis. These three points can be selected with the help of `ginput`. A circle is a special ellipse where minor and major axes are equally long. Read <https://en.wikipedia.org/wiki/Ellipse> for background information about ellipses.

### **Task:**

Read in the image and specify an ellipse that covers the face (use a small ellipse). First select the center point (near the nose), then select a second point (near the hair) and finally a point near the left ear. These two points define the long axis of the ellipse that define the mask of the face.

Next specify a circle (choose your own method to define the circle) describing one of the eyes. Do this by first selecting the center of the eye and then one of the boundary points of the circle.

First replace the pixels outside the face ellipse by black pixels.

Next replace the pixels in the eye circle with red pixels

### **Syntax:**

`function MImage = EllipsMask(FImage)`

where `Fimage` is the image with the face (usually 8-bit grayvalue) and `MImage` is the result (RGB image, 8bit)

### **Hints:**

In the simplest acceptable solution you can assume that the axes of the face ellipse are parallel to the coordinate axes.

An example can be seen as `einstein_x3.jpg`

The Matlab/Image conventions regarding columns/rows and x/y coordinates is important here. It is perhaps easiest if you decide your personal style and then stick to it. In the template we use

```
[sr,sc] = size(FImage);  
[C,R] = meshgrid((1:sc),(1:sr));
```

It is also possible to use  $[X,Y]$  or  $[Y,X]$  or some other convention. Make yourself familiar with `meshgrid` (for example with `[AA,BB] = meshgrid((1:2),(1:3))`) and decide what to do.

Use `einstein.jpg` as your `FImage`