CMPT 732

Practices in Visual Computing 1, Fall 2022

ASSIGNMENT 1

SANJANA MISHRA

PART 1

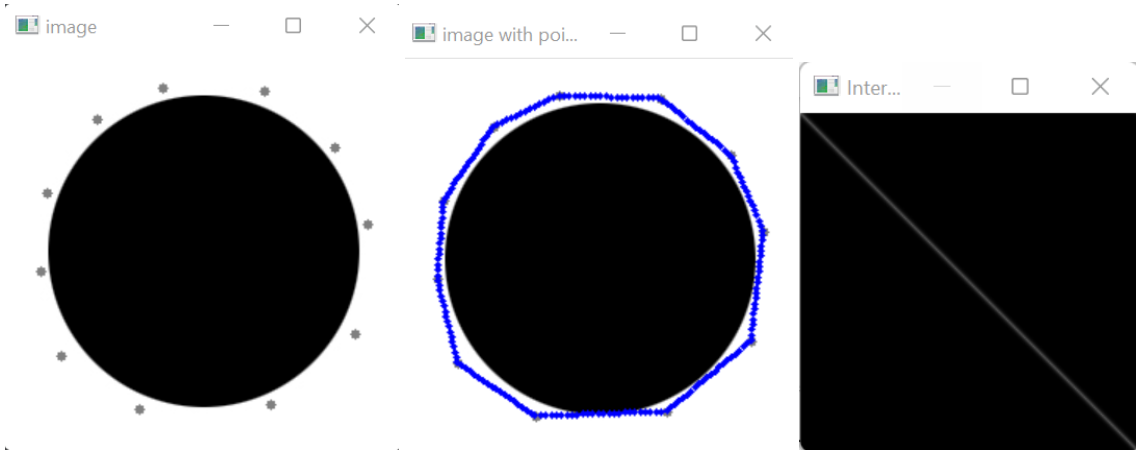
This section shows the visualizations related to Part 1 of this assignment.

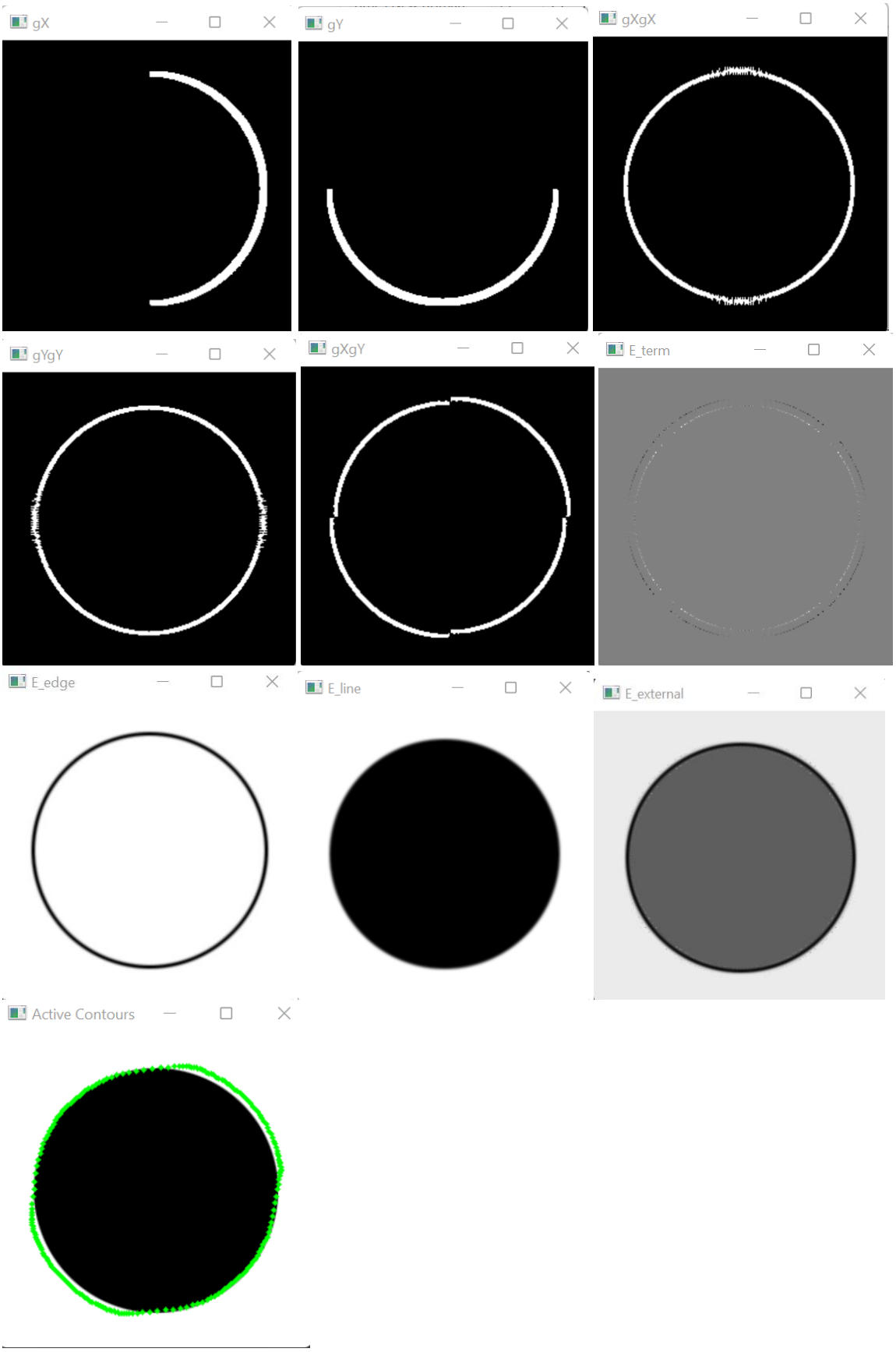
Active Contours

Binary images:

1. Circle:

```
alpha = 0.5 #tension
beta = 2. #smoothness
gamma = 1. #step-size
kappa = 0.5 #external factor
```



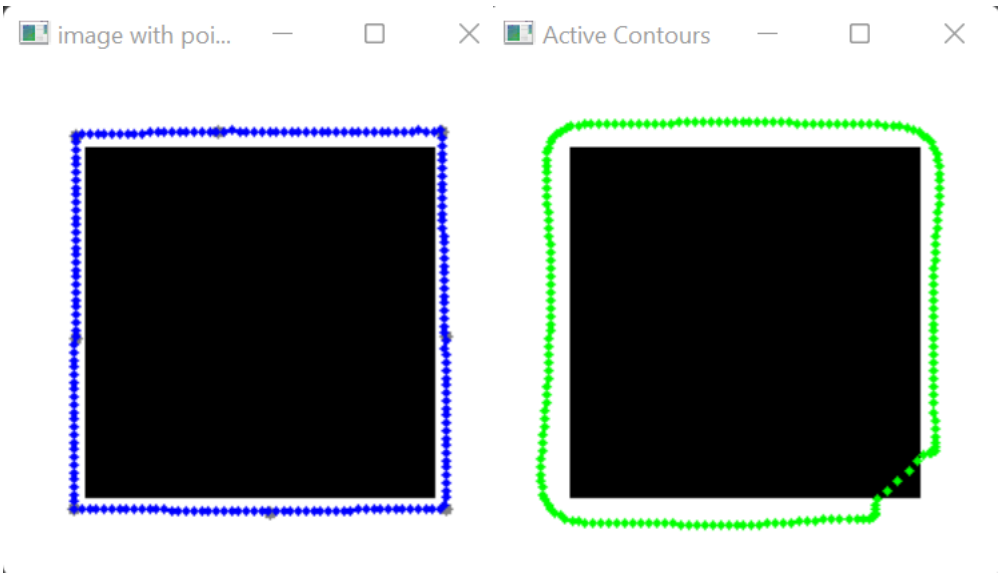

gX
gY
gXgX
gYgY
gXgY
E_term
E_edge
E_line
E_external
Active Contours

2. Square:

```
3. alpha = 0.02 #tension
   beta = 0.5 #smoothness
   gamma = 1. #step-size
   kappa = 1. #external factor
   num_points = len(xs)

   #get matrix
   M = get_matrix(alpha, beta, gamma, n)

   #get external energy
   w_line = 0.5
   w_edge = 0.5
   w_term = 0.5
```

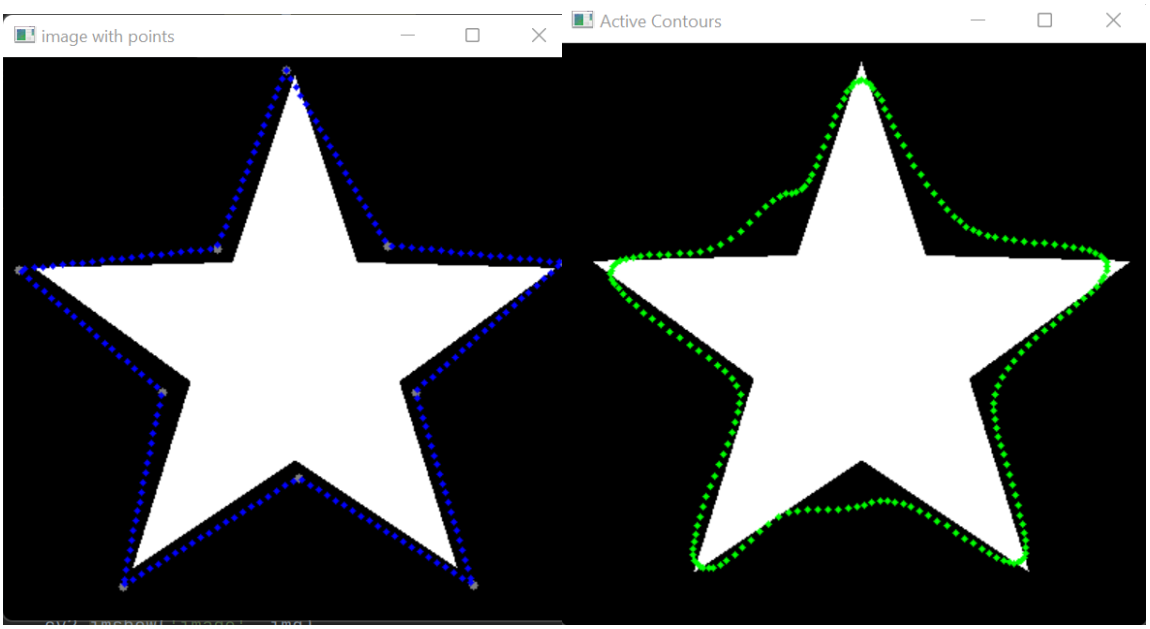


4. Star:

```
alpha = 0.04 #tension
beta = 0.5 #smoothness
gamma = 1. #step-size
kappa = 1.5 #external factor
num_points = len(xs)

#get matrix
M = get_matrix(alpha, beta, gamma, n)

#get external energy
w_line = 0.5
w_edge = 0.5
w_term = 1.5
```

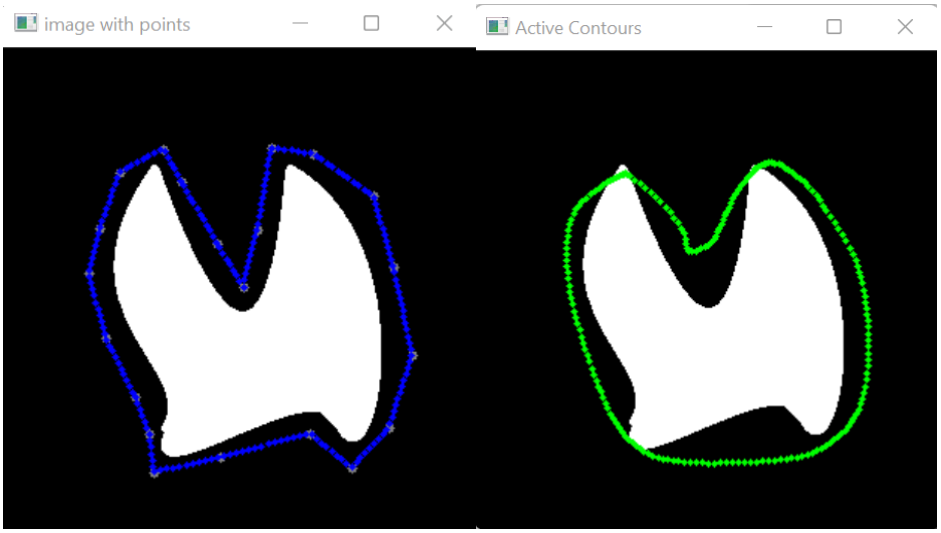


5. Shape:

```
6. alpha = 0.5 #tension
   beta = 1.5 #smoothness
   gamma = 1.5 #step-size
   kappa = 1.5 #external factor
   num_points = len(xs)

   #get matrix
   M = get_matrix(alpha, beta, gamma, n)

   #get external energy
   w_line = 0.5
   w_edge = 1.5
   w_term = 2.5
```

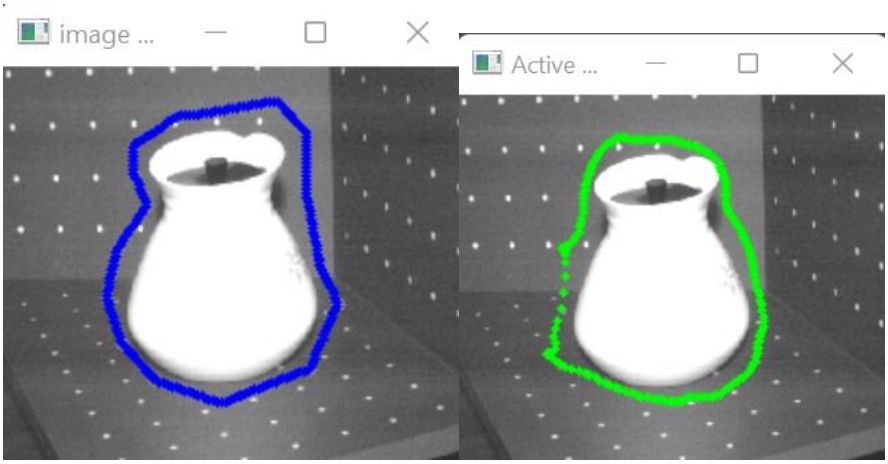


7. Vase:

```
8. alpha = 0.2 #tension
   beta = 0.5 #smoothness
   gamma = 1. #step-size
   kappa = 1.5 #external factor
   num_points = len(xs)

   #get matrix
   M = get_matrix(alpha, beta, gamma, n)

   #get external energy
   w_line = 0.5
   w_edge = 0.5
   w_term = 1.5
```



Row of teeth:

```
alpha = 0.09 #tension
beta = 0.5 #smoothness
gamma = 1. #step-size
kappa = 5.5 #external factor
num_points = len(xs)

#get matrix
M = get_matrix(alpha, beta, gamma, n)

#get external energy
w_line = 0.5
w_edge = 0.5
w_term = 1.5
```

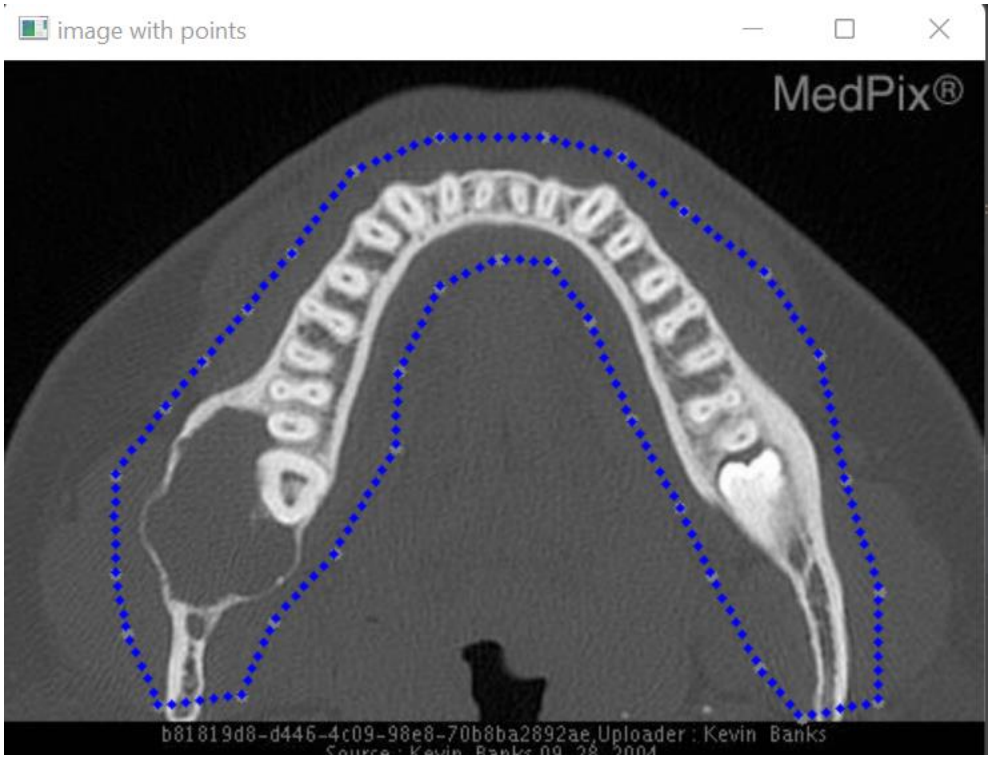
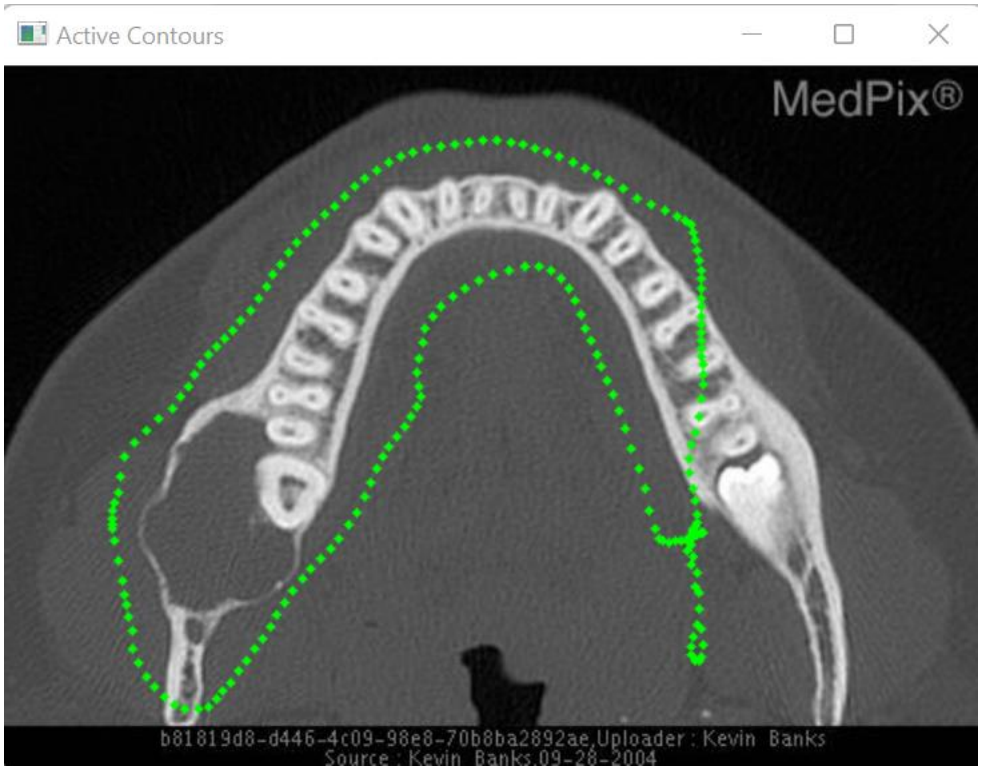


image with points
MedPix®
b81819d8-d446-4c09-98e8-70b8ba2892ae,Uploader : Kevin Banks

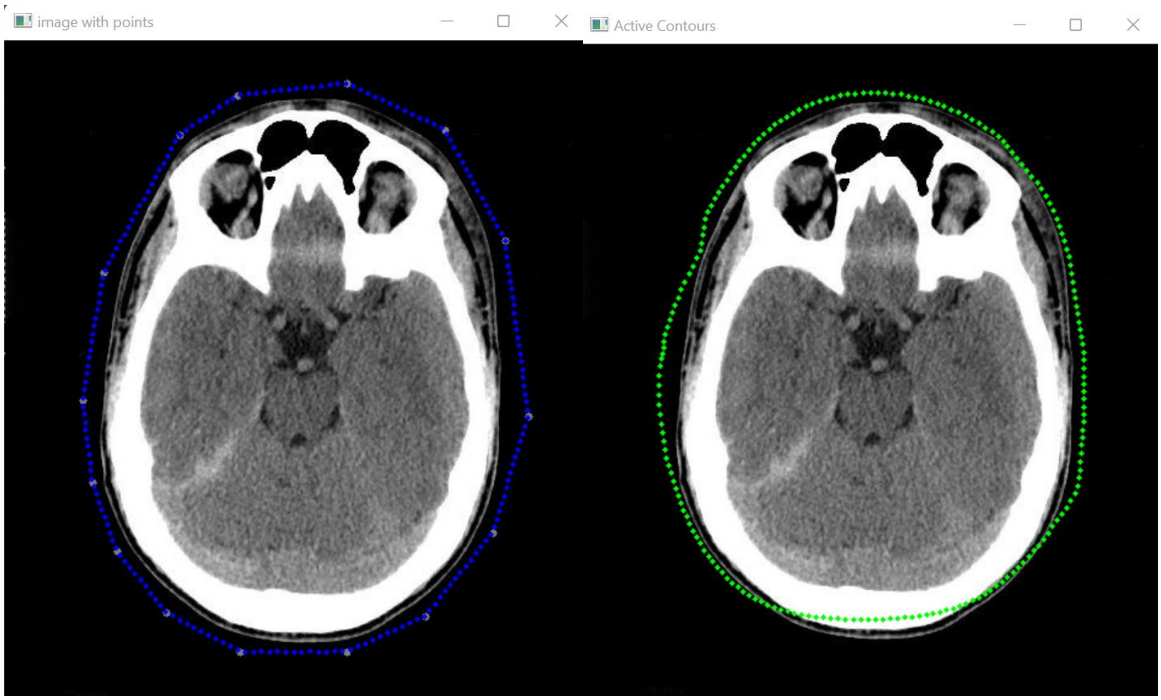

Active Contours
MedPix®
b81819d8-d446-4c09-98e8-70b8ba2892ae,Uploader : Kevin Banks
Source : Kevin Banks 09-28-2004

Outer layer of the skull:

```
alpha = 0.1 #tension
beta = 0.5 #smoothness
gamma = 0.5 #step-size
kappa = 0.5 #external factor
num_points = len(xs)

#get matrix
M = get_matrix(alpha, beta, gamma, n)

#get external energy
w_line = 0.5
w_edge = 1.5
w_term = 0.5
```

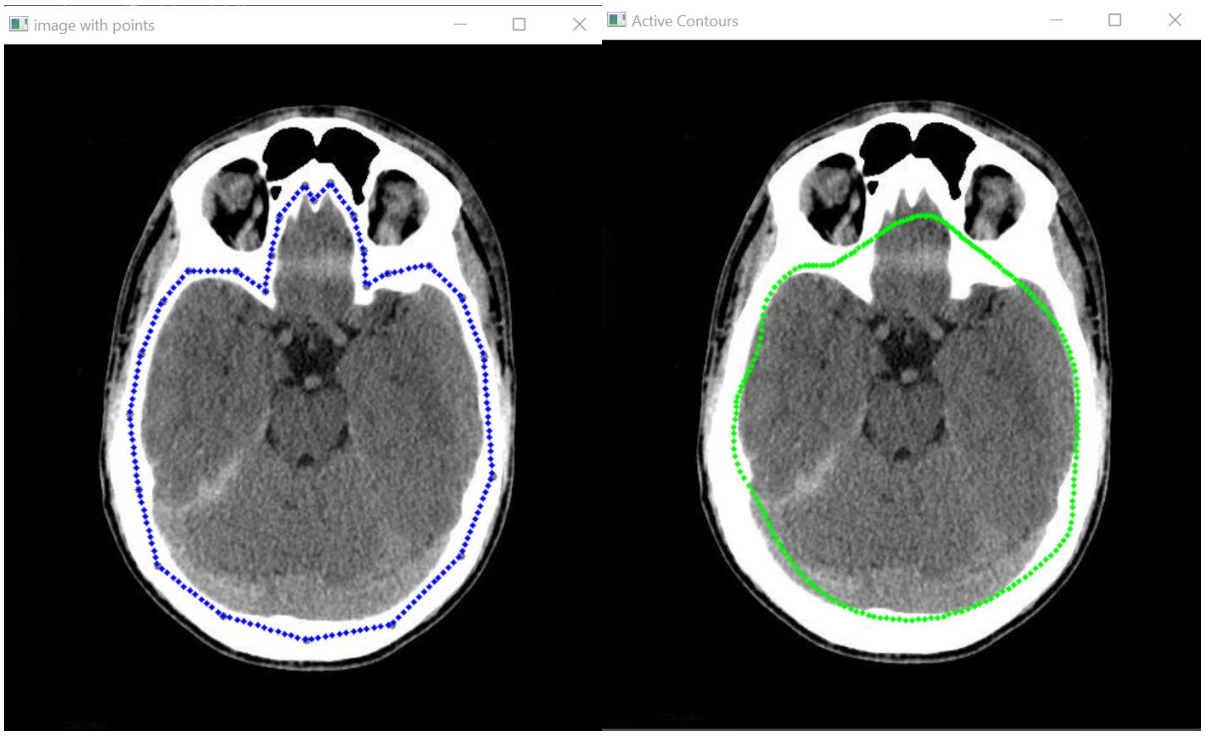


Inner contour of the brain:

```
alpha = 0.2 #tension
beta = 1.0 #smoothness
gamma = 0.5 #step-size
kappa = 1.0 #external factor
num_points = len(xs)

#get matrix
M = get_matrix(alpha, beta, gamma, n)

#get external energy
w_line = 0.5
w_edge = 0.5
w_term = 1.5
```



Right eye hole:

```
alpha = 0.9 #tension
beta = 0.5 #smoothness
gamma = 0.5 #step-size
kappa = 0.5 #external factor
num_points = len(xs)

#get matrix
M = get_matrix(alpha, beta, gamma, n)

#get external energy
w_line = 0.5
w_edge = 0.5
w_term = 0.5
```

PART 2

This section shows the visualizations related to Part 2 of this assignment.

Image Reconstruction

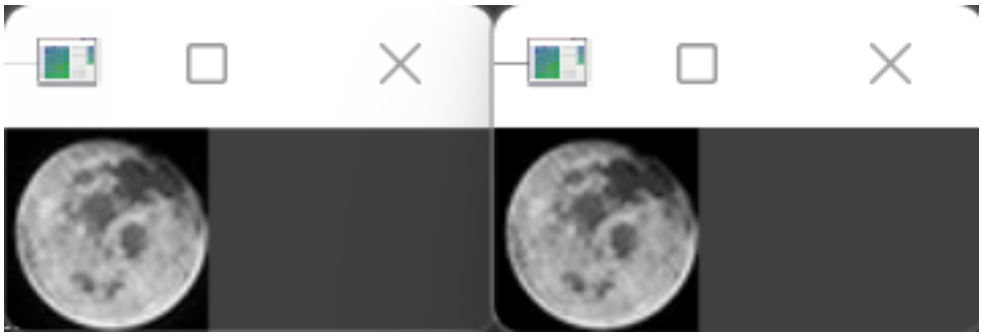
Output(s):

Taget.jpg: (const = 10)

Left: original image

Right: Reconstructed image

Error: 4.373190856240066e-12

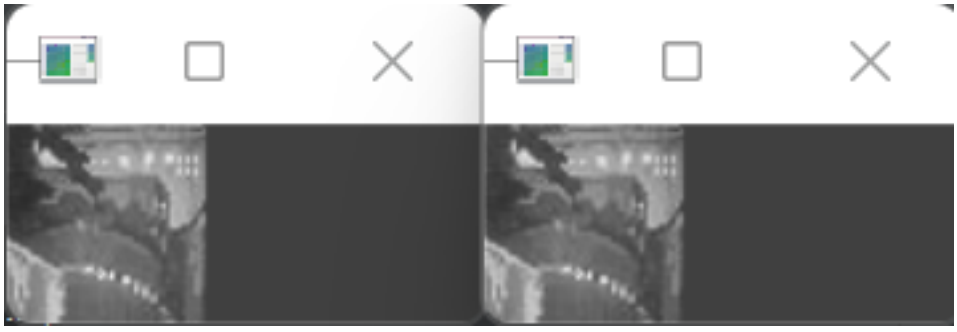


Taget1.jpg: (const = 70)

Left: original image

Right: Reconstructed image

Error: 3.69820258975494e-12

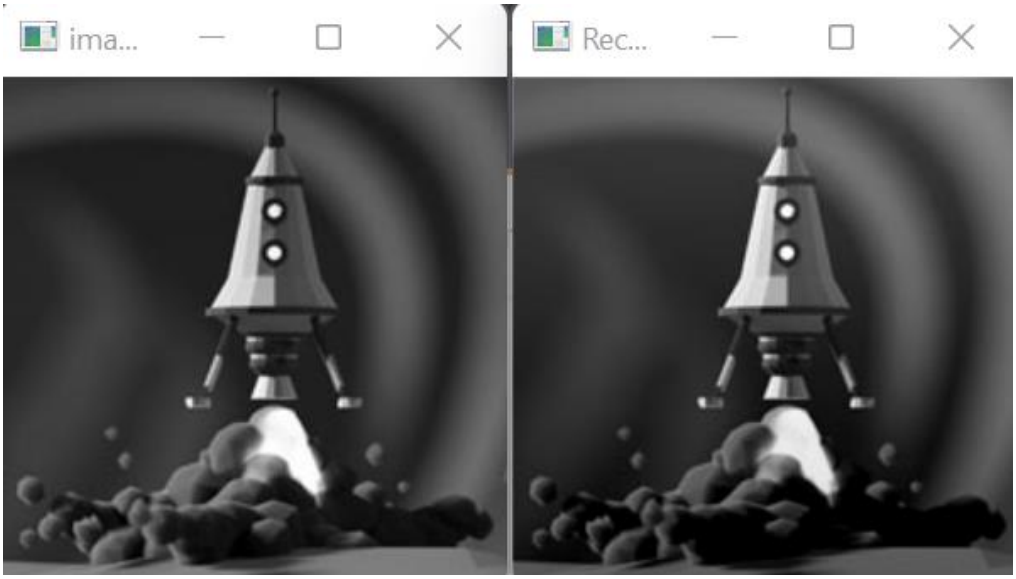


large.jpg: (const = 90)

Left: original image

Right: Reconstructed image

Error: 9.456269991851482e-12

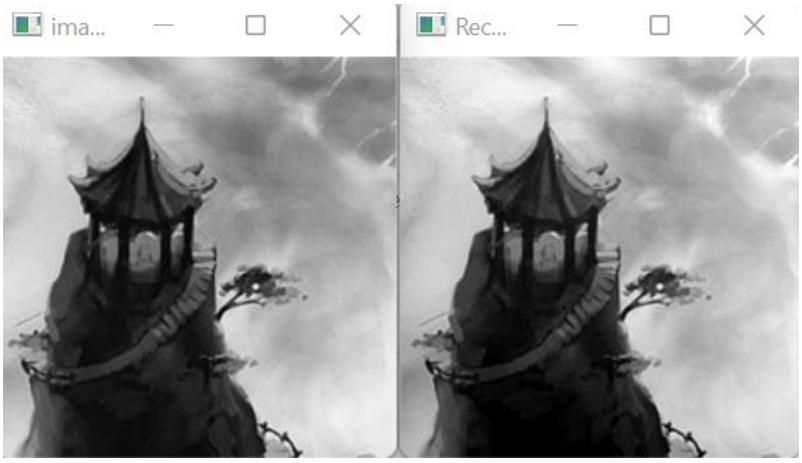


large1.jpg: (const = 215)

Left: original image

Right: Reconstructed image

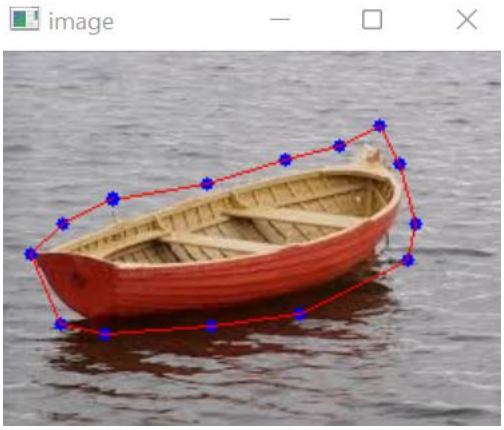
Error: 2.028438084705798e-11

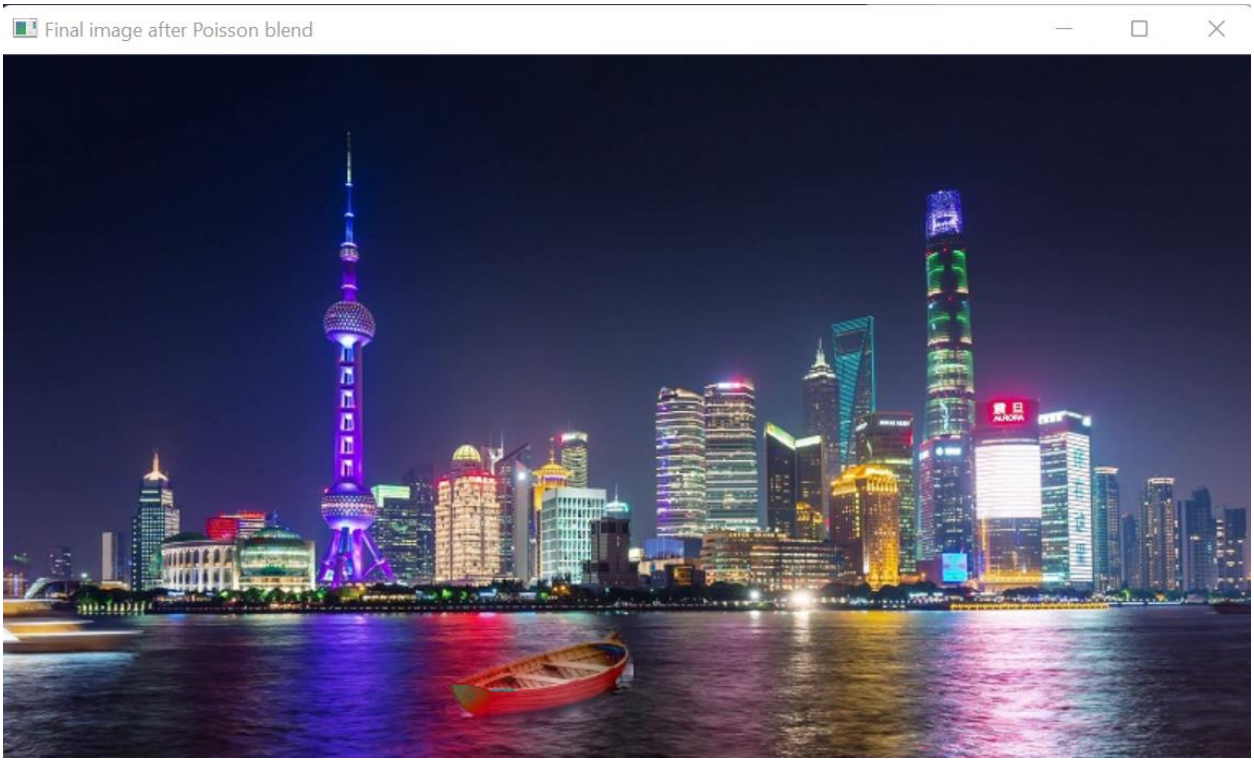


Poisson Blending

Output(s):

Visualization 1:

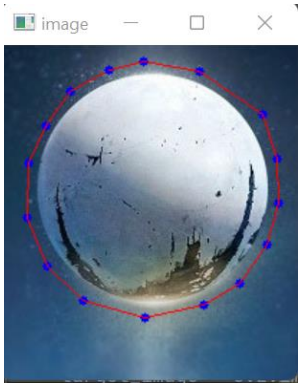


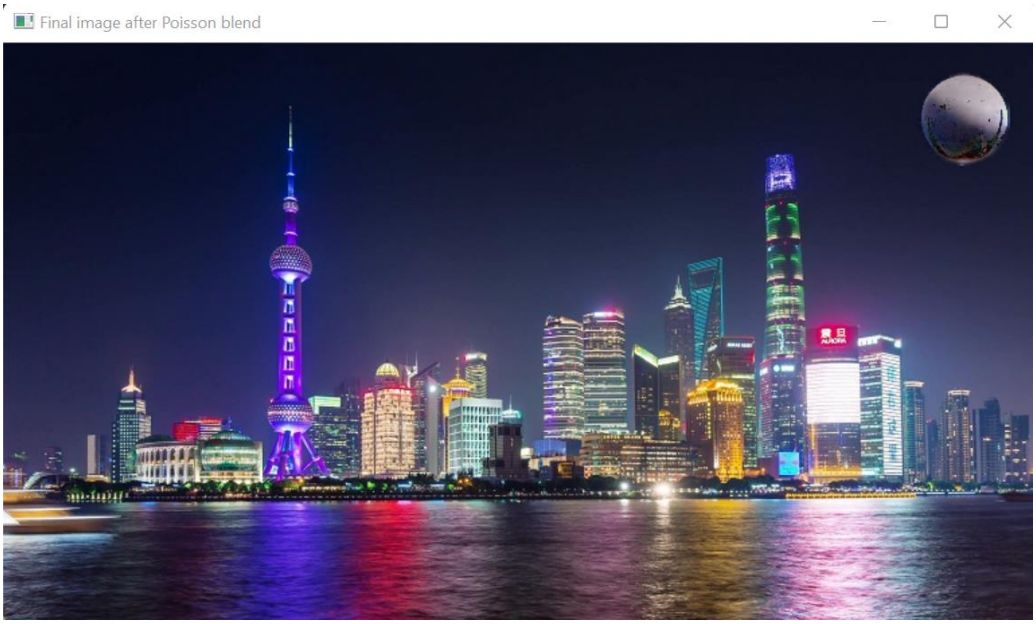


Error:

```
reconstruction × main ×
C:\Users\sanja\anaconda3\python.exe "C:/Users/sanja/Desktop/Assignment1-part2/Poisson blending/main.py"
Error in the Red channel:  5.730112243465986e-12
Error in the Green channel:  3.1597557702549405e-12
Error in the Blue channel:  3.2296520314415346e-12
```

Visualization 2:

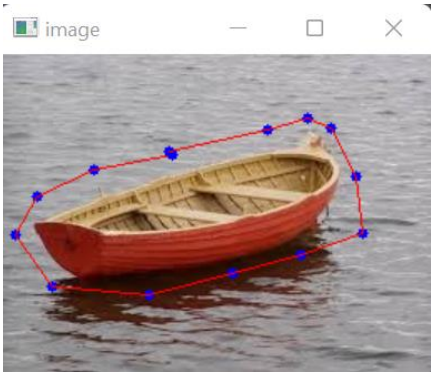


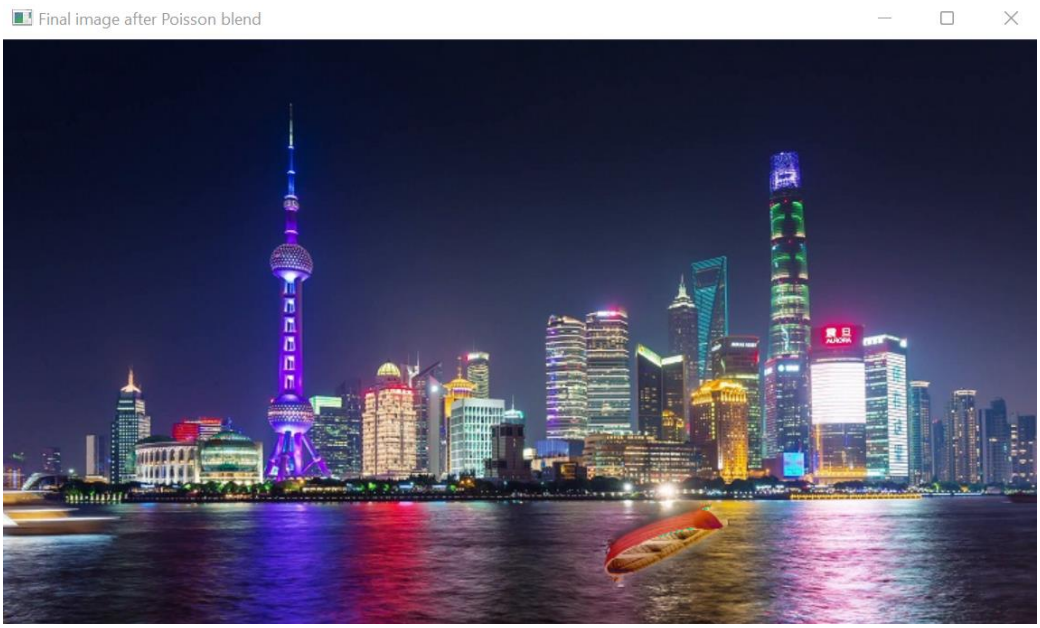


Error:

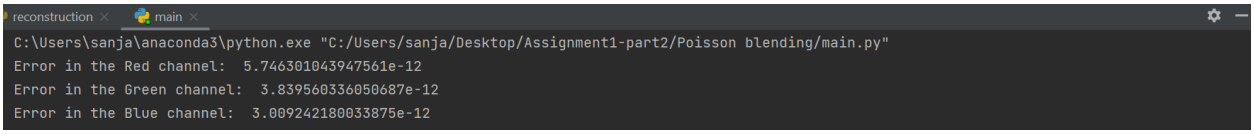
```
reconstruction   main
C:\Users\sanja\anaconda3\python.exe "C:/Users/sanja/Desktop/Assignment1-part2/Poisson blending/main.py"
Error in the Red channel:  4.479488302315642e-12
Error in the Green channel:  4.248260162276286e-12
Error in the Blue channel:  4.591103371589455e-12
```

Visualization 3:





Error:


reconstruction
main
C:\Users\sanja\anaconda3\python.exe "C:/Users/sanja/Desktop/Assignment1-part2/Poisson blending/main.py"
Error in the Red channel: 5.746301043947561e-12
Error in the Green channel: 3.839560336050687e-12
Error in the Blue channel: 3.009242180033875e-12