

Gebze Technical University

Computer Engineering

CSE 563 – 2022 SPRING HOMEWORK 01 REPORT

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Explanation:

There are 2 main functions(except library methods) such as: marker1 and marker2. By marker1, user marks corners at given source image so that functions saves the coordinates of corners in terms of homogenous coordinates. By marker2, the same stuff is getting done for the reference image(soccer_field.jpg).

In order to estimate homography, i used 2 OpenCv functions, which are findHomography and warpPerspective. findHomography function takes corner coordinates from both source and reference images and returns Homography Matrix and Mask.

Finally, warpPerspective function takes source image and Homography matrix in order to create result image as transformed image.

```
59
60
61
62 matrix, mask = cv.findHomography(SourceImageCoordinates, ReferenceImageCoordinates,cv.RANSAC) #RANSAC means Random Sample C
63
64 result_image = cv.warpPerspective(source_image, matrix, (len(reference_image[0]), len(reference_image))) #Result Image
65
```

matrix - NumPy object array				mask - NumPy object array			
	0	1	2		0		
0	1.18267	-2.11351	351.904	0	1		
1	1.63963	1.93261	-633.43	1	1		
2	-0.000491638	0.00293296	1	2	1		
				3	1		

$$\begin{bmatrix} t_i x' \\ t_i y' \\ t_i \end{bmatrix} = \begin{bmatrix} a_1 & a_2 & b_1 \\ a_3 & a_4 & b_2 \\ c_1 & c_2 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

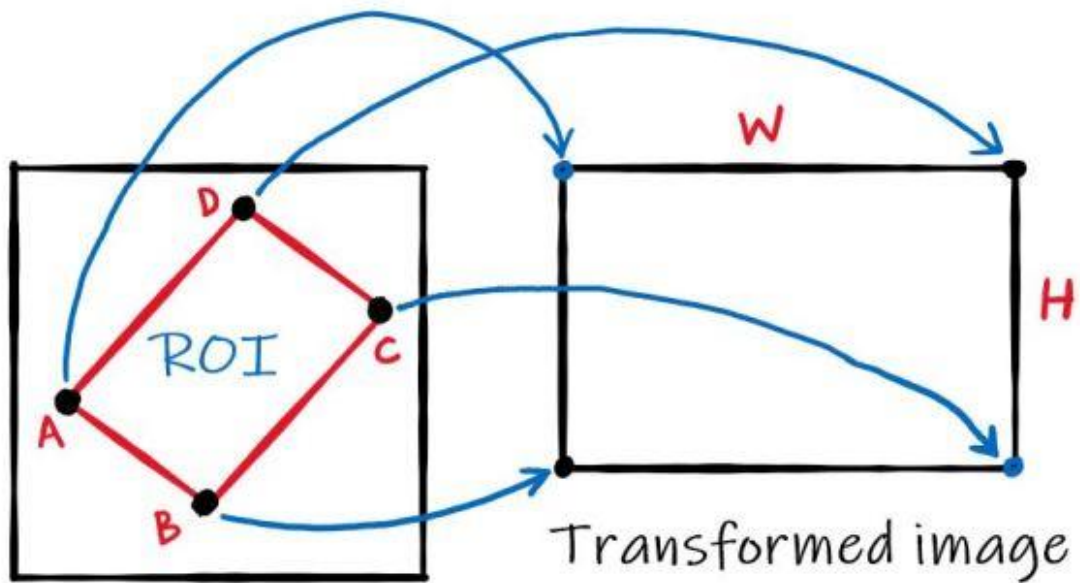
Scaling Factor

Transformation Matrix (M)

$\begin{bmatrix} a_1 & a_2 \\ a_3 & a_4 \end{bmatrix} \rightarrow$ defines transformations such as rotation, scaling etc

$\begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \rightarrow$ defines translation vector

$\begin{bmatrix} c_1 & c_2 \end{bmatrix} \rightarrow$ projection vector



Input image

Transformed image

Outputs:

