**CS-7390 - Breakout room assignment - 2**

**November 2, 2020**

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**(1) What OpenCV function is used to generate a matrix to perform a perspective transform?**

getPerspectiveTransform

**(2) How many corresponding pairs are required as input?**

4

**(3) What are the values (x,y) coords of each corresponding point pairs?**

[0, 0] - [12.8, 84.48]

[255, 0] - [230.4, 64]

[255, 255] - [204.8, 230.4]

[0, 255] - [51.2, 179.2]

**(4) What is the dimension of the matrix returned by (1)?**

3 x 3

**(5) What values are returned for the matrix here, using these points?**

[0.3729201224248184, 0.2164552760660107, 12.80000019073486;

-0.2137618459394137, 0.6019855901078708, 84.48000335693359;

-0.002085126676324565, 0.001286465596249091, 1]

**(6) What function is used to apply a perspective transformation to an image?**

Modify the program to explicitly create

cv:Mat warp\_mat = (Mat\_<double>(3,3) << a,b,c,d,e,f,g,h,i);

Using warpPerspective

**(7) Experiment with the elements in this array that correspond to a scale transformation. Change the scale factors to reflect scale values for x,y,z at 1,1,4.**

**Now Change the scale factors to reflect values x,y,z to be 0.25, 0.25, 1.  What do you observe?  Which situation reflects a projection on the the z=1 plan?   Which situation converts 3D -> 2D transformation using homogeneous coordinates?**

The image does not change when I changed the value from 1,1,4 to 0.25,0.25,1.

Since the Z element of each vertex represents the distance away from the screen/observer, I think when Z = 0 then the conversion would be from 3D -> 2D.

**(8) Experiment with translation and scaling combined to recreate this image, with the image shrunk by a factor of 4 and centered:**

I first did a scaling with (0,0) as center of my scaling. Then, I did a transistion and move the image to the center.

**A screen shot of a computer

Description automatically generated**